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Preface

This book is composed of the papers written and accepted for presentation and discussion at the 2022 International Conference on Marketing and Technologies (ICMarkTech'22). This conference had the support of the University of Santiago de Compostela. It took place at Santiago de Compostela, Spain 1–3, 2022.

The 2022 International Conference on Marketing and Technologies (ICMarkTech'22) is an international forum for researchers and professionals to present and discuss the latest innovations, trends, results, experiences, and concerns in the various fields of marketing and technologies related to it.

The Program Committee of ICMarkTech'22 was composed of a multidisciplinary group of 312 experts and those who are intimately concerned with marketing and technologies. They have had the responsibility for evaluating, in a 'double-blind review' process, the papers received for each of the main themes proposed for the conference: (A) Artificial Intelligence Applied in Marketing; (B) Virtual and Augmented Reality in Marketing; (C) Business Intelligence Databases and Marketing; (D) Data Mining and Big Data—Marketing Data Science; (E) Web Marketing, e-commerce and v-commerce; (F) Social Media and Networking; (G) Omnichannel and Marketing Communication; (H) Marketing, Geomarketing and IoT; (I) Marketing Automation and Marketing Inbound; (J) Machine Learning Applied to Marketing; (K) Customer Data Management and CRM; (L) Neuromarketing Technologies; (M) Mobile Marketing and Wearable Technologies; (N) Gamification Technologies to Marketing; (O) Blockchain Applied to Marketing; (P) Technologies Applied to Tourism Marketing; (Q) Metaverse and NFT applied to Marketing; (R) Digital Marketing and Branding; (T) Innovative Business Models and Applications for Smart Cities.

ICMarkTech'22 received about 220 contributions from 37 countries around the world. The papers accepted for presentation and discussion at the conference are published by Springer (this book, volume 1 and volume 2) and will be submitted for indexing by ISI, EI-Compendex, SCOPUS, DBLP, Google Scholar, and among others.

We acknowledge all of those that contributed to the staging of ICMarkTech'22 (authors, committees, workshop organizers, and sponsors). We deeply appreciate their involvement and support that was crucial for the success of ICMarkTech'22.

Santiago de Compostela, Spain
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Part I
Artificial Intelligence Applied in Marketing

Chapter 1
Computer-Generated Imagery Influencer Marketing—Which Ends of the Continuum Will Prevail? Humans or Avatars?



Sara El-Deeb

Abstract Although influencer marketing and marketer-generated brand anthropomorphism have been extensively studied, consumer-generated imagery influencers (CGIIs) have barely scratched the surface even though it is a rising phenomenon. This is the first study to explore the concept of CGIIs through social media platforms using netnography approach. Results indicate consumers' (1) positive attitude, (2) negative attitude, and (3) prediction to what CGII will represent in future. Common factor is that it is a distraction from reality, and if controlled and used right, it would have a massive reach, creativity, and engagement compared to 'classic influencers'. Having an emotional connection is not necessary towards humans; it could be powerful and real with CGIIs too as they show care and create relationships. The utopian scenario would be bridging the gap between physical and virtual experiences. The major worry is the ethics and moral values, in which strict regulations need to be applied. This study provides a basis of what is yet to come in the metaverse era.

Keywords Virtual influencer · Computer-generated imagery influencer · Netnography · Avatar · Social media

1.1 Introduction

Disruptive technologies and innovations changed the way businesses operate and the way consumers make decisions. For instance, social media's explosive growth has provided many opportunities in marketing. A recent study revealed that people, once they are up, spend a seventh of their time on social media. With the yearly increase of active social media users, this has caused a paradigm shift in consumer's ways of making decisions and on ways they engage with brands and organizations [1]. It gave new opportunities for brands to market, communicate, and reach their consumers.

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Moreover, as purchasing products and services online is considered risky (such as financial or product performance), consumers tend to turn to social media as part of their decision-making process [1]. Influencer marketing is one of the methods that is quite common in influencing consumers purchase decision. The industry is on the rise and is expected to grow annually by 32% [2]. One of the reasons that it is of no surprise that influencer marketing is being integrated within companies' social media strategy is that social media platforms are on the rise: Facebook has up to 2.45 billion monthly active users, YouTube 2 billion, Instagram 1 billion, and TikTok 800 million [3]. In today's utopia, computer-generated imagery influencers (CGII) are on the rise through these social media platforms. According to virtual humans [4], the industry of virtual influencers grew from nine in 2015 to over 200 in 2022; they have 3 times the engagement from fans as opposed to human influencers.

CGIIs are also called avatars, virtual influencers, and artificial intelligence influencers. Examples of CGIIs on Instagram that are anthropomorphized are Lil Miquela (3 M followers), Lu do Magalu (5.6 M followers), Knoxfrost (713 k followers), and the world's first digital supermodel Shudu (218 k followers).

Relevance of the Study

Social media has become inevitable in many people's lives, and social media influencers roles have increased as compared to pre-digital role models [5]. There is a plethora of literature on influencer marketing; however, that too is limited to quantitative methods and traditional qualitative methods. As the number of users engaging in online platforms is increasing, this study will use netnography through social media user-generated content. This research methodology exploits the capabilities of social media platforms in a cost-effective way.

Previous literature remains ambiguous with respect to defining and creating a taxonomy of computer-generated imagery influencers (CGIIs). They focused on brand–influencer relationships, types of communication objectives influencers are most successful at accomplishing, content type that works best for influencers, and effect of influencer marketing campaigns on consumer behaviour [6]. This research, however, places itself uniquely among existing research as it comes up with a novel concept that could provide a base for further exploration by academic researchers and practical professionals. Its objective is to explore the perceived benefits of CGIIs and consumers attitude and acceptance towards it. It also helps answer the question if they are more effective than humans in creating a relationship with the audience. Both brands, creators, and even policymakers of CGIIs can apply findings of this study in order to effectively plan what their future role and content will be.

1.2 Literature Review

With 3.5 billion active social media users worldwide, individuals' reliance on social media in their day-to-day lives is increasing, especially through the fastest growing platform—Instagram; as it focuses more on visual appeals and in enhancing the user

experience through stories, reels, and IGTV. It is widely used to promote products, in particularly fashion brands [6, 7].

Instagram is considered one of the most valuable platforms in meeting consumer's touchpoints when making their purchase decision. It has also proven to be a valuable platform for influencer marketing as nine out of ten marketers prefer to use it. This is due to the fact that conversion rates are higher as a result of influencer marketing [6].

1.2.1 Concept of Influencers

Influencer marketing has become a powerful promotional tool and a means of exposure and purchase for brands. Its importance is apparent since investment rate in the influencer market is growing; it was valued at $8 billion dollars in 2019 and is expected to grow to $15 billion by 2022 [8]. Moreover, 94% of marketers that ran influencer marketing gained 11 times more return in investment in comparison with traditional advertising [3].

This study draws on Hovland et al. [9] source-credibility model in identifying a successful influencer. The source-credibility theory is well established especially in the online context; it states that "people are more likely to be persuaded when the source presents itself as credible" ([10], p. 3). Plethora of extant literature has proven that influencer's credibility and their influence on people are positively correlated [7]. Three common influencer characteristics to be perceived as credible are attractiveness, expertise, and trustworthiness [11].

1.2.2 Concept of Computer-Generated Imagery Influencers (CGIIs)

The question in today's digital revolution would be, are all those influencers human voices? In this era of technological advancement, the answer is no due to artificial intelligence (AI). Artificial intelligence "refers to the broad idea that computers, through the use of software and algorithms, can think and perform tasks like humans" ([12], p. 1). A study conducted by Liu [13] conveyed that 30% of the content posted on Twitter seemingly by humans is actually created by bots using AI. Marketers incorporate AI through several methods other than bots; these include spokescharacters (which are obvious animated characters and not mistaken for humans such as Tony the Tiger) and virtual influencers which will be discussed further [12].

Influencers in the traditional sense are changing with the digital revolution in creating a sense of hyperreality in which they take new forms. This was predicted to happen by a philosopher and sociologist named Jean Baudrillard in the 1990s due to technological advancements. He explained hyperreality as the inability of

the human's conscious to distinguish between reality and simulated reality as they seem blended together. In other words, virtual reality blends with physical reality and same for human and artificial intelligence [14]. Evidently, spikes in new technological advancements like the metaverse introduced by Facebook already show the real world as being amplified by computer-generated perceptual information [15].

Hyperreality has also become apparent with the increasing popularity of CGIIs as their millions of followers are opting for artificial simulation. In order to understand the concept of CGIIs, the concept of anthropomorphism needs to be discussed. Anthropomorphism is defined as "attributing humanlike properties, characteristics or mental states to real or imagined nonhuman agents and objects" ([16], p. 865). In this context, CGIIs are made from programmers, designers, and copywriters in which the avatar they create is considered possessing human-like characteristics as they display human emotions such as sympathy (e.g., Lil Miquela participated in Black Lives Matter), affection, and heartbreak [17].

1.2.3 Blurry Lines on What Is Real and What Is Fake

Conceptualizations of attributes towards 'fake' in comparison with 'real' have become rather interesting. For instance, individuals have a liking towards Disney characters and avatars in games. Hence, it does not necessarily mean that if the object is not real and does not have a soul, means that they cannot have a connection towards them. Regardless, there is a blurry line between what is real and what is fake as CGIIs look human, act human, and dress human [3]. Also, the boundary between human behaviour and bot behaviour is becoming less and less distinct [18]. For example, Lil Miquela is gaining engagements as if she is real on Instagram; fans like, comment, and share her posts just like they would do with a real human influencer. So, on the one hand, even though she clearly is just a CGII, her identity and self-persona seem to exist just like other human online influencer identities. This raises a major question on personal identity—what are the requirements for self-existence on online platforms? Since this field is still evolving, there is no answer to it yet. However, this evolution in the influencer landscape opens up new marketing communications opportunities [8].

Based on the current top ranking CGIIs, Baumgarth et al. [3] revealed that most of the avatars are female, aged between 18 and 25 years old, with an Asian origin. Most of the content they create is related to fashion and their lifestyle. Due to the popularity of 'fake humans', luxury brands like Louis Vuitton, Balenciaga, and Prada are increasingly promoting their new lines through these avatars as shown in their Instagram pages.

1.2.4 Benefits and Risks of CGI Influencers

It is without doubt that the world of marketing is becoming digitized. Even though at first it seems utopian where more brands are adopting virtual influencers, it is of significant success. CGIIs give a sense of futurism and a connection to generation Z, hence creating buzz and being associated as innovative and 'cool'. They also never grow old, have a clear stable personality, and are flexible in time and place to advertise [3].

There is this camouflage, however, that CGIIs are of lower costs and that there is reduced likelihood that they will be involved in any scandal. On the contrary, Thomas and Fowler [12] argued that they often cost more than human influencers. Real influencers could just take a selfie and post it, whereas CGIIs need to hire 3D artists [19].

Another point is that CGIIs too could cause trouble; for example, one of the incidents, Lil Miquela was called out for queerbaiting. Given the controversies, it is estimated that 50% of content will be developed by machines as technology keeps advancing and algorithms keep getting smarter [12].

Another issue would be the question if this trend of virtual influencers will continue or will they be seen as boring in the long run; as at times, the flaws of human beings are what rises the public's interest [20]. Finally, CGIIs do not fit in all industries, for instance, in skin care products [3].

1.2.5 Form Realism versus Behavioural Realism

It would be assumed that humanized CGIIs like Lil Miquela would be more effective than animated CGIIs such as Hatsune Mike. However, many fictional characters in games and movies have been favoured by individuals. Therefore, it is not by character design, but by authenticity, transparency, credibility, and moral principles [20]. This raises the question of whether the realism of avatars in terms of behaviour or form or both together are important for the development of virtual environments. Miao et al. ([21], p. 71) defines form realism as "the extent to which the avatar's shape appears human, while behavioral realism captures the degree to which it behaves as a human would in the physical world".

The level of form realism and behavioural realism depends on different situations for the avatar to be most effective [22]. There are four categories of avatars: (1) superficial avatar—high form realism and low behavioural realism: They have high anthropomorphic appearance compared to low social intelligence. They are effective in things that required low-risk transactions like answering enquiries on bank account information. (2) Intelligent unrealistic avatar—low form realism and high behavioural realism: In this case, the avatar has cognitive and emotional intelligence but does not look human (more of an animation). It could be effective in complex situations that involve personal information, knowing that the non-human agent could

not judge the customer such as assessing posttraumatic stress disorder symptoms. (3) Simplistic avatar—low form realism and low behavioural realism—in other words, the avatar has neither anthropomorphic appearance nor intelligence. This too could be effective in situations that are hassle free and convenient such as providing travel information 24 h per day. (4) Digital human avatar—high form realism and high behavioural realism: This avatar provides good customer experience through high level of cognitive, affective, and social intelligence such as Lil Miquela [21].

1.2.6 Digital Ethics of Computer-Generated Imagery Influencers

Generally, technology is advancing faster than the law itself; so, given that rate of increase, standardized ethical codes are lacking [23]. Evidently, the emergence of CGIIs has created a set of issues that need to be addressed in the industry of influencers regarding authenticity, credibility, and transparency, given that CGIIs are fabricated [8]. From an ethical perspective, it is important for the CGII to let their followers know that it is a robot in their biography. Baumgarth et al. [3] stated that 41% of individuals visited CGII profiles did not notice they were not real humans.

From the perspective of ideal body image, previous research has shown that social media plays a factor when it comes to thin ideal body image. Among several other factors, it influences individuals' self-esteem, dissatisfaction with their body, and on one's self-image. This could lead to depression, over-exercising, eating disorder, and many more [24]. It is not proven or tested yet, but it is possible that these effects will be further intensified with CGIIs as they are mostly women and present the stereotypical ideal body shape and beauty standards.

1.3 Methodology

Due to the rise of the Internet, new methods of quantitative and qualitative research have evolved. Part of qualitative research is ethnographic approach which dates back to the 1980s. Basically, it is the study of people in their own environment; this could be done through observational methods and face-to-face interviews. As the technological advances have evolved and the world has become more connected through the Internet, opportunities have risen in the amount of qualitative data that can be collected through social media. Such data includes consumer-to-consumer interaction in online groups or from a brand's page or conversational data [1]. It is termed as netnography; it was introduced by Kozinets in the 1990s, and the author defined it as "a new qualitative research methodology that adapts ethnographic research techniques to study the cultures and communities that are emerging through computer-mediated communications" ([25], p. 62). Therefore, netnography

is considered ethnography but in an online platform. It is less costly than ethnography, less time consuming, and unobtrusive as the netnographer could have an observational role without interacting with community members. Yet, netnography has its limitations; for starters, it is difficult to know the participant's demographic information such as age, gender, and ethnicity. Also, ethical code of conduct of this research technique is questionable [26].

Netnographic Research

Netnography is conducted in four steps, similar to the stages of ethnographic research. The steps are (1) developing a research plan and establishing entrée, (2) data collection, (3) analysis and interpretation of results, and (4) ensuring ethical standards. The netnography process in the current study lasted for more than 2 years (from January 2020—July 2022), in which the researcher observed major CGIIs and gathered consumer insights from social media data.

1.3.1 Developing a Research Plan and Establishing Entrée

In this stage, research questions are formulated and the appropriate platform to collect the data is identified [27]. This study attempts to explore people's perspective on CGII and if they see them evolving in future, or is it just a phase? Hence, the research questions are:

RQ1: What are consumers attitude towards CGII?

RQ2: Are CGI influencers the future of influencer marketing?

1.3.2 Data Collection

There are three types of data collection techniques in netnography research proposed by Kozinets et al. [28] which were all used in this study; archival, elicited, and field note data. **Archival data** is the secondary use of data already existing on the Web; it is unobtrusive and due to passive monitoring, it is free from researcher bias. Hence, data was collected first through the use of the search tool on Facebook using keywords 'Virtual influencer', 'CGII', and 'Avatar' in order to observe in which groups the topic has been brought up in. Turns out it is not a common topic yet on Facebook and Instagram, however, there are many CGII accounts. The topic for CGII is more common on LinkedIn making several headlines such as:

> *Virtual influencers are set to revolutionize influencer marketing, by becoming more human-like characters with flaws, opinions, and struggles.*

Finally, on Instagram, the progression of CGIIs (Lil Miquela, Imma, Shudu, Lil Wavi, and Bermuda) over the past 2 years has been observed and there was a noticeable exponential increase in the number of followers and connection towards CGIIs throughout time.

Costello et al. [29] indicated that the whole point of netnography is to have human presence within the study; this could be either by lurking in online conversations or by being an active participant. Accordingly, this highlights the importance of the second type of data collection: **elicited data**. This approach is when the researcher does online interviews and participates in online communities and chat groups. Regarding the online community, they need to fulfil a certain level of characteristics rather than collecting data from basic online commenters. Whalen describes online communities as "a social network or tribe of consumers who engage in online interaction via computer networks" ([30], p. 3429). In addition to the interactions and familiarization with other group members, there should be a shared social environment in which consumers participate in discussions on topics with shared interests [30]. The researcher blended in the community groups on Facebook being an active participant. Active members on Facebook community groups entered are mostly females in the age group of 25–40. The accounts were selected based on the number of members in the group and the level of interaction; however, there was not much interest in the topic. On the contrary, the topic on LinkedIn is booming.

On LinkedIn, the researcher with a follower base of 7000 members asked the below question, to boost a debate about the topic:

> *Are virtual/ robot influencers the future of marketing? They have an average of 2–7 Million followers on Instagram and are sponsored by Prada Group, Gucci, Louis Vuitton, Balmain, Christian Dior Couture and many other companies! How is it that the recent trend is looking for personal interaction with brands, but then our world is becoming led by artificial intelligence? Which end of the continuum will win?*

The final approach is **field note data**; it is almost the same as elicited data but more natural and is based on observations of participant's interactions; the data collection could not be as controlled as in elicited data. However, the researcher needs to be immersed as long time of a period as possible in order to understand the culture and community [10]. Field notes were collected from the very start till the end of netnography; this includes posts, dates, comments, and discussions.

The researcher observed conversations on #virtualinfluencer and #avatar and #consumer_generated_imagery_influencer across three most commonly used social media platforms: Facebook, Instagram, and LinkedIn. Comments were collected, until they were redundant, reaching 310 comments.

1.3.3 Analysis and Interpretation of Results

In order to conduct content analysis to a qualitative data, a manual approach was used to analyse the collected data. This is considered a suitable approach for reasonable

sized data [31]. The researcher used MAXQDA programme in order to use Word Cloud (as shown in below) to help code the data. Cosh et al. [32] indicated that content clouds simplify the user-generated content through simply classifying it visually.

The researchers followed an inductive thematic approach through summarizing data and then generating categories that are then labelled as 'codes'. Coding helps the researcher then identify the themes [33]. After reviewing the comments and sorting out the data using MAXQDA software, codes were extracted as given in Table 1.1. This helped facilitate the data into two main themes: (1) attitude towards CGIIs and (2) predictions of the future. Furthermore, summaries of each theme were generated.

Under each theme, common comments were the following codes and common comments:

Positive attitude towards CGII

Humans better sympathize with cartoony animated people over realistic ones.

This industry will see fundamental disruptions and technologies that break through the clutter.

Virtual influencers will give brand's greater control over its content and the influencer's 'persona'.

This truly is game changing. We'll see more virtual influencers in the metaverse with enormous reach.

Negative attitude towards CGII

The line between what is real and what is not continues to blur.

Here's why body-shaming in the metaverse is inevitable!

Table 1.1 Themes and codes developed from comments on CGII's

Theme	General code	Description/Components
Attitude towards CGII	Positive attitude towards CGII	Advancement, greater control, fascinated, enhanced humanity, talented, exciting, emotional connection, marketing campaigns
	Negative attitude towards CGII	Scary, unemployment, deep fake, sensationalism, flawless realism, takeover, major disruptions, strange, impossible beauty standards, algorithmic nudging, handling art and music
	Uncertainty	Effect, high maintenance, blurry reality, authenticity, AI or human control, ethical concern
	Indifferent	Influencers existing algorithm, powered by humans, brand sentiment, cartoon characters sold products
Predictions of the future	Forecasts	If factor, future challenges, concerns, transitions, shifting industry paradigms, passing fad, human loneliness, self-image/self-esteem problems, CGII new normal
	Suggestions for development	Bridging between physical and virtual, strict regulations, morals and ethics

Fictional characters now have access to 'human filters' when they take selfies… just like human characters use filters to look fictional.

How much platform censoring, algorithmic nudging, manufactured consent, and self-censorship does it take before we're not even real?

Deepfake, AI and super realistic CGI can be very powerful tools. Scary.

It's important for our children to have REAL life human role models and those with the right values in place.

Indifferent

It's all about brand sentiments whether it's a human/robot the winner in this race is the 'need satisfaction process', and let's all remember 'behind a great robot, a joystick'.

Much of the core design for social media is built on a premise of users basically crafting their own avatar-like personas.

Humans always get scared when a new technology comes out. And for good reasons. But in a few years it's just going to be as common as anything else.

From cartoons to novels, characters have been selling products for years. Just ask Disney; Just another iteration of that.

Forecasts

Will also be in 3–10 years the fallout that happens when people start accusing these 'idealistic' identities of causing self-image/self esteem problems in children and adults.

It will shift industry paradigms and outdated norms.

Suggestions for future development

Bridging the gap between physical and virtual experiences: that's our sweet spot.

This will bring big challenges to distinguish reality from virtual, AI should be more responsible through strict regulations since influencers have huge impact on the act of teens and young youth.

We need to maintain some level of morals or ethics when it comes to humanizing robots or virtual humans.

1.3.4 Ensuring Ethical Standards

As conducting online research is different than physically conducting it offline, the researcher should provide full disclosure and confirm confidentiality of the data collected and anonymity of participants. Cloaking researcher presence in order to gather data is seen as deceptive practices [30]. In the current study, the observer mainly collected comments without actively participating. Only when the researcher got involved in writing a post, it was clearly stated that it was for research purposes.

1.4 Discussion and Implications

From a theoretical perspective, it synthesized scarce literature on the topic. While limited studies explored the benefits and risks associated with CGIIs [17, 21], none have explored consumer's perceptions and attitude towards CGII using netnography. Accordingly, this study explores consumer's attitudes and their predictions for the future: Will humans or robots prevail?

From a brand management perspective, CGIIs provide a vast opportunity for businesses when it comes to creativity, engagement, and reach in comparison with 'classic' influencers. Also with a team behind the CGII, it could participate in several conversations simultaneously. Currently with AI-driven virtual beings, they can be automated, powered by artificial intelligence, and be personalized for every user in the metaverse. Another implication for marketing managers is the risk management; CGIIs can be controlled—no scandals and no bad public behaviour. Finally, a common comment regarding CGII is that it is the future; better adopt it sooner than later.

CGIIs manage to tap into consumers emotion and connection, hence increasing their acceptance rate. As Mrad et al. [34] indicated, when their features become more human, and as they act more human, the more authentic and trustworthy CGIIs are perceived as. By time, consumers feel an emotional connection to them and care about them. For example, one of the comments was "Siri pops-ups when I'm doing research and gets me the data I need when I'm driving; she plays my best songs when I need that. Organize my agenda when I need that, and before I sleep she tells me stories of rolling stones and fairytales…I'll be telling her okay, Love you darling". This proves that 'real life' is not part of the criteria of being humane—but authenticity and storytelling are what matters. Consequently, as a managerial implication, brands really need to embrace the approach of having a carefully curated ideology for the CGII in terms of its lifestyle and personality. This could become a huge asset for companies that create their own ambassadors that embody brand values.

On the other hand, distinguishing between virtual and reality is blurry; consumers are finding it exciting but scary. To a point of questioning how far software engineers will go with algorithmic nudging? Another major point is the unrealistic beauty standards of CGII's, as they create even more unattainable models of beauty, lifestyle, and success leading to depression and feeling of loneliness. Companies need to focus on more realistic versions of CGIIs and make it have flaws. One of the comments stated "the true digital natives—GenZs, are wary of machines and lean more towards human touch and application. They appreciate imperfection" [35].

Finally, there are research opportunities within the framework of this research that was not covered; for example, aside from influencers—how could avatars be used to improve the productivity of employees in corporations in the service industry? While the phenomena of CGIIs have certainly raised more questions than answers, one thing for sure is that it is here to stay. Accordingly, the advertising industry needs to adapt and evolve and so do digital campaigns, marketing agencies, and brands.

1.5 Conclusion

This is the first study to adopt netnography research for CGIIs. It bridges a gap between the literature and practice, by conducting an exploratory study through netnography. The researcher collected data through archival, elicited, and field note data, reaching a collection of data from 310 comments. Two themes were derived: attitude towards CGII and future prediction. Some comments were positive, indicating CGIIs could be more controlled and are safer for brands, whereas other comments were negative, indicating sensationalism, algorithmic nudging, flawless realism, and impossible beauty standards that could lead to depression. Others were either indifferent or uncertain towards the concept. As it is a new concept, there are its uncertainties, especially regarding morals and ethics. Hence for the second theme of future predictions and suggestions, there needs to be strict regulations, especially that technology is advancing faster than laws and regulations. The ultimate utopia is bridging the gap between physical and virtual experiences.

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Chapter 2
The AI Evolution in Marketing and Sales: How Social Design Thinking Techniques Can Boost Long-Term AI Strategies in Companies and Regions

Margarethe Überwimmer, Elisabeth Frankus, Laura Casati, Shauna Stack, Tomáš Kincl, and Lucie Sára Závodná

Abstract Modern corporations are integrating Artificial Intelligence (AI) into their realities and facing challenges; lack of AI-focused strategy, poor data management, and mistrust towards this new technology hinder the success of a solid AI integration (Duan et al. in International Journal of Information Management 48:63–71, 2019; Mikalef, P., Gupta, M.: Artificial intelligence capability: Conceptualization, measurement calibration, and empirical study on its impact on organizational creativity and firm performance. Information and Management 58(103434):1–20, 2021). In this study, the authors have developed the Social Design Thinking Lab technique to investigate further the matter of AI barriers within the regions of Upper Austria, Vienna, and South Bohemia. The innovativeness of this paper lies in the confluence of three significant aspects: the role of AI technology, its impact on business, and the consequent argument of trust in AI applications. Findings differ according to the investigated target groups: regions and policymakers, AI developers, and companies. Nevertheless, common learnings point to a strong focus on change management and collaboration with regional institutions to get the most out of one's corporate AI strategy while making sure that the main ethical issues surrounding AI are discussed.

Keywords Artificial Intelligence · Marketing · Sales · Social Design Thinking

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2.1 Introduction

Artificial Intelligence (AI) implementation presents businesses with opportunities and obstacles that become interesting for research. With a focus on marketing and sales, these business contexts involve a confluence of interdisciplinary aspects which come into play during AI implementation and require complex resource planning, appropriate knowledge, and skills to prepare companies for the necessary change management [1]. The authors take an innovative approach by combining three perspectives on AI implementation—technology, business, and ethics. This triangular way of approaching AI highlights the need for companies to be aware of data management and adapt the entire organisation's mindset towards accepting AI in collaboration with regional entities that can support their AI growth. The objective of this paper is to investigate the barriers and needs that companies face when implementing AI. The second objective is to reflect on the various implications of such choices. Therefore, the main findings of the AI Social Design Thinking Lab, implemented during the INTERREG project AI Social Design Thinking Lab (AT-CZ 271), are highlighted. The first part of the paper contains the theoretical frame regarding the barriers and the ethical concerns surrounding AI. The theoretical frame takes into consideration the technological, business, and ethical perspectives. In the following section, the authors discuss the methodology. Before the conclusions are drawn in the final part of the paper, the authors describe their research findings.

2.2 Literature Review

The authors have analysed scientific papers to investigate the barriers which hinder the adoption of AI in corporations. To approach the issue with a holistic view, the authors set their research focus on technological, ethical, and business perspectives.

2.2.1 A Subsection Sample Framework Strategy

Artificial Intelligence (AI) is recognised by modern corporations as one of the most important technological advancements for pursuing competitive advantages and gaining efficiencies [1, 2]. It is reported that more and more organisations are adopting AI [3]; however, a surprisingly small number of organisations are in the process of integrating ad-hoc AI adoption plans into their corporate strategies [4]. Although there are abundant guidelines on how to benefit from AI, there is, however, a small number of systematic studies concentrating on the concrete challenges which AI poses to businesses—especially about the latest AI technologies [5]. According to a recent 2018 study conducted by McKinsey [6], which gathered responses from

2,135 participants representing a range of regions, industries, company sizes, functional specialities, and tenures, only 18 per cent possess a concrete strategy to solve the challenges of implementing AI. Considering that one of AI's use cases in B2B marketing is the revenue-generating process of structuring and aligning customers' data [6], and because AI is sometimes regarded as the computer-based technology for solving corporate problems in a precise and economical way [7], it is worth investigating what the barriers are which prevent AI's implementation from succeeding as a long-term strategic project within an organisation.

The most critical barriers to the implementation of AI for modern corporations are various and can occur in parallel with one another [1]. AI can be powerful, but if there is a lack of knowledge about which technology can support which (professional) activity, the selection of the most appropriate AI application can cost companies too much time [8]. The available literature has allowed the authors to divide the most relevant barriers into three categories: tangible barriers, human resources, and organisational barriers, and lastly, all the barriers which are rooted in a company's business and corporate culture.

Tangible barriers. The authors define potential barriers as all the resources which should be preliminarily available before the adoption of AI projects. The barrier lies in the lack of a tangible resource within corporations that could be crucial for AI implementation. Tangible resources/barriers span from financial availability; technological infrastructure; data and systems management [1]. The availability of the full range of tangible resources is, however, not exhaustive of the resources needed for a seamless AI integration. As an example, Ransbotham et al. [9] have found that a good dataset alone is not enough; understanding the data requirements is a crucial piece of knowledge that bridges tangible resources with human ones.

Human resources and organisational barriers: as mentioned above, when embarking on any AI project, there is a need to specify which technology should be pursued for which use case [2, 8]. Once there is a clear plan about which technologies should be used, it is important to move forward with the establishment of AI-dedicated teams [8] bringing together different influential roles within the company. Top management should be involved from the very beginning as the support of decision-makers can lead the charge for long-term AI implementation [1]. The right capabilities to progress towards sustainable AI implementation are critical, and thus, data scientists and employees possessing big-data knowledge should be recognised and leveraged; the more scattered and inconsistent the capabilities, the more a company will lessen its chances of success in durable AI projects due to a scarcity of "cognitive technology talent" [8].

Business culture-related barriers: To make sure that AI projects can scale up, the organisation needs to foster a good level of interdepartmental communication. For example, collaboration must be mastered between technology experts and owners of the business process being automated for AI projects to be successful after their pilot phase [8]. Eventually, to allow for scaling up, there is a degree of change management needed; it seems that each organisation will need to develop its own set of AI-specific resources to succeed in AI implementation [1].

2.2.2 AI Applications from a Triangular Perspective: Technology, Business, Ethics

Understanding the technologies behind AI, discerning the ones that are beneficial for businesses and understanding the value behind powerful technologies could make it easier to talk about the ethical implications that AI presents [9]. The authors, therefore, take a triangular approach to analyse AI applications in a holistic way covering the following perspectives: technology, business, and ethics.

The technology perspective. AI technologies are vast and scattered depending on their levels of development, the current trends and discoveries, and the use cases AI should be serving [10]. According to various categorizations, it is important to identify the technical type of AI being referred to as AI which can serve different purposes and benefit a corporation in different ways [5, 11, 12]. AI types range from being a rule, Machine Learning (ML), or neural symbolic integration based. ML-based AI happens when computers learn how to solve problems without specifically being programmed for them using different ways of learning like symbolic, connectionist, evolutionary, Bayesian, and analogical [13]; neural networks, on the other hand, help to build prediction models and are at the base of sophisticated deep learning models [14].

Usages of AI applications can be categorised by marketing and sales problem typologies like classification/categorization, regression, media synthesis (e.g. deep fakes), anomaly detection, clustering, and named-entity recognition. Ngai [11] states that ML technologies serve different purposes and span over the seven P's marketing mix. Typical AI technologies include: XGBoost/gradient-boosted trees for prediction and advertising management [15]; logistic regression to build chatbots [16, 17]; principal component/factor analysis for recommendation [18]; and clustering for marketing segmentation [19, 20]. Assessing ML scenarios' level of sophistication is also a topic of interest as it entails understanding how the algorithms learn and how independent AI is from the human being (supervised, unsupervised, semi-supervised, reinforcement, and active learning) [21]. There is evidence that nowadays, corporations add their familiarity with AI as part of their value proposition [22]. Subsequently, corporations need to decide which AI technologies to adopt, for which purpose, and how to evaluate the power of AI. Several criteria such as the training time of algorithms [23], efficiency or efficacy [24], and explainability [25] could guide the choice.

The business perspective: value for marketing and sales. There is a need to investigate deeper how companies harness the value of AI for their marketing and sales departments, knowing that there is already an assumed positive attitude towards adopting AI as corporations aim to become more competitive and know and serve their customers better. Having to deal with a massive database of customer information, marketing and sales are some of the departments which are most benefitting from automation, analysis, and recommendations [26].

Value for marketing: AI affects marketing in various ways but not without challenges. AI for digital marketing, for example, puts forward ethical questions of data

protection, data privacy, and general good conduct [27]. However, marketers can make use of AI to deliver personalised content and ads to the right audience, thus benefiting from high conversions from potential leads. Additionally, AI can scan and analyse large sets of both written and not-written user-generated content which is available online [28]; thus, corporations are enabled to expand their knowledge about customers.

Value for sales: Modern sales performance is highly affected by the availability of agile dashboards fuelled by predictive and forecasting capability technologies. There is a high chance that those performances could be enhanced once AI algorithms are up and running and employed for this exact purpose. As well as this, the AI-CRM seems to be a revolution that could eliminate tedious and non-efficient activities to concentrate more on the customers [6, 29]. Furthermore, AI serves sales by making high personalization possible via human-like transactions which is, once well established, resulting in accurate and low-cost sales processes [29–31].

The ethical perspective. Ethics has taken on an important role in the context of AI. Former "computer ethics" (in the year 2001), which already included topics such as privacy and data protection, transparency, accountability, bias, and discrimination, later became (in the year 2008) "ethics of AI". This new concept, which is directed to a specific technology that at the same time covers many different tools, includes stronger economic concerns as well as questions of employment and justice. ML systems raise additional questions of reliability, security, and safety [32]. Decision-making, including technical decision-making, is generally linked to ethical considerations. The belief that technology is "value neutral" misses the fact that ethical issues are always inherent in the design, selection, and use of technology [33]. The human-centric approach to AI aims to ensure that human values are at the heart of the development and deployment of AI systems. In particular, the fundamental human rights of the European Union and the Charter of Fundamental Rights of the European Union are to be guaranteed. Accordingly, consideration should also be given to the natural environment and other living beings [34].

In ethical debates around AI, attention is particularly focused on artificial decision-making (ADM) and how human decisions are delegated to ADM. Here, trustworthiness in the delegation process plays a special role, which is related to the promotion of a more inclusive, open, and democratic culture of human–environment relations [35]. Care must be taken to ensure that AI systems do not hold bias in the sense of being inclined towards prejudice against a person, object, or position. Bias can arise in AI systems during data acquisition or training through machine learning, as well as in logic-based AI systems through constructed rules by knowledge engineers. It does not necessarily have to be human bias or human-driven data acquisition. Rather, it may be that a system is only used in a restricted context and cannot be applied to other contexts. Accordingly, bias may be intentional or unintentional and may lead to discriminatory and/or unfair results (unfair bias) [34]. Since there is no objectively correct definition of fairness, only humans can be used as moral actors whose understanding of fairness is incorporated into AI systems [36].

Related to bias and fairness is the risk of asymmetric power relations or that power imbalance arises, for example, between employers and employees or AI developers

and AI users. Information asymmetries can reinforce these. Special consideration should be given to disadvantaged persons such as children, people with disabilities, who are particularly at risk. Regarding the topic of transparency, which represents one of the main key requirements for trustworthy AI (in addition to human agency and oversight, technical robustness and safety, privacy and data governance, transparency, diversity, non-discrimination and fairness, environmental and societal well-being, and accountability) [34], it is important that ethical decision-making steps are recorded for traceability to be able to understand why the system has made a decision [37]. Not only the degree of transparency needs to be defined, but also how it is communicated to whom [38].

Throughout the lifecycle of an AI system, privacy and data protection must be ensured. This includes, on the one hand, the information provided by the user at the beginning and, on the other hand, the information generated over time. The data should not lead to the user being unlawfully or unjustifiably discriminated against [34].

Companies' explanation of how AI systems make algorithmic decisions can lead to a higher level of trust among their customers. To signal credibility and increase trust in AI, companies are committing themselves to standards and guidelines. However, misinterpreted government regulations are potentially restrictive, hindering innovation. Software providers, industrial users, governments, and professional organisations such as institutions representing engineers can be understood as institutions responsible for building trust. On the one hand, software providers are obliged to develop high-quality solutions and reliable algorithms. At the same time, they depend on feedback from industrial users. On the other hand, governments or similar authorities make regulations—the ultimate authority—and thus, the power to strengthen trust ultimately rests with legislators who can enact binding laws and monitor their compliance. Society must deal with issues such as access to knowledge, social responsibility, ethical behaviour, and sustainability [39].

Even if regulations are made, an AI system will ultimately only be as ethical as the purpose of the social system in which it is used [40].

2.2.3 Pre-study on Barriers and Needs

A pre-study with 12 expert interviews conducted in Austria in 2022 illustrates that besides lack of knowledge, also proper infrastructure, resources, and missing or insufficient trust in AI applications create barriers for companies to implement AI systems in the regions investigated. Another barrier is the little willingness to innovate. Therefore, not only do more corresponding knowledge and skills need to be developed and transferred between companies, but also legal and technical frameworks must be (further) developed and distributed among EU companies. In general, AI-driven knowledge centres and testbeds, as well as support from influential policymakers and governments, can help to increase an AI-driven organisational landscape in Upper Austria, Vienna, and South Bohemia. Apart from these competencies

needed, companies must be agile and open to new technologies and management processes. This requires leaders to have a fresh mindset, the ability to acquire change management skills, and to be open to shifting priorities towards AI adoption.

2.2.4 Research Questions

Against the background of this literature and the pre-study, the main research questions for this study focus on AI barriers, needs, and ethical implications faced by companies when adopting AI into their marketing and sales organisations. They are as follows:

- RQ1: What are the needs and barriers for companies when it comes to implementing AI applications?
- RQ2: What are the ethical implications from the inside–out vs. outside–inside marketing and sales perspective?

2.3 Methodological Approach—AI Social Design Thinking Lab

The AI Social Design Thinking Lab (AI SDT Lab) was a two-day event held in Steyr (Upper Austria) in May 2022 and was designed with two main components. Sections 2.3.1 and 2.3.2 below describe the theoretical basis which inspired the design of the lab context. The first component of the lab was a showcase and demonstration of AI applications where participants from relevant target groups (Austrian policymakers, students, export-focused SMEs, and startups) could interact and test the chosen applications. The rationale behind the selection of these applications follows the Paschen [11] framework as described in Sect. 2.3.3. The second component of the lab was a discussion session, where various exercises described in Sect. 2.3.4 were used to encourage reflection and discussion from participants. This second component was intended to use the experiences from the first part as input to reflect on the various organisational and ethical challenges which were identified in the literature and pre-study as obstacles to AI implementation.

2.3.1 Social Lab

The scientific method of Social Labs, traced back to Hassan [41], provides the space for engaging a variety of stakeholders to find effective and dynamic solutions to complex societal challenges. In the AI SDT Lab, parts of the methodological development of Timmermans et al. [42], which is defined by six characteristics ((1), social

labs offer a space for experimentation, (2), are not isolated from the outside world, (3), build on the broad participation of different relevant societal actors, (4), are designed to be multi-and interdisciplinary, (5) systematically support finding solutions and the development of prototypes, and (6) pursue an iterative, agile approach) and [43] in combination with methods from the Design Thinking Lab, were incorporated. The authors see this approach as appropriate for R&I processes considering the different dimensions of the concept of Responsible Research and Innovation [44] to make stakeholders mutually responsive to each other and to share responsibility for anticipated research and innovation outcomes.

2.3.2 Design Thinking Methods

In the study, the Social Lab is combined with existing Design Thinking techniques, coming up with an original methodology to investigate the study respondents' feelings towards AI applications and their adoption in a corporate context. The choice is reinforced by Davenport's [45] statement regarding organisational redesign when integrating a cognitive project into an organisation—a process that can benefit from design thinking techniques. The preconception of Design Thinking dates to the 1960s; today, however, the main advocates of design thinking are the consultancy group IDEO [46]. The idea behind Design Thinking is to give people the tools to come up with great solutions for business by taking care of available resources, technology allocation, and feasibility of the whole project. Because it has been argued that design thinking techniques work for business [47], this study builds on the premises of these techniques to come up with innovative ways for the target group to brainstorm, discuss, and visualise topics regarding AI adoption in a corporate reality.

2.3.3 AI Applications for Marketing and Sales Along the Sales Funnel

As Ngai [11] points out, the benefit of AI technologies can affect different stages of the marketing journey. The Paschen [11] framework is called "Artificial and human intelligence for value creation in B2B sales". For this study, the authors adjusted this framework to be used in the AISDT Lab (Table 2.1). Over a period of two months, the authors selected a total of thirteen AI applications and categorised them according to their original interpretation of the AI-enhanced sales funnel [2] in a three-step process: firstly, scouting marketing and sales AI applications that were available on the market at the time of the study; secondly, shortlisting only those AI applications fitting into Paschen's [11] categorisation of the AI-enhanced sales funnel; thirdly,

final selection based on the following criteria: availability of the application, accessibility (licencing costs and collaboration of AI developers), customisation (marketing and sales focus and low code).

Description of the shortlisted AI applications. The authors selected thirteen applications following diverse criteria. To instruct all study participants and sum up the findings regarding each AI application, the authors created thirteen informational sheets summing up the most relevant information for each AI application. Following

Table 2.1 AI applications matching the marketing and sales funnel (based on Paschen [11])

Stage in the sales funnel	Marketing and sales use cases (#)	Underlying AI technologies used	Level of expertise to use an AI application	AI-enhanced values for sales and marketing
1. Prospecting	Lead generation, lead qualification, market research (4)	ML-(un)supervised, neural networks, clustering, recommendation engines, logistic regression, NLP, human in the loop, integration experience	From intuitive AI applications to applications that need guidance from the AI developer	Automation and verification of lead qualification, faster and more precise market research, and competition analysis
2. Pre-approach and approach	Content marketing, in-ear translators (5)	Deep Learning (DL), language recognition and processing, ML, NLP	Intuitive AI applications, no coding skills needed	Automation of SEO-sensitive content creation, efficiency in content marketing, automatic translations in more than 30 languages
3. Presentation	Eye tracking analysis applied to advertising efficacy (2)	DL (artificial neural networks)	First guidance of AI developer needed	Consumer behaviour/ neuromarketing, usability testing (UX, website, apps), advertisement
4. Overcoming objections and closing	Salesforce training, real-time AI customer advisors (1)	Automatic speech recognition, ML, language processing	First guidance of AI developer needed	Smart post-call analysis to enhance sales, up-selling, cross-selling
5. Follow-up	A chatbot (1)	Conversational AI, ML, NLP	Intuitive AI application, logical thinking needed, low code	Customer communications

the above categorisation (Table 2.1), the study participants were able to expand their AI applications' knowledge, specifically gathering the following facts:

- Basic information of all shortlisted AI applications (name of the application, location and application's description, date of application's entry to market in years).
- Underlying AI technology/technologies used.
- Stage within the sales funnel/customer journey.
- Description of the use case/s.

Those facts entail the understanding of the application's role within the sales funnel, the used AI technology, the capabilities to use each AI application, their use cases for marketing and sales, and finally, the value for the company when adopting the AI applications. One missing aspect within the above categorisation lies in the ethical implications that derive from the adoption and usage of AI applications. To dig further into this fundamental aspect of AI adoption, therefore, the authors have chosen a selection of AI SDT Lab techniques to expand the topic of trust in, and ethical considerations about, AI applications across the different selected target groups.

2.3.4 Description of the Techniques with Exercises for Reflection

The second component of the Social Design Thinking Lab included exercises to motivate reflection on the first part of the lab, the showcase of AI applications. The exercises for stimulating discussion were as follows: Exercise A focused on an exchange of AI experiences between fellow participants within their physical proximity, followed by documentation of the keywords from the discussion. Exercise B, using the so-called "Disney method", involved participants taking on the role of either dreamers, critics, or realists. These roles were meant to provoke the imagination of what will come, the ethical implications of these changes, and the practical implications of these changes, respectively. Exercise C was about perspectives, as scenarios involving the introduction of AI were presented and participants were assigned different roles in an organisation and were tasked to discuss their points of view regarding AI implementation. In Exercise D, participants engaged in a gallery walk with each station of the gallery representing a specific target group (AI developer, SME, policymakers, and wider society) and were asked to notate reflections on each point of view as it relates to making AI more attractive for companies. Lastly, in Exercise E participants responded to a quantitative survey about their increase of awareness, inclination towards, and trust in AI after the AI SDT Lab.

2.3.5 Description of the Target Group

Four selected target groups are participated in the AI SDT Lab: companies (SMEs and startups) and policymakers located in Austria consisting of 45 representatives; 13 part-time master's degree students, and 35 pupils aged 16 and 17 years.

2.4 Findings Based on the AI Social Design Thinking Lab

In this section, the authors describe the findings gained during the AI Social Design Thinking Lab. First, perceived barriers and needs of companies are presented before Ethical implications are discussed.

2.4.1 Level of Awareness

This section will first describe the level of awareness about AI the participants reported during Exercise E, which took place during the final stages of the workshop. Based on the results from the survey, the participants' awareness increased somewhat after participating in the AI SDT Lab, with a majority of 48.3% of company respondents rating their increase in awareness a 3 out of 5 and 41.4% rating their increase a 2 out of 5. Compared to the company participants, the students reported less increase in awareness after taking part in the AI SDT Lab, with a majority of 79.4% rating it 2 out of 5 and 11.8% rating it 1 out of 5. These results demonstrate that across both groups, participants came in with some level of awareness about AI, with most students and roughly half of company representatives experiencing a small increase in awareness after the lab. Comparatively, the company representatives reported more increase in awareness, with no respondents giving a ranking of 1, whereas the student's second most frequent response was a 1, suggesting that the AI SDT Lab made no increase in their awareness of AI.

2.4.2 Barriers and Needs to Implement AI Applications in Companies

Participants discussed different barriers hindering a seamless AI application in the context of Austrian corporations (SMEs and startups). The study's objective was to investigate what modern corporations need to succeed in the advancement of their digitalisation processes and increase their competitiveness. Attempting to address the study's first research question (RQ1), the authors provide insights on barriers and needs by analysing the topic according to the study's results. Possible improvement

scenarios based on confronting existing organisational models are put forward in Sect. 2.5.

Barriers that companies face to seamless AI adoption. The study participants identified both organisational and competence-specific issues. Barriers like lack of trust and concerns about data management, however, are also top of mind. If companies wish to enhance their businesses with AI technologies, they should also change their managerial approach and demonstrate an AI-first mentality across all corporate units. The lack thereof will result in organisational barriers and in the incapability of companies to be ready to accept the change. Top management involvement is crucial and seen as a driver to lead the AI evolution within a corporation, as well as the ability to structure or restructure teams under the needs of an AI-first logic. Lack of planning and fear of high costs originating from introducing new technology are also identified as show-stoppers.

Barriers inhibiting companies to succeed in the AI evolution according to companies and policymakers. Companies and policymakers have summed up the top barriers as follows: the need for change management, the importance of understanding data and managing data in the right way, and a generally more courageous attitude towards new technology acquisition.

Barriers inhibiting companies to succeed in the AI evolution according to master students. Master students identified change management and a correct investment plan which promotes AI as some of the biggest challenges for any corporation. The willingness to share AI best practices while making AI comprehensible and accessible at the same time are some of the biggest urges and showstoppers that companies face now.

Barriers inhibiting companies to succeed in the AI evolution according to pupils. Pupils identified trust and data management as one of the main barriers. For this target group, one of the biggest barriers is also the ability to set up not deceiving tools for the customers (e.g.: chatbots that do not convey a sense of disappointment across the customer experience).

Needs to implement AI. As well as evidently trying to solve the above-mentioned barriers, needs for companies include the support of AI facilitators, responsible resources, and investment planning as well as the development of AI knowledge centres within the corporations. A remarkable need is the ability of a company to gain and keep its knowledge on data including data strategy, availability, and quality. Whenever there is control over data, it will be easier for corporations to know which AI technology and tool to adopt and how to proceed with the adoption.

Needs according to companies and policymakers. The need for easier AI solutions was mentioned which could make the integration into any organisation less disruptive. To achieve this, however, there is a need to keep the AI technology in full control and to sponsor a human-driven AI approach—to sponsor the usage of AI technologies whose decisions are still driven by humans. There is the expectation of an integrated set of rules to regulate AI and its technologies to fully benefit from them.

Needs according to master students. Students believe that the utmost need for companies is to understand AI technologies and carve out their benefits at the

maximum levels. To achieve the above, AI technology awareness and education are needed.

Needs according to pupils. Like the other target groups, pupils believe it necessary to both be clear about the AI objectives and to train and educate the workforce to accept the new technologies and take advantage of them with the help of a clear set of AI regulations coming from higher political institutes.

Synthesis. The lack of a clear AI-first strategy attributed to the probable ineffectiveness of corporations to embrace a disruptive technological change and the lack of a steady regulatory framework leave companies lagging on the benefits of AI. Developing an ethical mindset towards AI and creating regulations that work and are accepted by companies is today both a barrier and a need for the future. The authors have, therefore, expanded on the ethical side of AI technologies more in detail, given the frequency of this topic in all target groups.

2.4.3 Ethical Implications

Pupils and company participants identified the ethical implications of AI in Exercise B "Disney Method" while being asked to reflect on AI critically. Attempting to address the study's second research question (RQ2), the authors can report that the ethical implications came from the perspectives of employees, company leaders, and broader society and revolved around issues of changing employee work practices due to AI implementation, legal, and company policies to mitigate misuse of AI and the role of AI in market dynamics.

Employee practices. On one hand, some participants took the stance that human employees have inherent value over AI, "Human > Machine", "connected thinking of humans not represented in AI", "human ability to make decisions", and "consideration of integral thinking". On the other hand, some participants were not as confident that employee agency and "human rights" can be assured with AI implementation and cited potential problems such as "mistake culture" and a "loss of self-determination" if boundaries between employees and AI are not properly established. Participants suggested that an "analysis of impacts of humans" should be performed when implementing AI and that AI should have "easy use" to prevent potential issues.

Legal and company policies. Participants identified ethical issues from the level of the company and the policy environment in which companies make decisions. Some of the legal aspects include issues of "liability questions", "transparency", "legal framework", "data protection", and "ethical basic knowledge". These aspects pertain to issues that can be best addressed with legal and policy measures, either at the regional, national, or even global level through new norms and standards from the business and AI community. At the level of the company, the participants raised potential ethical issues mostly related to companies' misuse of AI. Specific examples of these "questionable terms of use" provided by participants include "manipulation

through AI", "selective discrimination", "surveillance", "predictive crime", and more broadly, "AI models" which have some known or otherwise intentional misuse.

Broader perspective. On a wider, economic level, participants discussed ethical aspects of AI implementation such as "competitiveness", "data trading", and "data sovereignty" which can impact the market dynamics in which companies operate. In terms of broader societal impact, one participant raised the issue that "AI takes on the role of the human in society".

2.5 Conclusions

Dwivedi et al. [29] bring forward the argument that due to the potential application and use of AI, the implementation of AI technologies can be challenging for governments and organisations. Such challenges include social, ethical, economic, political, legal, organisational, managerial, technological, and data-related challenges. In the following, the authors reflect on these aspects for three different target groups.

2.5.1 Learnings for Regions and Policymakers

Based on the results of the AI SDT Lab, different learnings for regions and policymakers can be identified. First, more regional and national support services are needed for companies to help them plan and implement AI integration. In addition to testbeds and reflection on AI implementation to make AI more attractive, this also includes informative platforms and regular events that also promote the exchange of companies' experiences with AI. In addition, more public contact points should be made available for companies to provide help in developing corporate AI strategies which fit their specific company needs. To strengthen knowledge of AI and its application, different target groups should receive tailored AI training opportunities—as conceived in the Interreg Project (ATCZ21) AI SDT Lab—which, in addition to technical and business-related aspects, also deal with ethical implications. To promote trust in AI, regions and policymakers need to communicate the European AI ethical guidelines more actively to companies via their websites or other means of relevant communication tools which are available to their stakeholders. It can be assumed that more companies would use AI if there were (more) independent AI consultancies at the regional level that are free of charge for companies. Universities and research organisations can serve as such AI consultancies and AI translators. Establishing these is seen as a task for the regions. Finally, stronger participation of regional and national policymakers in European discussions on global AI development and AI application in companies as well as in the further development of corresponding ethical and legal implementation guidelines for companies is considered useful.

2.5.2 Findings for Companies

Companies (SMEs in the field of marketing and sales, startups, and export-driven corporations) are at the centre of the study as a target group involved in the AI SDT Lab and simultaneously as one of the study's target groups for reflection. The literature review and the high participant engagement in the study have shown the influential importance of AI nowadays and have demonstrated the benefits that AI offers for corporate realities. However, companies can still not capture the best of AI for their corporations. The authors believe that this is due to lacking a structured AI-focused strategic mindset, which could lead an organisation to adopt new technologies to benefit the corporation. The study has shown that AI still prompts fears and prejudices, probably due to issues of lacking knowledge and trust in its applications. As the Disney Method's findings during the AI SDT Lab show, a proactive change management attitude is needed to trigger and lead the systematisation of an AI-first strategy. With the whole organisation moving towards one goal, removing those significant barriers preventing companies from evolving their AI landscape within their corporate reality is easier. As Schwaninger [48] says, a company's identity is at the heart of a company's transformation with strategy, processes, and behavioural changes, including the empowerment of the workforce, which should be coordinated with the ethos of one's company. If all these factors are aligned, there is a high chance of success in implementing new technologies. As this study's findings have shown, companies need to oversee their data management and understand how data are collected to learn more about a company's customer base. Therefore, the authors support the market-oriented transformation by Wengler et al. [49] which states that success begins with an internally driven set of success factors: processes, people, and data.

2.5.3 Learnings for AI Developers

The results of the AI SDT Lab also show important indications for how AI developers handle AI: even though the scene of AI developers in Austria is growing more and more, many companies do not know about the broad AI offer. This also means that there is hardly any easily accessible information about AI systems. There arises the need for a platform that provides information about the technical aspects of AI applications as well as those related to management, business processes, ethics, and law. In addition, AI developers should support communicating how their AI systems are used in different companies. This would strengthen the trust of companies in AI systems and would also be possible via such a platform. The discussions in the AI SDT Lab have also shown that there is a great need for sustainable and transparent AI systems. It is the responsibility of the AI developers to ensure this and to make it available to companies in a comprehensible way. To provide companies with the best possible support in AI implementation, AI developers should cooperate more closely

with AI consultancies and present their AI applications to companies during events such as the AI SDT Lab, where they can directly discuss AI application opportunities with representatives of companies.

2.5.4 Limitations and Future Research

The SDT Lab was a one-off event; therefore, the study lacks any comparison research. The authors, at this stage, believe it important to reiterate the study perhaps also taking into consideration the findings drawn by the study partners in South Bohemia. Another limitation is that companies who responded to the study have already expressed an interest in the topic of AI, whereas the companies who are more reluctant and behind on the process of AI adoption have not been part of this specific study. Future research should involve companies in various stages of their AI awareness. Therefore, more effort is needed on the researcher's side to involve companies which are less interested in AI. The authors will further test the triangle of technology, business, and ethics with more companies, public institutions, and other targeted public domains.

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Chapter 3
Creating a Well-being Index for a Company Using Customer Sentiment Analysis



Orlando Belo and Ricardo Milhazes

Abstract Companies know that it is essential for their well-being to know their customers, the way they act, and the opinions they have about the services provided to them. Today, many of these opinions are posted on social media, which allow for expressing opinions freely and in many cases without great control. As such, they receive messages revealing very curious elements about the services companies provide. Spite being often not very reliable, most of the messages reveal true opinions, in which sentimental manifestations are incorporated. When properly evaluated, they support positively or negatively the opinion expressed. In this paper, we present and discuss a system for analyzing customer opinions about services provided by a hotel, which has the ability to identify sentiments expressed in the opinion texts and establish a well-being index for the hotel. Using the index, it is possible to know the "image" of the hotel to customers, according to the opinion elements identified by the system, which can help to reduce risks, identify emerging trends, and contribute to increased revenue or adjust hotel marketing actions.

Keywords Customer analytics · Customer opinion analysis · Service assessment · Sentiment analysis · Natural language processing · Machine learning

3.1 First Section

The emergence of social networks promoted a new model of communication and sharing of opinions, which quickly spread to the most diverse business areas [1]. The information generated daily in social media is enormous. The way people share their opinions and discuss the most diverse subjects is extraordinary. They use their

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knowledge combined with their closest people transmit to them or with what they acquire on the numerous sites they consult, often in a daily basis. In this world of sharing opinions, things happen in short periods. For example, it is enough for a social network user, with a reasonable level of followers, to share his opinion about a good or service of a company, and, from one moment to the next, his opinion is spread instantly, echoing across different domains.

Regardless of this type of event, and its good or bad influence, the importance of a shared message and the direct or indirect knowledge it embodies is of great value to companies, particularly when it reveals opinions about the company itself, its activities, or the goods and services they sell, for example. Therefore, it is no surprise that a large number of companies started intensively to explore the information sources they have access, extracting, analyzing, and applying data, in order to know better their customers, which includes to know their habits, trends, preferences, or even their social behavior [2]. All these customer analytics processes allow for establishing customer's profiles including behavioral patterns. With such profiles, companies may improve relationships with customers, developing marketing, sales, or follow-up business actions, as personalized as possible. According to McKinsey and Company [3], all companies that implement and apply intensive customer data analysis processes are 2.6 times more likely to have a significantly higher ROI and 3 times more possibilities to generate revenue growth above the average of its competitors.

The development of customer analytics processes [4] is not easy to implement, as they require a systematic approach to everything related to gather, analyze, and apply of previously selected information, usually located in a very diverse set of sources. Furthermore, in order for customer analytics processes to be, in fact, effective, they need temporal data, organized according to the various business aspects of the companies, which, in some way, reflect quantitatively, and qualitatively the behavior of customers and their relationship with the company over time. In this way, it is possible to establish customer behavior patterns and, from there, create or adjust strategies and decision-making processes, as well as improve clarity on how customers are understood and the way they act and move in the market. In practice, such patterns improve company's "well-being".

We can define the well-being of a company using different methods and forms of assessment, which are sometimes debatable and subject to very subjective interpretations. However, the adoption of a strongly data-oriented assessment approach clearly reduces this subjectivity, allows for the justification of the well-being value found, and establishes a concrete well-being index for the organization, easy to interpret and with great meaning. One of the types of data with great potential to support this type of indexes are the aforementioned opinion texts that companies' clients make available through the Web. Today, based on these texts, it is possible to process well-being indexes for companies using sentiment analysis techniques [5–7]. Currently, this area provides a very diverse range of tools that, combining natural language processing techniques [8] and machine learning [9] techniques, allow us to explore opinion texts, recognizing concepts, and their relationships, and identifying the sentiments expressed in the texts. Then, if we convert the sentiments to a certain value,

within a specific scale, with meaning for the company, we can establish a well-being index, which reveals the status of the company toward its customers, anytime.

In this paper, we present a system (test bed) that we developed to create a well-being index for a given company, whose values are generated from the sentiments expressed in opinion texts that customers posted on some reviewing websites. In order to demonstrate the well-being index assessment model, as well as the usefulness of the system conceived, we randomly collected from the Web a very diverse set of hotel customers' opinions, which we assumed that belonged to a fictitious hotel, idealized by us.

Then, based on the sentiments expressed in opinion texts, as well as on the opinion elements references (facilities, services, staff, amenities, etc.) customers included in the texts, we defined and created a well-being index for the hotel. This index will allow a hotel manager, for example, to know the "image" of the hotel toward its customers, according to the various elements of opinion that have been established by the system. With this knowledge, the manager will be able to adjust hotel's services or promotion strategies, for example. The rest of the paper is organized as follows: Sect. 3.2 exposes and discusses some of the fundamentals regarding customer analytics and sentiment analysis; Sect. 3.3 presents the sentiment analysis system we implemented, discussing how the well-being index was calculated and maintained in a multidimensional database, and the results we got; finally, Sect. 3.4 presents some conclusions and future work.

3.2 Related Work

Over the past few years, the way companies deal with their customers has changed dramatically. Although the methods of action are of a different nature, often depending on business models and strategies, and company's management actions, the goal is quite consensual: to know and understand better the behavior of customers, with particular emphasis on their degree of satisfaction with the company. Today, it is common to find customer analytics systems implemented in organizations, which operate essentially supported by platforms intensively oriented by data gathered on the most diverse sources—e.g., sales and marketing systems, social networks, email, or Web pages. There are several data collection channels that need to be implemented and maintained to feed customer analytics systems with selected, relevant and up-to-date information that reveals opinions, expressions of interest, purchasing trends, or eventual mundane needs, among many other things.

More recently, companies have started to analyze some of these sources in different manners, using more ambitious and less conventional perspectives, in particular those that contain customer opinions. Often, the data extracted from such sources, from a social network or a web page, for example, provides useful analytical information, revealing facts and statistical data about one or more business perspectives and models. However, today, companies' business requirements change and this information is no longer enough for satisfying the needs of the companies in terms of

knowledge and understanding of their customers and adding value to their performance inside the markets where they do business. Some of them want (or need) to know what customers "feel" about them, what is the "image" customers have about their services and products. It is no longer enough having just statistical data about business relationships established among the company and its customers.

The analysis of customers' opinions [10], directly or indirectly, in texts they share on social networks, for example, could be a way for satisfying these new requirements. Doing a careful analysis of opinion texts, we are able to infer sentiment expressed in the texts based on their content, on the words used and on their temporal and modal conjugation. The ability for expressing sentiments through writing, in natural language and in an unstructured way, is a characteristic of human beings. People express sentiments using different types and models of writing, which combine in a unique way. Sometimes, they use simple sentences, with feelings explicitly expressed, and other times use more complicated sentences, with elaborate writing, involving cases of irony or sarcasm, revealing emotions, judgments, opinions, or ideas, according to their way of being and susceptibility.

In computational terms, sentiment analysis is essentially based on opinions expressed in texts, which reveals objective and subjective information about companies, people, objects, entities, events, or areas of interest [11], through the study of sentiments, opinions, evaluations, appreciations, attitudes, or emotions expressed in texts [12]. Sentiment analysis is also recognized as opinion mining. However, some authors differentiate these two denominations, stating that the first allows the identification of sentiment expressed in texts, with the purpose of identifying their polarity, while the second extracts and analyzes only the opinions expressed in the texts [13].

The analysis of sentiments in texts, written in natural language, is a difficult process to implement, due to the difficulties that exist to identify the way sentiments are expressed through writing. The writing styles used in opinion texts vary greatly from text to text, from author to author, from language to language, among many other things. For example, opinions expressed through the Twitter are carried out through short texts, quickly and sometimes carelessly, while an opinion posted on a company's website is usually materialized in a longer text, with more careful and complex sentences, often using comparisons or evaluations. Cases like these raise numerous problems in the process of identifying and classifying the polarity of sentiments. In practice, we can use sentiment analysis to work with opinion texts in order to identify subjective contents. Despite being used in several application domains, some experts recognize that the level of accuracy of the solutions obtained is still unsatisfactory in applications where accuracy is critical. Increasing the level of accuracy of a solution will obviously increase the effectiveness of sentiment analysis processes [14].

Sentiment analysis processes can be implemented in many ways, depending largely on the domain of application and the techniques chosen for processing the language used in texts, and for discovering and classifying the sentiments expressed in the texts [16]. However, we can assume that a sentiment analysis process involves essentially four distinct stages (Fig. 3.1), namely [15]: (1) selecting and extracting data; (2) processing data; (3) classifying sentiments; and (4) showing results.

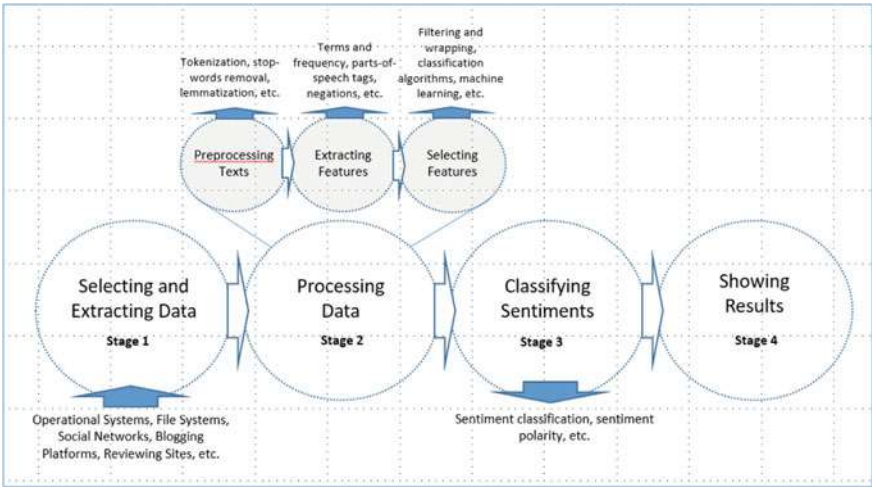


Fig. 3.1 Most essential working stages of a sentiment analysis process—adapted from [15]

In the first stage, we do the tasks necessary to identify and extract the texts (data) we need, according to the requirements established for the implementation of the sentiment analysis process. Essentially, textual data are collected from sources in which opinions are stored, such as database systems, file systems, social networks, or reviewing sites, among many others. These complex tasks deal with very heterogeneous data, having different types and structures, which often imply the development of very specific wrapping and crawling systems. Sometimes, they also involve actions to enrich the data collected with information from other specialized information sources. Then, in the second stage, we do three distinct tasks, whose role is decisive in the success of the global process of analyzing feelings. The first of these tasks, preprocessing texts, ensures the quality of the collected data, removing noise, and syntactic and grammatical errors. In addition, it tries to discover and remove the words and characters that are in the texts that do not contribute to the definition of the polarity of feelings, using methods and techniques such as tokenization, stop words removal, or lemmatization, among others. Then, the feature extraction task is performed, whose objective is, essentially, to discover words that express sentiments in the opinion texts. From a very diverse list of features, we can highlight the identification of relevant terms (one or more words) and the determination of their frequency in opinion texts; tags or annotations, which reveal the function of words (parts-of-speech tags); words that express positive or negative feelings; or negation words, among others text aspects. Finally, in this stage, we have the feature selection task. This task is responsible for identifying and eliminating irrelevant or redundant features identified in the previous task, having the goal to reduce the number of dimensions of the sentiment analysis process, contributing to improve its precision, using lexical and statistical methods.

In the third stage, classifying sentiments, the system identifies and classifies the sentiments that are expressed in the opinion texts, using: machine learning techniques and methods for classifying sentiments; lexical, to identify words and phrases that express positive or negative feelings; or hybrids, which use combinations of the two previous methods and techniques. Finally, the process performs a fourth and final stage: the visualization of results. Here it shows the results of the sentiment analysis process, according to the requirements of the system users, using suitable visualization mechanisms, such as analytical dashboards including gauges, charts, tables, widgets, or emoji symbols conceived especially for sentiment analysis scenarios.

3.3 Customer Sentiment Analytics

3.3.1 One Problem, One Case Study

Companies use to be concerned with their image, with the way and how customers recognize them in the market. In general, this image is strongly influenced by the quality of the services that companies provide, the products they sell, and how customers capture and transmit (directly or indirectly) this image to third parties. Today, the role social networks play allows customers to express themselves openly and spontaneously, expressing opinions or rating services, whenever and however they want. Usually, people like to talk about their experiences, whether personal or professional, giving them the emphasis they want, and revealing what they most like, or worry, about at a particular moment, on one or more subjects. In computing environments, where usually there is no direct interlocutor, as happens in social networks, people feel free to express themselves and their opinions. It seems that indirect communication takes away from them the "fear" of communication and expression. As such, their manifestations are quite spontaneous, often expressing opinions, which contain very varied elements of interest. For companies, these opinions are a very interesting source of information, which provides them descriptions of events, reports of facts, small talk sessions, and subjective sentences, among many other things.

However, we know that sometimes this information is not very reliable. People do not always express themselves in the best way and often, in the same opinion, for example, classify the quality of service of a company in a way, and attach opinion texts that do not always coincide with the evaluation they made. It is easy to rate a service, with "one or more" stars. How many of us are not familiar with data acquisition systems that ask us when exiting a store to choose a button with an "emoji" in order to reflect our opinion about the service we have just received. We know that different people select the same option to assess different qualities of service. In these cases, an opinion system will be not very enlightening. However, if we ask people to justify their opinion, preferably anonymously, their justifications highlight different aspects from those we think are the most appropriate. On several opinion sites, we find

statements with very positive ratings (4 or 5 stars) about some service provided. However, when we read the text that was attached to the classification, often we find that the opinion is not so good. Obviously, the opposite also happens.

Having examples like these ones in mind, we decided to evaluate the quality of service of a fictitious hotel, using a set of opinion texts that we collected in some opinion Web sites, which also included a rating (on a scale from 1 to 5) jointly with the opinion texts. Analyzing these texts, we wanted to identify and classify the sentiment expressed, as well as verify if the classification somehow coincided with the classification attributed by customers who expressed their opinion. In addition, and taking a step a little further in the classification of sentiments, we also wanted to assess the impact that certain opinion elements (so we called them) that characterize hotel services, for example, "staff", "service", "clean", "room", "restaurant", "reception", or "air-conditioning", among many others, mentioned throughout the opinion text, had in the identification of the sentiment expressed. In order to carry out this work, we developed a customer analytics system, based on sentiment analysis, especially oriented to calculate a sentiment rate for each opinion we analyzed, in particular, and globally for the hotel case study we used. In the following section, we will present and characterize it.

3.3.2 The Analytical System

In the implementation and development of the sentiment analysis system, we chose to adopt a functional architecture similar to the one presented previously in Fig. 3.1. Thus, we started collecting and preparing the opinion texts gathered in a set of reviewing Web sites. After cleaning (and anonymizing) text data, we stored opinion texts in the system database, using JSON structures—Fig. 3.2 shows a small fragment of a JSON document related to a single opinion text. This structure contains the opinion text ("Opinion") we want to analyze, jointly with the customer service appreciation rate ("Rate"), as well as all the opinion elements ("Elements") we identified in the opinion text, using a small dictionary of hotel terms that we prepared.

The sentiment analysis process we implemented can be briefly described as follows. After preparing the collected textual data, in a first stage, the system reads the customer opinion texts stored in the database and initiates their preprocessing. It

```
{
"Id": "0031",
"Opinion": "It was clean, efficient, ... room was small ... ",
"Rate": "3",
"Elements": [
   {"Element": "clean", "Occurrence": "1"},
   {"Element": "room", "Occurrence": "1"},
   {"Element": "train", "Occurrence": "1"}]
}
```

Fig. 3.2 A JSON fragment of an opinion data structure

starts by isolating texts' words, separating sentences, small phrases, symbols, or other types of tokens into single words (tokenization). This will facilitate the individual analysis of each word. Then, it then converts all letters to lowercase and begins the task of identifying the grammatical class of each word (POS tagging). When finishing this task, it selects words based on their syntactic class, transforming them into their respective root word, using application contexts, in order to be able to relate them to other similar words in terms of meaning (lemmatization). After this task, it makes the removal of tokens with a size equal to 1. Finally, finishing this initial analysis stage, system transforms opinion texts into vectors, using attribute selection mechanisms provided by the *Term Frequency-Inverse Document Frequency* (TF-IDF) [17], adding columns containing the values "1" or "0", depending on whether or not it has found a syntactic pattern that can be applied in the sentiment recognition process.

After finishing with success in the first analysis stage, systems proceed to a new stage: the prediction of the classification of the feelings expressed in the texts. To perform a sentiment classification process, we can use several types of techniques and classifiers. In the attribute extraction and in the test and training tasks of the classifiers, more than one technique can be used, which may allow for comparing different classification models. In this way, a more thoughtful and correct choice of model to be used is ensured, based on the criteria defined for its evaluation. Initially, eight different classification models were developed and studied. After their validation, we decided to apply only two, respectively, random forest [18] and support vector machines [19], both supported by TF-IDF in the attribute selection phase. In our application case, the precision obtained for the results of the sentiment classification process was not very appreciable. It was around 55% in both models. Despite this, we believe that this value does not deprecate the application of the system to the selected case study.

After investigating why this precision value occurred, we considered that was due to the difficulty shown by the system in classifying opinion texts in more than two or three classes. Usually, sentiment classification problems focus on classifying opinion texts, simply, as "positive" or "negative", and sometimes include the "neutral" classification. Currently, classifying opinion texts as negative or positive, theoretically, is considered a simple task, as it is relatively easy to identify the difference between a negative and a positive comment. For that reason, we ran the aforementioned models again for classifying sentiments on a scale of values between 1 and 5. However, this time, we took into account the classification of the "polarity" property, which contains negative, positive, and neutral classes. It should be noted that, the sentiment analysis process was carried out at the document level [20], considering the opinion text as a whole, which generated a single polarity value for each processed opinion text. Usually, this type of analysis generates a positive, negative, or neutral classification of the opinion expressed in texts. However, as we said, we adapted the algorithms used to transform the polarity values in the scale referred before.

In the following section, we will present only the results obtained with the classification model implemented with the random forest algorithm, since they were the ones that best revealed the feelings that customers expressed in the opinion texts that were processed, taking into account the result validation process we carried out.

3.3.3 Results Analysis

The design and implementation of a generic model for sentiment analysis based on a set of opinion elements were the main reasons that led us to develop this work. Its practical implementation revealed that it was possible to establish a basic set of sentiment analysis mechanisms that, when combined with multidimensional data structures, provided a multidimensional analysis platform for sentiments expressed in opinion texts. As mentioned, we used as application case a fictitious hotel, collected a significant set of opinions randomly from different opinion sites available on the Web, and then built the structures and mechanisms of the system. Its design was specifically oriented to reveal a well-being index for the hotel, through processing a sentiment rate generated using opinion texts. Additionally, the system has the possibility to justify the processed sentiment rate using the impact (or influence) of the different opinion elements that system identified and classified during the sentiment analysis process.

In order to analyze the hotel's well-being index (the sentiment rate predicted by the system) in a multidimensional way, we designed and created a multidimensional database having the ability to receive the results of the sentiment analysis process. The schema of the database (Fig. 3.3) includes one fact-table ("Well-Being-Index"), which received sentiment analysis results records, and three dimension tables, namely "Time", which stored the time elements we considered relevant for the process, "OpinionElements", which maintains the description of the opinion elements discovered, and "OpinionElementClasses", which stores the description of the opinion elements clusters previously configured and created. Thus, we stored the customer reviews we collected, and their respective ratings, as well as the sentiment rates processed by the system.

Additionally, in a second schema, we stored the impact values of each opinion element identified by the system during sentiment rates processing. In assessing the impact of each element, we assumed that the more references an opinion element

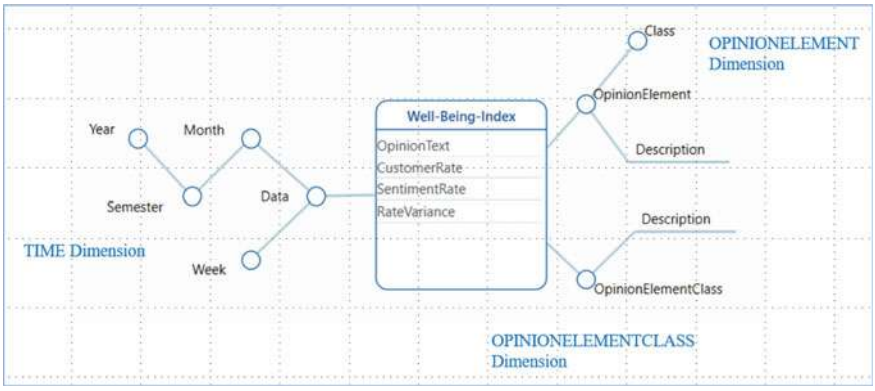


Fig. 3.3 Multidimensional schema of the well-being index database

had throughout the opinion text, the greater its relevance (impact or influence) on the processed sentiment rate and, consequently, on the well-being index of the hotel. In fact, it is not a very strong analysis rule. Based on our experience, we think it is a very reasonable analysis heuristic, given the nature of the system we implemented. Anyway, it can be modified whenever we want, according to the requisites of the application case.

The database schema (Fig. 3.3) allows us to analyze sentiment rates (globally and by opinion element) in a very flexible way, providing means to navigate the classification data accordingly each dimensional hierarchy (e.g., TIME: "date">>"month">>"semester">>"year" or OPINIONELEMENT: "opinionelement">>"class"). This allows us for performing filtering, crossing, pivoting, drilling-down or rolling-up sentiment data accordingly the various dimensional elements integrated into the schema. We could have included two more dimensions in the current schema, namely "customer" and "staff". However, we did not. We wanted to guarantee the anonymity of the data we used. We also removed the "Time" dimension from the schema avoiding increasing the complexity of the sentiment analysis process. However, in the future versions of the system, we intend to include them in one or more real application scenarios.

The results we obtained in the sentiment analysis process for our case study (Table 3.1), using random forest classification, revealed a well-being index, which can be interpreted as an appreciation rate, for the hotel services a little above what we usually consider as reasonable value (3,325). In this case, the value we got is not far from the average classification rate (3,625) given by customers in the opinion texts we analyzed. Despite the small difference between customers' and system's classifications, when we down to the opinion level analysis (or element of opinion) we verify that results enlighten clearly the status of the hotel, revealing something that the practice of analysis has taught us in some works we have done previously. Customers tend to be more positive (or sympathetic/empathetic) when they rate something (a service or a good) and less positive when they have to justify their rating. In fact, we verified the same in this case study. About 38% of the opinions expressed revealed a more negative sentiment (an evaluation) when compared to the rating given by the customer. The opposite also happened. However, to a lesser extent (6%), the remaining opinions, about half of the global opinion set, the system classified them with appreciation rates equal to those that customers communicated together with their texts. In Table 3.2, we present a brief summary of the rating results we got with the system.

Table 3.1 Global service quality assessment

The hotel case study	
Nr. of text opinions	40
Avg. classification rate	3.625
Avg. prediction rate (sentiment rate)	3.325
Nr. of opinion elements	57

Table 3.2 General rating results

Nr of opinions	Status	%	Remark
19	Coincident	48	Rating COINCIDENTAL with customer opinion
6	Higher	15	Rating WORSE than customer opinion
15	Lower	38	Rating BETTER than customer opinion

Next, in Fig. 3.4, we can see the distribution of customer ratings and the prediction rates of the system for each assessment value, using the scale (1 to 5) defined for receiving well-being index values. It is curious to see that the discrepancy of the classifications is much greater for negative values (1 and 2), especially in the classification with the lowest value (Fig. 4c).

It is also interesting to analyze the results concerning the various elements of opinion identified and their respective classes (Fig. 3.5). This analysis reveals the impact (or influence) of each of these elements (and their classes) on the sentiment rate predicted by the system. In our case study, we found that the elements of opinion "room", "staff" and "breakfast" were those that had more references in the texts that originated the sentiment rate we got. Following the same type of analysis for opinion element classes, which aggregate the various elements of opinion into classification groups, we found that the classes "facility", "status", and "amenity", were those that had more elements referred to in the texts of opinion.

The usefulness of the results obviously depends on the business strategy adopted by each analyst or decision-maker. However, within the scope of our case study, we can highlight some perspectives of analysis and possible decision-making actions by one of the managers of our hotel. For example, the distribution of the impact on the processed sentiment rate of the top five opinion elements, "facility", "status", "amenity", "service", and "furniture", indicates that the processed value (3,325) was greatly influenced by them. This is not a great value. We think that any hotel manager would like to have a much better rating. As such, we should analyze the reason for these classifications and take the most appropriate action. In our case study, for example, two of the previously mentioned classes, "facility" and "status", were promoted by elements such as "room", "restaurant", "reception", or "bar", and "clean", "noise", "price", or "dirty", respectively. With this information, a hotel manager may assume that a well-being index having a value of 3,325 (reasonable) does not announce anything good.

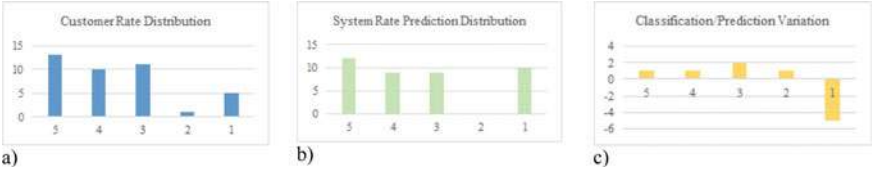


Fig. 3.4 Customer and system classification rates distribution

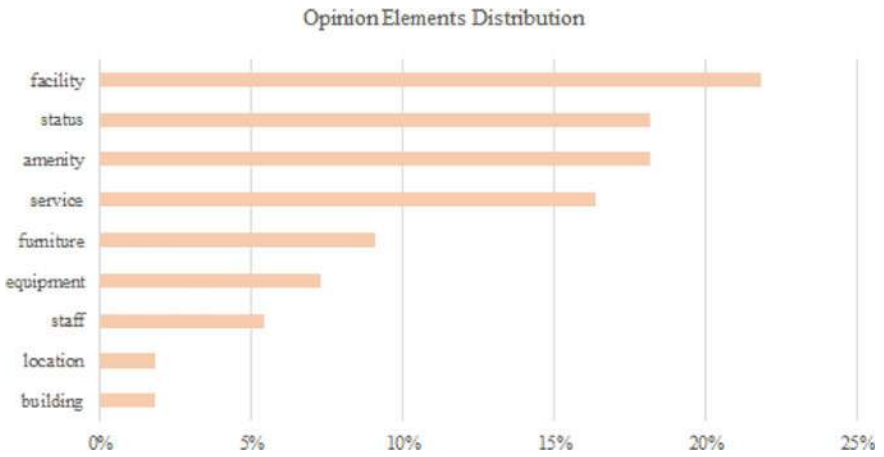


Fig. 3.5 Opinion elements distribution

3.4 Conclusions and Future Work

Over the last few years, we have witnessed the emergence of a large number of systems and applications in the field of sentiment analysis. A large number of authors have presented a wide range of models and techniques for analyzing the subjectivity expressed in opinion texts, with the aim of discovering manifestations of sentiments that can, in some way, characterize what people feel about things that they do. Companies have been increasingly their concerns with the implementation of processes that allow them to know their customers better. Companies know that such knowledge will bring more value to their businesses. Although sentiment analysis systems still do not show a high level of confidence in the results they generate, their use, even today, provides very interesting elements to improve decision-making processes.

In this paper, we presented a sentiment analysis system for evaluating the business status of a hotel. Using a subjective analysis of the content of a set of opinion texts, which we collected in several opinion sites scattered over the Web, the system calculates a well-being index, whose values are generated from the sentiments detected in the opinion texts. Sentiment rates were processed by natural language processing and machine learning mechanisms and validated using the impact of a set of opinion elements, such as “room”, “restaurant”, “taxi”, “bar”, “clean”, “noise”, or “metro”, just to name a few. The results obtained prove the application and usefulness of the system in providing essential elements to identify and reduce management or operational risks, analyze emerging market trends, contribute to increasing revenues, or adjust marketing actions. In practice, the well-being index reveals, in a very simple way, the status (the image) of the hotel toward its customers. As we know, this knowledge is very valuable for any company that cares about its image and quality of service.

As referred, our case study is fictitious. Consequently, this may detract some credit from the results we got. However, we think it does not take the credit from the application of the sentiment analysis process we conceived and implemented. Of course, the case study could be different, with or without a real-world application. The validation process of system's results, made by comparing opinion texts contents and semantics with the sentiment rate processed (globally for the hotel and partially for each customer opinion), allows us to say that will be not difficult to apply this work to a real-world application case. It will be useful to managers, which intend establishing actions and measures to identify and reduce risks or recognize emerging trends in the market, in order to contribute to the increase of revenues or adjust actions of marketing, for example.

The current system implementation and its application to the selected case study revealed an interesting performance in all natural language processing and machine learning mechanisms we used. However, in a near future, we must improve the selecting and extracting data stage, incorporating automatic crawling and scrapping mechanisms for improving gathering opinion data and preparing it for preprocessing and consequent sentiment analysis. This will improve system performance, effectivity, and quality in sentiment analysis processes. Furthermore, we need to provide a better data visualization platform, having flexible dashboards for result analysis and well-being indexes representation.

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Chapter 4
Alexa, Give Me a Hand…On GenZ' Smart Speaker Acceptance in a Retail Environment

Anne Schmitz, Myriam Quiñones, and Ana M. Díaz-Martín

Abstract The aim of this paper is to assess the acceptance of smart speakers in a retail environment, with a special focus on the perceptions of GenZ, one of the heaviest user groups. With the use of smart speakers on the rise, it is important to make sure that customers perceive them as feasible and useful devices for their daily tasks. With the retail industry being part and parcel of smart speaker integration, this short paper focuses on analyzing their usage intention in the said environment by means of a modified version of UTAUT2. To assess the reliability and validity of the proposed model, both an exploratory and a confirmatory analysis were conducted (SPSS 26). Thereafter, structural equation modeling was used to test the hypotheses (AMOS 26). The results show that effort expectancy, habit, social influence, and hedonic motivation have a direct, significant, positive, and direct effect on the usage intention of smart speakers in a retail environment. This study sheds light onto the perceived barriers to using voice assistants during their shopping journey. It also identifies both strong and pain points that retailers should focus on in order to establish valuable customer relationships in evolving retail service environments.

Keywords Voice assistants · Smart speakers · Usage intention · Retail · Gen Z

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4.1 Introduction

A smart speaker is defined by the Oxford Learner's Dictionary as "an electronic speaker that is connected to the Internet and is controlled by spoken commands."[1] Capable of sensing its immediate surroundings, they interact with humans by means of AI-equipped voice assistants [6].

These devices are changing the ways customers interact with business and help transitioning away from the traditional approaches in which both parties used to connect and communicate. In this context, smart customers are one of the core elements to ensure a seamless shift toward more digital service encounters. With the prevalence of smart speakers on the rise all around the world, very little industries will be able to extricate themselves from their growing popularity. Whereas banking and finance have become an ideal examples of smart speaker application [14], they are paving their way into areas such as health care, hospitality, or retail. As a matter of fact, in a retail environment, voice commerce or voice shopping occurs when customers conduct their shopping endeavors by the integration and application of voice assistants [21].

The growth of the voice assistant market is showing no signs of stopping, and with increased popularity comes increased use. As smart speakers become the most rapidly growing customer technology, predictions point toward a steady growth that will surpass 8.4 billion voice assistants in 2024—a number higher than the world's population. Recent data shows that China and the USA lead the way in terms of market size and that Amazon's Alexa, followed by Google and Apple, are on the podium of customers' favorite brands [24]. Regarding the Spanish market, although it is true that this type of device has been gaining popularity, few use them on a regular daily basis [2].

Speaking in generational terms, younger users are adopting voice assistants at a faster rate than previous age groups. In fact, 18–24-year-olds own more voice assistants than any other cohort. Specifically, following a recent report by CivicScience [8], almost 70% of GenZ already own or intents to own a smart device. With voice technology being widely used by GenZ, young users tend to agree that it already offers real speed and convenience.

Nonetheless, for a technology to become fully adopted, customers need to be both willing and able to interact with the device. Based on the aforementioned, the aim of this paper is to assess the acceptance of smart speakers in a retail environment, with a special focus on the perceptions and shopping intentions of GenZ, one of the heaviest user groups.

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[1] https://www.oxfordlearnersdictionaries.com/definition/english/smart-speaker, accessed on October 10th, 2022.

This investigation was conducted under the framework of CIEDI-UAM, the Research Group UAM-TECHNOCONS "Consumer Behavior and Technology" and was financially supported by the Professorship Excellence Program in accordance with the multi-year agreement signed by the Government of Madrid and the Autonomous University of Madrid, UAM (Line #3) and the Spanish Ministry of Science and Innovation, grant number PID2020-113561RB-I00.

The work is structured as follows: the literature review, the research model, a modified version of UTAUT2 [23], and the hypotheses are presented in the next section. Subsequently, we detail the methodology that was applied, alongside the results of the empirical study. In the last sections, we discuss the results obtained and their implications. We close the study by outlining its limitations and giving insights into possible future research ideas.

4.2 Literature Review

From a marketing point of view, studying the factors that influence an individual when accepting or rejecting a new product, service, or technology is a mature and consolidated research line that exists within the field of customer behavior [25]. It is, however, far from becoming obsolete thanks to the continuous evolution of technology itself.

With respect to the scope of this research, customers who employ smart speakers for their shopping journey mainly use them for information search, which may include product details or restaurant recommendations, among others [18], which turns them into an interesting target for brands and companies.

Technology acceptance is one of the most consolidated research lines within the context of consumer behavior studies [25], and smart speaker adoption would hardly be the exception. Among the rather recent literature, Bawack et al. [6] study the adoption of smart speakers for voice shopping by means of a modified version of the theory of reasoned action, Baier et al. [4] focus their study on the ways in which conversational user interfaces influence customer satisfaction, Ahn et al. [1] center their research on the intention to adopt voice shopping by means of a modified UTAUT model and [13] elaborate users' motivations to adopt voice assistants in service encounters. The latter highlight the need of further investigations, as research on automated technologies is still in its infancy.

The Unified Theory of Acceptance and Use of Technology 2 (UTAUT2 hereafter) proposed by Venkatesh et al. [23] is one of the most widely accepted technology acceptance models because it was specifically developed for an end-user environment [15, 16]. Considering the aforementioned, the present paper adds knowledge to the existing literature, taking it one step further by working with a modified version of UTAUT2. It furthermore focuses on GenZ in Spain, which is knowingly one of the heaviest user groups and pretends to shed light onto the state of the art of voice shopping. Hence, and in order to reduce possible pain points, friction, and customer-perceived barriers, companies must understand the factors that influence the usage intention of this new technology.

Keeping in mind that the ultimate goal of this study is to deepen the existing knowledge of smart speaker acceptance in retail environments, the next part of the paper formulates the hypotheses this investigation is based upon.

4.2.1 Hypotheses

4.2.1.1 Effort expectancy

Convenience is one of the major reasons customers that indicate for using smart speakers in e-commerce [26]. Referring to the degree to which technology adds convenience to a customer's daily activities [23], they are known to be a direct antecedent to usage intention and have shown to be an important determinant in terms of technology acceptance in a wide variety of industries [10, 22]. In the environment of smart speaker acceptance and use, [26] empirically confirmed the importance and predictive power of effort expectancy. We hence formulate our first hypothesis as follows:

H1: Effort expectancy will have a positive, direct, and significant impact on the usage intention of smart speakers during the shopping journey.

4.2.1.2 Habit

Habit describes the extent to which people tend to perform a task or a behavior automatically because of learning [23]. As stated previously, with predictions on market growth on the rise, increasing popularity will eventually entail increased use. Therefore, creating a habit of using voice assistants will also have a substantial impact on the future implementation of these devices and therefore may increase usage intention [12]. Based on the above argument, our second hypothesis says as follows:

H2: Habit will have a positive, direct, and significant impact on the usage intention of smart speakers.

4.2.1.3 Social Influence

Social influence refers to the degree to which people perceive that important others believe that they should use a certain technology [23]. In general terms, the role of social influence on technology acceptance has been acknowledged in the academic literature, but it needs to be further investigated and consolidated [19].

Nonetheless, friends and family and other peers can be referred to as important influencing factors and it is known that especially the younger generation is more susceptible to what others think [17]. Hence, our third hypothesis says as follows:

H3: Social influence will have a positive, direct, and significant impact on the usage intention of smart speakers during the shopping journey.

4.2.1.4 Hedonic Motivation

Referring to the playful and ludic component in technology acceptance processes, hedonic motivation refers to the extent to which people perceive the use of a new technology as interesting, entertaining, or joyful [23]. In a society in which the use of information and communication technologies is deeply rooted in peoples' everyday lives, understanding the hedonic components is of both growing and fundamental importance.

Knowing that the use of smart devices can signify fun in a variety of occasions, the hedonic importance of smart speakers is empirically validated by [3]. Additionally, [27] state and conclude that hedonic factors indeed affect the acceptance of smart speakers. Therefore, our fourth hypothesis states as follows:

H4: Hedonic motivation will have a positive, direct, and significant impact on the usage intention of smart speakers during the shopping journey.

4.2.1.5 Gender

Following [23], gender is a core moderating variable in technology acceptance. It is, in fact, according to authors such as [20] or [9], the second most studied variable in the acceptance of new technologies.

Theories about gender schemes suggest that the differences between people are due to the roles that are instilled from birth and to the socialization processes of societies, but they are not attributable to gender per se. As a counterpoint, there is another current of research that supports the theory that there are indeed significant differences between men and women regarding their adoption behavior of new technologies [5].

Under the premise of rather contradicting data and with the goal to shed light onto the role of gender in the context of this study, gender has been incorporated into the research model as a moderating variable. The last hypothesis of this paper therefore says:

H5: Gender will have a moderating effect on the antecedent variables and the usage intention of smart speakers during the shopping journey.

4.3 Materials and Methods

A modified version of UTAUT2 was applied to study the usage intention of smart speakers in a retail environment. Employing a non-probability convenience sampling method, an online survey (Qualtrics) was administered to 334 students of the Business Administration Degree of a major Spanish public university in March 2022.

The participants rated 27 descriptive items related to using voice speakers for their shopping endeavors. We obtained our measurement items for effort expectancy, habit,

social influence, and hedonic motivation from [23]. All items were measured on a 7-point Likert scale and were translated into the Spanish language. Regarding the sample, 50.5% were male, 49.2% female, and 0.3% identified as non-binary. About 86.2% of the sample was between 20 and 22 years old.

Exploratory and confirmatory factor analysis (SPSS 26) confirmed suitable goodness-of-fit indexes of the proposed research model. Both discriminant and convergent validity were confirmed prior to applying structural equation modeling to test the hypotheses (SPSS-AMOS 26).

Lastly, a multigroup analysis was carried out in order to assess possible differences among peoples' gender.

4.4 Results

Respondents were asked about their general knowledge of different smart speaker brands that are available on the market. Apple's Siri was the most known device (100%), followed by Alexa (98.8%) and Google coming in third (90.6%).

We tested our hypotheses using structural equation modeling (SEM) in AMOS (version 26). More specifically, we first assessed the measurement model. Next, we estimated our structural model. For the confirmatory factor analysis (CFA), we kept the items enabling the value scale to satisfy the psychometric properties (validity and reliability). The model's goodness-of-fit measures were acceptable (χ^2/d.f. = 1.708; SRMR = 0.040; CFI = 0.984; PClose = 0.623; RMSA = 0.047). Table 4.1 shows the results of the model estimation. The composite reliability and Cronbach's alpha indicators were equal to or greater than 0.7. The AVE values were greater than the cutoff score of 0.5.

The results of the structural model are shown in Table 4.2.

All proposed hypotheses, meaning effort expectancy, habit, social influence, and hedonic motivation, had a direct, significant, and positive effect on the usage intention of smart speakers in a retail environment. In fact, and in order of significance, hedonic motivation has been shown to be the most important predictor of usage intention, followed by social influence, habit, and effort expectancy in the last place.

Table 4.1 Average variance extracted, composite reliability, and discriminant validity

	AVE	CR		UI	EE	HAB	SI	HM
UI	0.867	0.687	IU	**0.829**				
EE	0.953	0.838	EE	0.538***	**0.915**			
HAB	0.807	0.585	HAB	0.466***	0.336***	**0.765**		
SI	0.906	0.713	SI	0.518***	0.364***	0.240***	**0.844**	
HM	0.888	0.8	HM	0.692***	0.553***	0.384***	0.472***	**0.895**

Note *UI* usage intention, *EE* effort expectancy, *HAB* habit, *SI* social influence, *HM* hedonic motivation

Table 4.2 Model results

Path	Estimate	t statistic	Hypotheses
Effort expectancy → Usage intention	0.157	**	Supported
Social influence → Usage intention	0.211	***	Supported
Habit → Usage intention	0.198	***	Supported
Hedonic motivation → Usage intention	0.430	***	Supported

Note **: significant at 95%; ***: significant at 99%

A multigroup analysis has been carried out to assess differences among the moderating variable gender. Whereas there were no differences regarding people's effort expectancy, hedonic motivation or social influence, statistically significant differences were found when it comes to habit with the effect of said variable on usage intention being more pronounced for males than females.

4.5 Discussion and Conclusions

The aim of this study was to gain a deeper understanding of Spanish GenZ' usage intentions of smart speakers in their shopping journey. Our proposed research model empirically confirmed the importance of effort expectancy, hedonic motivation, social influence, and habit on the usage intention of smart speakers and showed statistically significant differences regarding the hedonic component and peoples' gender.

Due to the profound digital transformation that modern societies are experiencing since the first two decades of the twenty-first century, the servicescape as we know it is changing drastically, and with this, the way customers interact in modern retail environments.

As [3] state, there are few marketing-focused empirical studies on smart speakers. Since the smart speaker market is supposed to grow considerably in the near future, we have addressed this gap and take a first step to generate knowledge on the topic.

The results show that GenZ considers voice assistants as a rather effortless and entertaining technology that is feasible to become part of the future for their daily use. With GenZ being widely accustomed to the use of a wide range of mobile and electronic devices, this study proves that smart speakers are being seamlessly incorporated into their modern technology repertoire.

Being considered as popular and easy-to-use tools is one important factor of success. Paired with the possibility to use them in variety of ways, smart devices with voice integration should be marketed "in the name of convenience" even though in the future they will be projected to be much more than a mere trend.

The participants of this study have shown to be quite susceptible to third-party opinions and believe that the hedonic part of using a new technology is crucial to ensure a seamless adoption process. These results align perfectly with authors such as

Ciranka and van den Bos [7], who point out that peer pressure is particularly relevant for the younger generations. It has even been pointed out that GenZ customers rely more on peer influence than any other generation [11].

To stay on top of mind, companies must know that the future of voice search goes beyond its current abilities. Improving technology brings along rising customer expectations and, in order for brands to stay interesting for their clients, it really is all about convenience and the ability to "adapt or die" in this rapidly changing society.

4.6 Limitations and Future Research

This investigation is not without limitations. It has to be pointed out that the sample consisted of local university students, which might imply a limited generalizability of the results to the general public. Furthermore, a theoretical model, however, complete it may be, never represents 100% of reality.

Future research could consider new antecedent or moderating variables. It might therefore be interesting to use the complete UTAUT2 model to study usage intention or even real usage of smart speakers.

Furthermore, the incorporation of additional moderating variables such as age or experience will give more fruitful insight into people's motivations for using these devices. Lastly, the addition of new antecedent variables is also likely to broaden the horizons on this topic whose importance and relevance have just begun to show.

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Part II
Data Mining and Big Data—Marketing Data Science

Chapter 5
Human Talent Management to Increase Productivity: Case Study EQUATOROSES EQR

Rommel Velastegui, Giovanni Hidalgo, Maria-Jose Mayorga, and Marcelo V. Garcia

Abstract Managing human talent today is a reflection of productivity in companies which is why EQR considers human resources as the main priority in its development. An organization that is not prepared for the sudden and frequent changes that the globalized world demands are not competitive. For that reason, this study proposed the evaluation of 124 collaborators from different work areas; through the assessment of the organizational environment, psychosocial risks, and labor performance. The EDCO test evaluates the organizational environment allowing us to discover flaws in the leadership style (28.54%); resource availability (18.95%); stability (14.22%); and clarity and coherence in management (9.14%); subsequently with the FPSICO the psychosocial risk assessment was obtained, with the following results: PS (55%), TT (28.3%), and RAS (26.7%); Finally, a comparison is made with the results of the work performance evaluation: adaptation (15%), responsibility (16%) and knowledge, skill and attitude (18%). The data will allow the company to propose the implementation of total, group, and individual intervention plans depending on the identified findings.

Keywords Human talent management · Organizational environment · Psychosocial risks

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5.1 Introduction

Managing human talent in companies in a globalized world where there have been sudden and hasty changes represents a challenge for business leaders [12]. Business factors such as organizational structures, quality of life, productivity, and currently external factors such as COVID-19 can alter the members of the organization's behavior and decrease productivity [11].

One of the elements within companies that cover most of the problems is the organizational environment, which can be the obstacle or the link for successful job performance [3].

The research proposed in EQR indicates a case study where the internal variables of the collaborators are evaluated to achieve a methodology that seeks to stabilize or improve work performance, some factors that were included in the study are leadership, psychosocial risks, motivation, and interpersonal relationships. To achieve the aforementioned, it is necessary to seek the support of evaluation instruments that guarantee the identification of all factors detrimental to the company [6].

The evaluation process was achieved with the following instruments: EDCO, FPsico, and EQR performance evaluation, each one with its own technical details and specifications. The organizational environment evaluation with EDCO allowed the analysis of characteristics that organizations do not consider they could affect job performance [1].

The evaluation of psychosocial risks with FPsico has served to detect, prevent andor correct situations related to these risks, taking into account that working today in times of COVID-19 requires a greater effort to adapt to protect the health and the safety of the collaborators in the fulfillment of the tasks in each job position [9].

Once these two variables have been evaluated, organizational environment and psychosocial risks, the correlation will be carried out with the evaluation of work performance, allowing to determine the level of total, group, or individual involvement of the collaborators; through these actions, the study intends to apply intervention plans which seek to strengthen the organizational culture, avoid the appearance of occupational diseases; in other words, improve the employees' quality of life so that they are enthusiastic at work and increase business productivity [2].

5.2 Background Literature

Most companies today operate in a volatile, competitive, complicated, and global environment. They also face several global challenges, such as those related to the flow of human talent and the lack of necessary capabilities. To achieve and maintain a competitive advantage, companies must be global in scope and methodical in managing their human capital because of these issues. This fact is widely recognized by human resource professionals and consultants. Academics are showing considerable interest, as indicated by their work in the newly created field of "global talent management [16].

Talent management practices can create the most lasting competitive advantages, but the extent to which talent management represents a new and discrete management activity versus the latest exhortation of human resource management is largely unknown. The current global credit crisis and rising unemployment may reduce the importance of talent management in its original form, i.e., due to talent shortages. We argue that the context has only changed and that it has never been more important to have talented employees in key strategic positions in the organization. Talent management is arguably of greater importance among multinational enterprises (MNEs) for three reasons. Firstly, it is the recognition and recognition of the right management talent to manage the international operations of an organization. Third, it is the most demanding set of competencies required by companies operating internationally [7].

Managing and promoting essential talent is becoming an obsession for organizations. However, this view is mainly supported by anecdotal evidence rather than solid empirical data. Companies generally have procedures and systems in place to systematically identify and nurture their talent, many others seem to take a haphazard approach. For example, a minimal percentage of companies in Ecuador have formal management development programs for their high-potential employees, in addition to comprehensive succession planning.

Among some definitions that stand out about human talent is that talented people are individuals who can influence the success of the organization, either immediately through their contribution or over time by showing the highest levels of potential.

Talent management is the methodical process of attracting, identifying, developing, engaging/retaining, and deploying those people who have high potential and are especially valuable to an organization. These definitions consider "talent" to be equivalent to "talented people" [4].

The phrase is remarkable and suggests that talent is an undifferentiated commodity and that some people are more gifted than others, making them more valuable investments. To support talent management should include finding and rewarding talented candidates, organizing talent pools (banks and pools), ensuring talent diversity, talent assessment (and performance management), talent development, talent deployment, talent tracking, and talent retention [10].

Other organizations support a rationalist and instrumental (hard) approach to talent management more strongly than the CIPD, whose mission is to promote individual development. They start from the assumption that ability is a vital resource (which is considered abstracted from the individuals who currently possess it or may do so in the future). Some argue that corporate and demographic trends indicate a shortage of talent, making this resource even more important [13].

The findings of this Background Literature are that companies should have a human resource management plan aimed at improving individual and collective learning, motivation, and retention of employees for knowledge acquisition and sharing. Given that the influence of human resource management on knowledge management may open the field for new studies on further investigation of the relationships between human resource management, knowledge management, and organizational performance in knowledge-intensive industries in developing economies.

5.3 Methodology

5.3.1 Sample Population

For the development of the research, all the collaborators of the EQR Company of Ecuador were taken into account, there is enough predisposition and interest of the organization leaders on the research matter. 124 collaborators participated in the evaluation process, which is equivalent to 100% of the population, data has not been intentionally manipulated, it is not an experimental investigation and the sample has not been calculated. For the research process, the study subjects were previously informed, agreeing with the application of the assessment process as a case study, the information was collected individually and the data collected is confidential for academic purposes [8].

5.3.2 Methodology of Evaluation and Data Collection

To increase productivity in times of COVID-19 is necessary to manage human talent, for this reason, the research proposed three types of evaluations: organizational environment, psychosocial risks, and work performance, each with its respective specifications and technical characteristics. As a first step, the Organizational Environment Scale (EDCO) was used, it is made up of 8 dimensions: 1. interpersonal relationships, 2. management style, 3. sense of belonging, 4. salary, 5. availability of resources, 6. labor stability, 7. clarity and coherence in management, 8. collective values; each dimension is made up of 5 questions. The assessment is given through a Likert scale as follows: 1 = Never, 2 = Very rarely, 3 = Sometimes, 4 = Almost always, 5 = Always.

Subsequently, psychosocial risk factors were evaluated through the FPSICO 4.0 tool of the National Institute of Safety and Health at Work of Spain, it has 9 factors which are: 1. Work time (TT), 2. Autonomy (AU), 3. Workload (CT), 4. Psychological demands (DP), 5. Variety of content (VC), 6. Participation supervision (PS), 7. Interest in work compensation (ITC), 8. Role performance (DR), and 9. Relationships and social support (RAS). The evaluation is indicated through a Likert scale where: 1 = Very satisfied, 2 = Sufficient, 3 = Insufficient in some cases, and 4 = Totally dissatisfied. The results of this instrument can be represented by: adequate situation, moderate risk, high risk, and very high risk.

To end with the performance evaluation, a company-specific questionnaire was used that consisted of 5 categories: 1. Knowledge, ability, attitude, 2. Responsibility, 3. Interpersonal relationships, 4. Adaptation, 5. Labor aspects. It was evaluated through a Likert scale where: 5 = Excellent, 4 = Very good, 3 = Good, 2 = Irregular, 1 = Inadequate.

5.3.3 Information Validation

The validation of information made it possible to make decisions to manage the company's human talent at different hierarchical levels. Once the evaluations of the 124 collaborators were completed, the information was consolidated through a database in an Excel spreadsheet, this information is the individual results of the evaluations: (a) The level of organizational environment, (b) The level of psychosocial risk, and (c) Work performance.

Subsequently, the study seeks to relate the organizational environment and psychosocial risks with the work performance of the collaborators. The following steps were proposed to process the data: (i) Entry of data obtained from the evaluations; (ii) Data entry into the IBM SPSS 20 software as shown in Fig. 5.1; (iii) Data validation through crossover variables.

5.3.4 Solution Strategies

Once the labor environment, psychosocial risks, and work performance of the company have been diagnosed, administrative strategies have been proposed that increase or maintain the productivity of the collaborators. The main proposal is the business intervention plans at three levels: at a total level where all the company's collaborators will be involved; at the group, the level depending on the needs of each area or section of work and at the individual level depending on their needs after carrying out one or more specific evaluations.

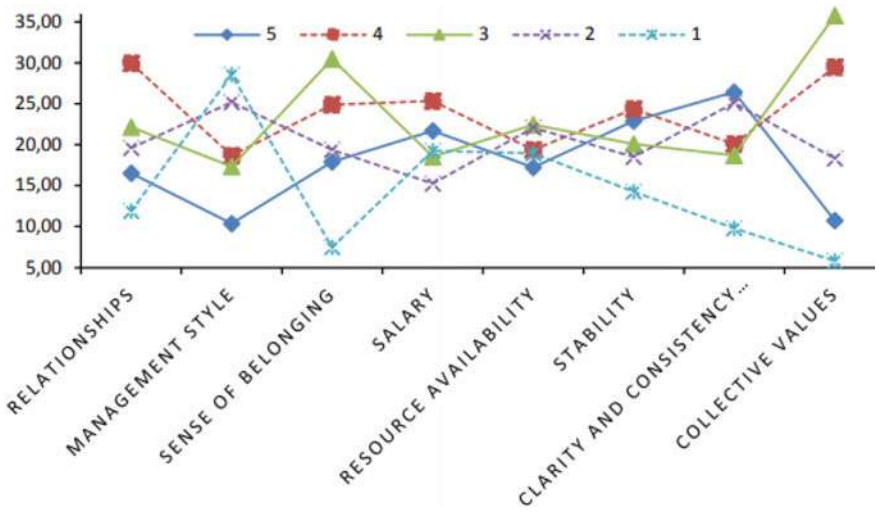


Fig. 5.1 Results of the organizational environment evaluation

5.4 Results

Once the organizational environment, psychosocial risks, and work performance have been evaluated, the results are presented below.

5.4.1 Organizational Environment Scale (EDCO)

The analysis of the organizational environment is important to analyze at a global level in all the dimensions of the study, in this way, the management of human talent has been analyzed collectively, in Table 5.1 and Fig. 5.1 the general results of the evaluation of the organizational environment are shown.

There are four dimensions on which the study focuses: Management style, Availability of resources, Clarity and coherence in the management and Stability, the results of the evaluations show anomalies that must be taken into account in percentage terms. For example, the dimension management style has 10.34% always, 18.65% almost always, 17.30% sometimes, 25.17% very rarely and 28.54% never; the most difficult items are human talent management between managers and collaborators, as well as leadership.

The dimension availability of resources shows 17.21% always, 19.36% almost always, 22.44% sometimes, 22.04% very rarely, and 18.95% never; it is logical to think that most companies consider providing the collaborators with the necessary materials, however, talking about resources, they will always be necessary if it can be generalized.

Table 5.1 Results of the organizational environment evaluation

Dimension	5	4	3	2	1
Relationships	16.48	29.96	22.14	19.56	11.86
Management style	10.34	18.65	17.30	25.17	28.54
Sense of belonging	17.88	24.87	30.47	19.36	7.42
Salary	21.69	25.31	18.53	15.23	19.24
Resource availability	17.21	19.36	22.44	22.04	18.95
Stability	22.90	24.33	20.06	18.49	14.22
Clarity and consistency in management	26.42	20.05	18.66	25.11	9.76
Collective values	10.69	29.46	35.77	18.31	5.77

The dimension of clarity and coherence in management points out 26.42% always, 20.05% almost always, 18.66% sometimes, 25.11% very rarely and 9.76% never; in the company, there are work areas where there are no well-established processes, added to the level of education of the employees in certain work areas, leads to ignorance of goals and results based on their efforts. Finally, the stability dimension has 22.90% always, 24.33% almost always, 20.06% sometimes, 18.49% very rarely and 14.22% never; there is a high degree of work absenteeism so there is staff turnover.

5.4.2 Psico 4.0

With the results of the Fpsico software has been possible to determine the risk levels. represented graphically in Fig. 5.2, where the evaluated dimensions and the color representation of the measure and level of risk are found. The most representative results of the dimensions that have high risk levels are: Work time (TT), Participation and supervision (PS), and Relationships and social support (RAS) [5].

In the dimension (TT), the results presented indicate that employees, once the working day is over, cannot fulfill the designated activities, which must be kept in a continuous work rhythm with little rest time [15].

In the dimension (PS), the results presented indicate that there is an imbalance between the number of collaborators and supervision, developing an inappropriate work environment, since work overload can generate psychological consequences and physical complications; in the same way, the participation of colaborators in the company's processes is not relevant [14].

In the dimension (RAS), the results obtained are associated with the accumulation of work tasks and activities that are often carried out in remote and individual environments, there is a lack of communication with their superiors and coworkers affecting their feelings of team collaboration and camaraderie.

5.4.3 EQR Performance Evaluation

The performance evaluation carried out by the Human Talent Department for the first quarter of 2021 has been considered, the collaborators who have remained in the EQR Company for more than 6 months were taken into account for it.

Table 5.2 and Fig. 5.3 show the results of the performance evaluation carried out on 124 employees from all work areas. The results are general for each of the dimensions.

Employees present inadequate results in the adaptation dimension, this is produced by the demanding activities that they must perform to comply with their daily performance evaluation during their labor hours, as these influence the employees' health conditions, generating consequences in a physical way such as muscular pains.

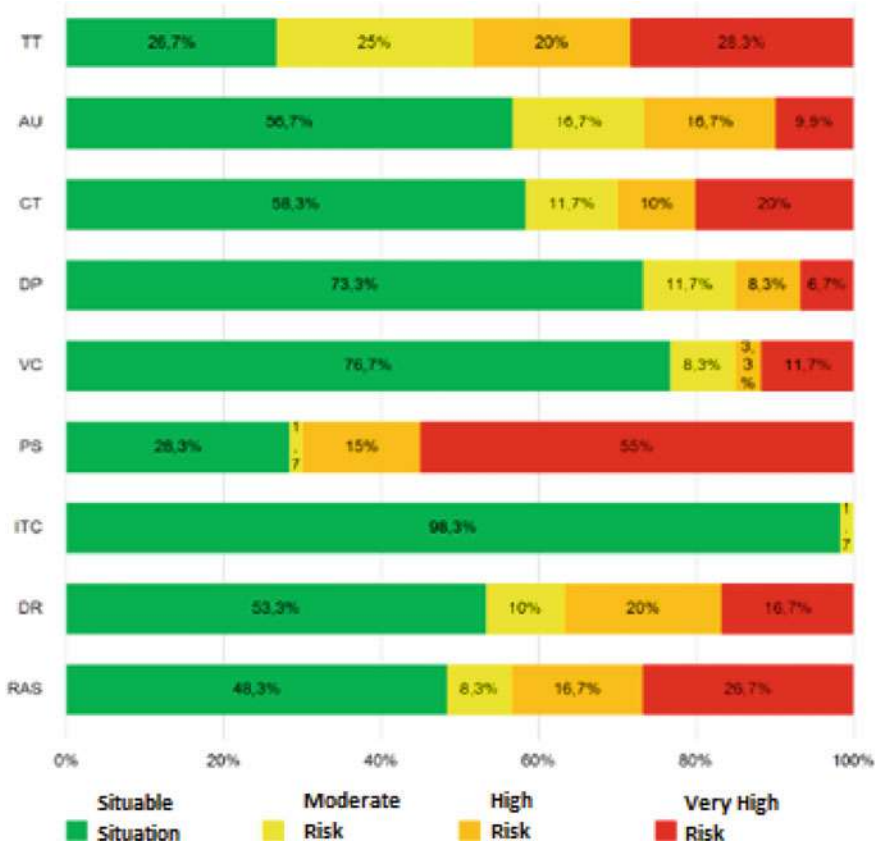


Fig. 5.2 Fpsico software evaluation

Table 5.2 Results of the organizational environment evaluation

Dimensions	Excellent (%)	Very good (%)	Good (%)	Regular (%)	Inadequate (%)
Relationships	63	22	12	3	0
Labor aspects	59	23	11	6	1
Knowledge, skill and attitude	58	24	13	4	1
Responsibility	57	27	12	3	1
Adaptation	52	33	9	6	0

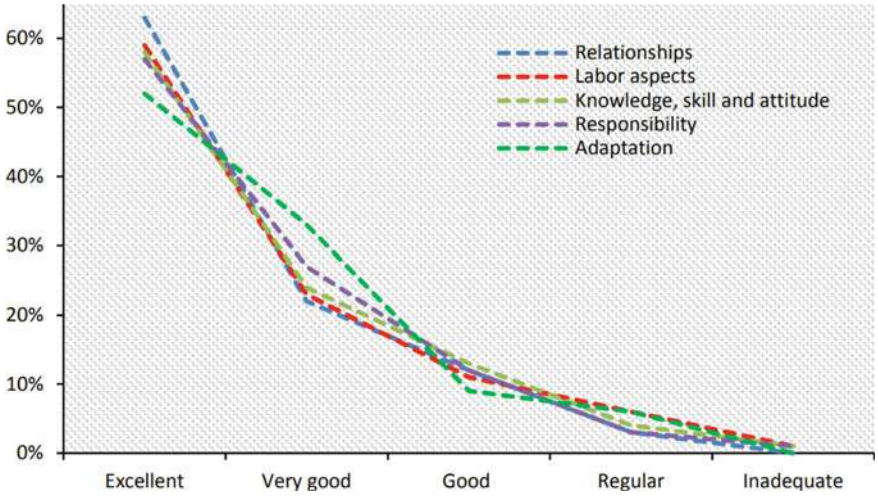


Fig. 5.3 Relevant dimensions of performance evaluation

5.4.4 Correlation and Solution Alternatives

In the process of correlation of variables, parametric data has been considered due to the nature of the tests. Due to the high number of data to be manipulated, the SPSS software has been used to support statistical calculations. For the first analysis of the correlation, the critical results of the evaluations of the three study variables have been considered, where there are: (i) organizational environment, the dimension of leadership style; (ii) psychosocial risks, the participation and supervision dimension; and to correlate (iii) job performance, the subsection knowledge skill and attitude; the procedural result is favorable and it has been correlated with a Chi2 value of 16.87.

However, to corroborate this answer, a second analysis has been considered where it has been considered: (i) organizational environment, the dimensions: (a) leadership style, (b) availability of resources, (c) stability; (ii) psychosocial risks, the dimensions: (a) participation and supervision, (b) work time, (c) relationships and social support; and to correlate (iii) job performance, the subsections: (a) knowledge, skill, and attitude, (b) responsibility, (c) adaptation; and with the increase in data in each study variable, the results indicate that there is a direct correlation with a Chi2 value of 14.16.

Once it has been analyzed that there is a high correlation between variables, the Human Talent Department of the EQR company has analyzed the implementation of intervention plans at three levels: At the organizational level aimed at all employees, this covers the senior management, department heads, section heads, administrative and operational staff, for which active pause plans and preventive health plans have been proposed.

At a group or departmental level, depending on the characteristics of each work team, specific training will be provided to administrative personnel, training plans and goal fulfillment plans will be implemented for operational personnel; and, finally, at an individual or personal level, depending on the problem of each collaborator, interventions with the specialist to attack the identified problem will be carried out.

5.5 Conclusions

Managing human talent in times of the COVID-19 pandemic is a challenge to maintain and even more to increase productivity due to all the adversities caused in society, the various external factors that appear during the course of the pandemic require companies to act quickly so as not to lose competitiveness. Therefore, in the EQR Company, factors such as a) organizational environment, b) psychosocial risk, and c) work performance were evaluated in 124 employees from different work areas.

Once the evaluation of the Organizational Environment through the EDCO test has been concluded, the dimensions where there is more affectation are: Leadership style with 28.54%; availability of resources with 18.95%; stability with 14.22%; and clarity and coherence in the management with 9.14%. These percentages affect the management of human talent among bosses-subordinates and equally among subordinates negatively.

The FPSICO instrument helps in the evaluation of psychosocial risks, it has been possible to take into consideration the high risk levels where it is possible to identify the dimensions that can cause the greatest impact on human talent: Participation and supervision (55%), Time at work (28.3%), and Relationships and social support (26.7%).

Work performance was evaluated with an instrument of the company where it was possible to identify three characteristics that affect the level of productivity: Adaptation (15%), responsibility (16%) and knowledge, skill and attitude (18%).

In addition, according to the data calculated in the SPSS software, there is a direct relationship between the variables evaluated, organizational environment, and psychosocial risks, this directly affects job performance.

The statistical test indicates that the collaborators with the greatest affectation fail to fulfill the tasks assigned by the (PS), (TT), and (RAS); However, these measurements allow to intervene in the specific problems of each collaborator and that, at a general level, work performance is at an acceptable level.

Finally, the Human Talent Department of the EQR Company by analyzing the plans, proposes interventions at three levels: At the organizational level aimed at all collaborators; at a group or departmental level, depending on the characteristics of each work team; and on a personal level with health complications of each collaborator.

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Chapter 6
Data Anonymization: Techniques and Models



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Abstract Data growth is exponential and nearly immeasurable. We used to talk about megabytes when we spoke about data, but now we talk about petabytes with BigData. This data growth makes sensitive data and identifiers increasingly exposed. To address this issue, there is anonymization data, which attempts to "mask" the data so that it is nearly difficult to identify and correlate persons with them; yet, the data remains usable for statistical reasons, among other things. To avoid falling behind in these technical difficulties, many businesses employ free, open-source software. However, this software is not always secure or meets the user's expectations. The goal of OSSpal is to normalize these concerns.

Keywords Anonymization · k-Anonymity · l-Diversity · FOSS · OSSpal

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6.1 Introduction

With the continuing development of data flow, there is a growing demand to exchange this same data with several sources. Outsourcing software development, for example, requires data to leave its "core" and travel to the outside environment, where it may include sensitive information about users. In other words, this sensitive information cannot/should not be made public, not only because they are sensitive data but also due to the users' lack of authorization [9]. There is a variety of sensitive data. Personally Identifiable Information (PII) is a sort of sensitive data that may be used to identify or associate an individual in a simple or combined manner (Table 6.1). When this property is hacked or seen by the wrong persons, it can lead to the loss of the owner's reputation or even blackmail [11].

Medical data can be further classified as Personal Health Information (PHI). The distinction between PHI and PII is slight because PHI does not include educational or career information. This category (PHI) emerges because a large amount of health data is collected, stored, and sent to multiple elements such as public or private hospitals, laboratories, automated systems for identifying abnormalities and forecasting illnesses, and so on.

The requirement to comply with legislation (e.g., GDPR) associated with the risk of losing clients due to improper use of personal data has driven businesses to search increasingly for data privacy solutions. One such solution is data anonymization, which assures that even if anonymized data is disclosed or stolen, it does not allow it to be misused. Data anonymization is the process of de-identifying sensitive data while keeping its data format and type intact, so it does not become unusable. After anonymization, the data produced could be realistic, a random series of data, or deterministic, which means the same result every time. These outcomes depend directly on the various strategies employed for this purpose [7]. This method is carried out by combining multiple models, including k-anonymity and l-diversity. These models, in turn, employ techniques such as generalization, suppression, perturbation, and anatomizing [1].

To evaluate and confirm these methodologies and procedures, we will examine two FOSS tools (free and open-source software). These tools are ARX—Data Anonymization Tool and Amnesia.

Table 6.1 Personal identifiable information

Data type	Examples
Personal data	Age, gender, religion, government ID, biometric data, address, zip code, etc.
Educational data	Qualifications, schools attended, etc.
Contact data	Phone number, email, social network profiles, etc.
Financial data	Account balance, credit/debit card number, etc.
Medical data	Prior/current medical status, health identification number, etc.

Section 6.2 examines several anonymization strategies and privacy models. Section 6.3 provides a brief overview of two open-source anonymization programs. The experimental setup is shown in Sect. 6.4. Section 6.5 discusses the acquired results and their analysis. Section 6.6 concludes by drawing some findings and discussing future work.

6.2 Literature Survey

There are various phases to the anonymization process. The data is processed by models, usually multiple times, to provide the best possible outcome. As a rule, it combines many models to mitigate the flaws of the others. Several techniques are tied up with these models [13].

6.2.1 Techniques

Anonymization techniques are designed to reduce the identifiability of data that qualifies as personal data and belongs to a legal person to a level that does not exceed a pre-set risk limit.

Generalization: For categorical attributes, generalization, also known as global recording, merges a sequence of categories into new, less specific categories. For continuous attributes, replace these attributes with intervals (Table 6.2). The goal is to eliminate specific identifiers without impacting the accuracy of the data [6].

Suppression: Suppression begins with the identification of sensitive cells using sensitivity guidelines:

- (n, k)-dominance: A cell is sensitive if its incidence is so low that it may be used to identify it. In other words, a cell is deemed sensitive if n records equate to more than k percent of the overall value;
- pq-rule: $(p/100)$ Percent of the greatest contribution is less than $(q/100)$ percent of the cell total minus the two largest contributions;

Table 6.2 Generalization

Before generalization	After generalization
Age	
17	[10,20[
26	[20,30[
39	[30,40[
19	[10,20[

Table 6.3 Suppression results

Before suppression			After suppression		
Gender	Age	Education	Gender	Age	Education
Male	25	Lower	Male	25	NA
Male	25	Higher	Male	25	Higher
Male	25	Higher	Male	25	Higher
Male	25	Higher	Male	25	Higher

- $p\%$ rule: The cell total less the two greatest contributions are less than (p/100) of the largest contribution.

Following the discovery of sensitive cells, the same are replaced with empty values (Table 6.3). Additional suppressions may be required to avoid the recovery of initial suppression of rows or marginal columns [5].

Perturbation: The perturbation does not eliminate values from the data collection but disrupts (alters/distorts) the data to reduce the risk of the data leak, causing uncertainty about the actual data. An attacker cannot be guaranteed that the relationship between microdata and an external file is correct. The notion of matrix masking underpins the majority of perturbative approaches [8].

The formula for this approach is $Z = A.B + C$, where Z represents the changed dataset, A is a matrix used to convert the records, B is a matrix used to modify the variables, and C is a matrix with extra noise. The main benefit of this technique is that it reduces information loss depending on the amount of perturbation because no value is suppressed. One significant downside is that for users unfamiliar with the procedure, it may appear that the data has not been anonymized.

Anatomizing anatomization begins with examining the dataset and separating the observed association between the quasi-identifying and sensitive variables. Decoupling the same data results in two different tables with non-overlapping properties (Table 6.4). Because it does not reflect the sensitive value corresponding to any tuple that may be randomly assumed from the database of sensitive characteristics, this strategy protects privacy [12].

6.2.2 Privacy Models

After studying the various techniques for data anonymization, it is also critical to comprehend the different privacy models. Using these models, you may evaluate many scenarios and select the one that appears to be the best fit. This decision must be made to reduce the danger of disclosure.

k-Anonymity: The k-anonymity privacy model is a prominent strategy for avoiding identity exposure. This model involves building dataset groups, each comprising at least k records with the same value for each quasi-identifier. In the anonymous dataset,

Table 6.4 Anatomization process

Before anatomization				
Original table				
Gender	Age	City	Disease	Symptom
Male	63	OPorto	Cancer	Sore throat
Male	53	Lisbon	Prostrate inflammation	Pain in the bladder area
After anatomization				
Quasi-identifier table			Sensitive attribute table	
Gender	Age	City	Disease	Symptom
Male	63	OPorto	Cancer	Sore throat
Male	53	Lisbon	Prostrate inflammation	Pain in the bladder area

the likelihood of re-identifying a person is at a maximum of $1/k$. It may be executed using various methods, including generalization and micro-aggregation [2].

This model is vulnerable to a few attacks, including:

- Homogeneity attack: Pedro is a 43-year-old guy from postcode 3500. As a result, Pedro is almost certainly in the first category and has a poor degree of schooling (Table 6.5).
- Background knowledge attack: Miguel, age 55, resides in postcode 3500. Miguel is reported to have attended mid-school. As a result, he can be considered to have a higher education degree (Table 6.5).

l-Diversity: The l-diversity model was developed to address some limitations of k-anonymity. This concept is founded on the idea that preserving k-individual identities is not the same as protecting corresponding confidential values. To defend against attribute disclosure, the distribution of a sensitive attribute in each equivalence class contains at least l "well-represented" values [4].

This model is vulnerable to similarity attacks; for example, if it is known that Nuno earns a low wage, between $1000 and $3000, it might be assumed that he

Table 6.5: k-anonymity

	ZIP Code	Age	Education
1	350***	4*	Lower
2	350***	4*	Lower
3	350***	4*	Lower
4	351***	< 40	Mid
5	351***	< 40	Lower
6	351***	< 40	Higher
7	350***	5*	Lower
8	350***	5*	Higher
9	350***	5*	Higher

Table 6.6 l-diversity

	ZIP Code	Age	Salary	Disease
1	350***	4*	1K	Coronary artery disease
2	350***	4*	2K	Blood vessel disease
3	350***	4*	3K	Heart valve disease
4	351***	< 40	7K	Ulcer
5	351***	< 40	12K	Coronavirus disease
6	351***	< 40	9K	Bronchitis
7	350***	5*	8K	Bronchitis
8	350***	5*	10K	Gastritis
9	350***	5*	11K	Flu

has heart disease (Table 6.6). That is because this model disregards the semantic closeness of values.

6.3 FOSS Tools

As previously said, data anonymization is becoming increasingly vital due to the exponential increase in this matter (data). As a result, there are more and more sensitive and secret data that must be secured. However, in-market solutions might be prohibitively expensive for certain businesses. As a result, they have the option of using open-source software.

6.3.1 ARX—Data Anonymization Tool

ARX is an open-source tool for changing structured (i.e., tabular) personal data using approaches drawn from the fields of data anonymization and statistical disclosure control. It allows for the transformation of datasets to ensure that they comply with user-specified privacy models and risk thresholds that reduce assaults that may result in privacy breaches. ARX can be used to eliminate direct identifiers (e.g., civil ID) from datasets and impose additional limitations on indirect identifiers. Indirect identifiers (also known as quasi-identifiers or keys) are features that do not directly identify a person but can be utilized in linkage attacks when combined with other indirect identifiers. ARX supports privacy models, such as k-anonymity, l-diversity, t-closeness, δ-disclosure privacy, β-likeness, and δ-presence [10].

6.3.2 Amnesia Anonymization Tool

The Amnesia anonymization tool is Java and JavaScript software that should be used locally to anonymize personal and sensitive data. The essential principle behind anonymization is that users upload a document containing personal information (original data) into Amnesia, which then changes it into an anonymous dataset that may be saved locally. The transformation is directed by user preferences and ensures anonymity for the resultant dataset. Currently, Amnesia provides k-anonymity and km-anonymity guarantees.

The anonymization process is summarized in the five phases below:

1. Dataset: Amnesia can process datasets saved as delimited text files. Each line in the text file represents a different record, with each value of the record separated by a delimiter. When importing a dataset, the user must specify the delimiter used in the original file to the program.
2. Hierarchy: Amnesia will utilize the hierarchy for replacing detailed data with more general values until the desired level of privacy is obtained.
3. Algorithms: The masking approach is used for pseudo-anonymization. When a user enters a dataset into Amnesia, a "pseudo-anonymization" button appears next to each string attribute.
4. Solution Graph: Amnesia is designed to allow the user to customize each step of the anonymization process. This implies the possibility of picking any good solution for basic k-anonymity. Amnesia illustrates the solution space and allows the user to select from solutions that ensure k-anonymity.
5. Anonymized Dataset: Finally, the data is anonymized, and the user can save it.

6.4 Experimental Setup

A dataset called adult.csv from the ARX tool's GitHub repository was utilized to run the experiments with the anonymization tools. This dataset has nine columns: sex, age, race, marital status, education, native-country, work class, occupation, and salary class.

The OSSpal approach was used to evaluate the tools. The OSSpal methodology is the project's replacement for the Business Readiness Rating (BRR). These approaches are designed to assist businesses in locating free, high-quality open-source software. By integrating quantitative and qualitative assessment methods, OSSpal can determine which program has the highest rating [3]. This strategy is divided into seven categories:

- Functionality: Analyzes how effectively the software will respond to user identified demands.
- Operational software characteristics: Analyzes concerns with software security, functionality, and so forth. Analyzes end-user UI/UX characteristics and the ease of installing, configuring, deploying, and managing software.

- Documentation: Check to see whether there is a tutorial that describes how to use the software to assist users and programmers in its use and development of new features.
- Support and service: Analyzes the software component's level of support and if it receives assistance from the community or the commercial sector.
- Community and adoption: Analyzes how the community, market, and industry have embraced the component. Check the software's community activity as well.
- Software technology attributes: Validates the software's architecture. It examines the same in terms of granularity, scalability, and integration ease.
- Development process: Assesses the level of professionalism in the development process and project management.

Figure 6.1 shows an illustrative diagram of OSSpal. A percentage is associated with each category of the same, which defines the overall weight of that category. The categories and the overall result are rated from 1 to 5, with five being excellent, four good, three acceptable, two poor, and one unacceptable. The formula in Eq. 6.1 allows getting the final score that defines an open-source software.

$$\text{Final Score} = \frac{\left(\sum \text{category Score}\right) \times (\text{weight})}{\sum \text{weight}} \tag{6.1}$$

6.5 Results and Analysis

The first step in utilizing the ARX tool is to create a project. After that, the dataset is loaded, which in this case had 30,162 lines. When the data set has been imported, the data type of the columns must be identified as insensitive, sensitives, quasi-identifying, or identifying. Following that, the program allows the user to establish a generalization hierarchy that describes how the column will be anonymized. Figure 6.2, for example, shows the specification of age intervals, which will be used to substitute the values in the age column throughout the anonymization process.

The final step is to select the preferred privacy model, adjust basic settings, and then begin the anonymization process. This process has distributed 72 different ages over nine age intervals and took roughly 1.14 s to complete using the k-anonymity model with k equal to 2.

The beginning procedure is the same for the Amnesia tool. The same generalization hierarchy was generated in this instance using the same dataset used earlier. For $k = 2$, the anonymization procedure took around 1.07 s. The software first shows anonymization and also specifies which of the outcomes is safe or not. Figure 6.3 compares the original dataset and the anonymized dataset side by side.

Following the use and exploration of the tools, it was possible to analyze and make conclusions on numerous factors. These factors allowed the evaluation of the various OSSpal categories listed above. The classes assigned to each tool are described in

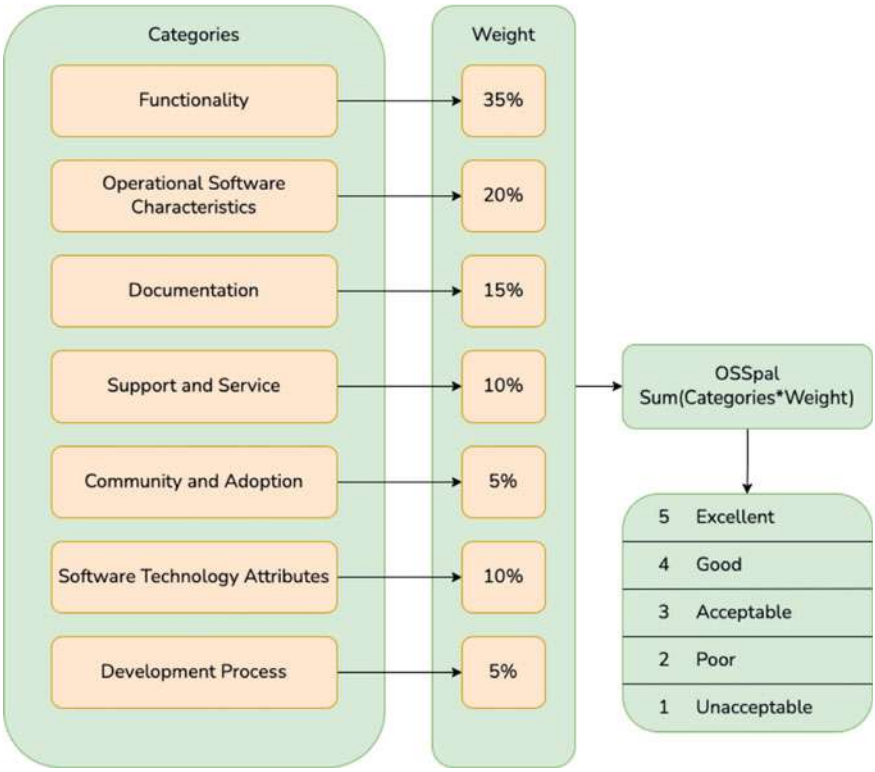


Fig. 6.1 OSSpal diagram

Table 6.7. Analyzing the classifications presented, the ARX Data Anonymization Tool is classified as an acceptable open-source software. Meanwhile, the Amnesia Anonymization Tool is classified as good open-source software.

The ARX tool received a 3 in the functionality category because it displays the bare minimum to the end-user; yet, specific simple actions, such as data masking, are not intuitive and may go overlooked by most users. The tool receives a grade of 2 in the operational software characteristics area because it has a legacy UI and is hard to use. The documentation received a 3 rating because, despite considerable explanation; sometimes, it may be unclear. The tool scored a 4 in the support and service area because public evaluations indicate good support. The community and adoption received a 4 rating. The grade was determined after evaluating general metrics from the GitHub repository. In order to help retrieve conclusions, a program was developed that consumes the GitHub API and displays various information, as shown in Fig. 6.4. Although it is accessible for the three major operating systems (Windows, Linux, and macOS), the utility received a grade of 3 in the software technology attributes category. It also lacks an online demo version so that customers

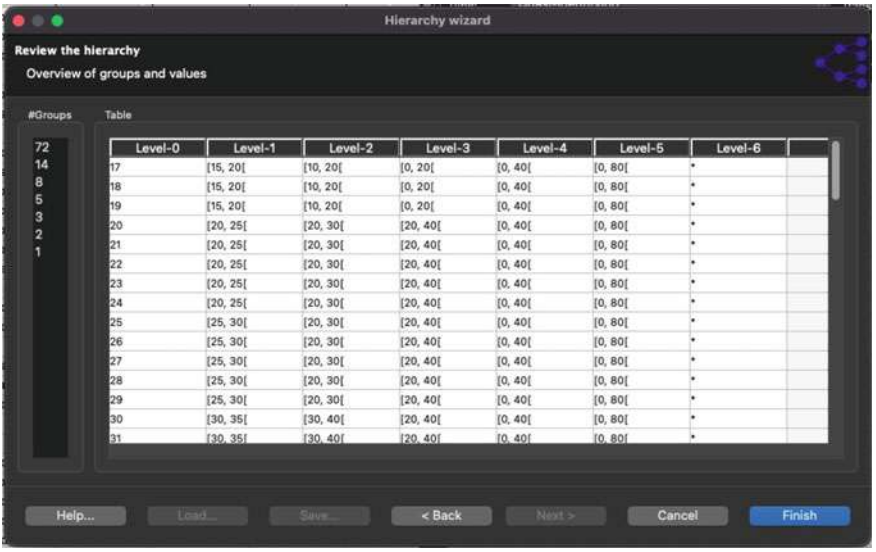


Fig. 6.2 Generalization hierarchy



Fig. 6.3 Original data set versus anonymized data set

can experience the tool first-hand. The classification in the final category is 3. The rating in this category is directly dependent on the types mentioned above.

The Amnesia tool received a 4 in the functionality category because it displays the requirements to the end-user, such as data masking, available by clicking a button. The tool receives a grade of 4 in the operational software characteristics category because it is a up-to-date UI and is easy to use. The documentation received a 3 rating because, despite considerable explanation; sometimes, it may be unclear. The tool scored a 4 in the support and service category because public evaluations indicate good support. The community and adoption received a 3 rating because their GitHub repository is low on movement. The tool received a four in the software technology attributes category because it is available for Windows and Linux. It also has a web version that allows customers to have first-hand experience with the tool. The classification

Table 6.7 OSSpal evaluation

		ARX—Data Anonymization Tool	Amnesia Anonymization Tool
Categories	Functionality (35%)	3	4
	Operational software characteristics (20%)	1	4
	Documentation (15%)	3	3
	Support and service (10%)	4	4
	Community and adoption (5%)	4	3
	Software technology attributes (10%)	3	4
	Development process (5%)	3	3
Total		2.95	3.75



Fig. 6.4 FOSS evaluation

in the final category is 3. The rating in this category is directly dependent on the categories mentioned above.

6.6 Conclusions and Future Work

As previously said, data expansion is exponential. As a result, more and more sensitive data and identities are released on the Internet, increasing the significance of securing these same data. The anonymization data is a little-discussed issue, but it must become more prevalent in companies.

Companies choose FOSS due to the expensive cost of some software; yet, they frequently do not know if it is good, safe, and fits the standards, among other things. These are the issues that OSSpal seeks to address.

6.6.1 Future Work

We constructed the mentioned application, which collects statistical data about GitHub public repositories to aid in assessing FOSS software. One area that should be improved is the tool's integration with more public repositories, which would increase the tool's reliability. Another improvement would be providing general forms for the community to assess each OSSpal category, resulting in a more comprehensive evaluation.

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Chapter 7
Performance Evaluation Between HarperDB, Mongo DB and PostgreSQL



Diana Figueiredo, Goncalo Saraiva, Joao Rebelo, Ricardo Rodrigues, Filipe Cardoso, Cristina Wanzeller, Pedro Martins, and Maryam Abbasi

Abstract Several modern-day problems, like information overload and big data, need to deal with large amounts of data. As such, to meet the application requirements, for instance, performance and consistency, more and more systems are adapting to the specificities. The existing relational database management system (RDBMS)'s processing of massive data has become an issue because these databases do not deal with a massive amount of data. NoSQL is a database management system that makes processing massive and/or unstructured data easier because it uses key-value to store the data, collections or document stores instead of tables. Many companies today tend to start a project using NoSQL. However, HarperDB aims to produce a relational and non-relational DBMS, allowing developers to choose between different solutions. This paper aims to show the most relevant differences between HarperDB, MongoDB and PostgreSQL and compare their performances. Preliminary results show that

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PostgreSQL performs better with structured data, but HarperDB can integrate NoSQL and SQL, which can be a significant advantage to HarperDB compared with the other solutions.

Keywords RDBMS · NoSQL · PostgreSQL · MongoDB · HarperDB · Performance

7.1 Introduction

The data volumes generated by modern-day systems have met staggering growth during the last few years. Managing and analyzing these data is becoming increasingly important, enabling novel applications that may transform science and society. Thanks to advances in storage technology (being larger and cheaper), more data of customers is being stored in the cloud. The problem is that the data collected is no longer relational, and companies have been adopting a new structure called NoSQL to meet this new requirement. The relational database management systems (RDBMS) have issues structuring unstructured data and performance/cost problems in processing massive data [1]. NoSQL performs read/write faster because it has a memory mapping function, making NoSQL suitable for processing big data. In addition, unlike RDBMS, which mainly processes structured data, NoSQL can handle unstructured data more easily [1]. This type of database has been around since the 1960s. However, in the last decade, we have seen market traction and the trend toward databases, such as HarperDB, that are capable of storing relational and non-relational data together [2]. HarperDB has been created to address the complexity and expense of current database systems. This database can be built and scaled without prior knowledge or understanding and without sacrificing performance. It has been marketed as a "true native high transnational NoSQL and SQL" single database solution [2]. With this in mind, in this paper, we will analyze the performance differences between PostgreSQL, an RDBMS, MongoDB, a NoSQL database, and HarperDB, which can work with relational and unstructured data. To perform these tests, we will use the TPC-H benchmark that was initially designed to compare database systems end-to-end. Researchers also use it to benchmark implementation details and algorithms. It consists of a suite of business-oriented ad-hoc queries and concurrent data modifications [3].

This document is organized into five sections. Section 7.2 presents the state-of-the-art articles comparing the performance between HarperDB, MongoDB and PostgreSQL. Section 7.3 explains, analyzes and compares the different architectures. Section 7.4 describes the setup used in the tests. Section 7.5 shows the obtained results in the tests. Finally, in Sect. 7.6 conclusions are drawn, followed by the introduction of future work guidelines.

7.2 Related Work(s)

The geographical data that current systems produce has grown astoundingly during the past few years. Managing and interpreting these data is becoming more and more crucial since it enables novel applications that could revolutionize science and society. The effort to deal with this data flood has shown to be greatly helped by distributed database systems. This article [4] compares the performance in terms of response time between a scalable document-based NoSQL data store MongoDB and an open-source object-relational database system (ORDBMS)—PostgreSQL with the PostGIS extension. PostGIS is a spatial extender that adds support for geographic objects [4]. Spatio-temporal queries that simulate actual case scenarios run against a dataset are used to gauge performance. The evaluation of the systems was investigated under various conditions, including a five-node cluster configuration vs a one-node implementation with and without the use of indexes. Each database system was installed on an Amazon Web Services (AWS) EC2 instance and utilized an Amazon S3 bucket to store and retrieve the data. The authors of this paper came to the following conclusions: PostgreSQL outperforms MongoDB in all scenarios; the average response time is reduced by half, almost always, with the use of indexes; however, PostgreSQL again reduces the response time by a significant amount; and PostgreSQL reduces the dataset size occupied in the system DB by four times because it stores data more effectively [4]. This paper differs in that, in addition to comparing the performance of the PostgreSQL database with the MongoDB performance. We also compare it with HarperDB.

Big data technology has recently attracted interest from many industries and has received close attention from governments worldwide. Big data is viewed as the "oil" of contemporary civilization, and scientific research has shifted its attention to the value of the information it holds [5]. Before the big data era, data was organized using a two-dimensional table schema in the common format, which is relatively simple to manage and use. The complexity of the data kinds in the big data environment, however, makes it hard to predict how the data will be stored. For this reason, the shift from model-driven research to data-driven research was necessary [5]. When comparing the consumption times for writing the data into each database and the compression ratio, the authors of this paper [5] used remote sensing data as the target data to assess the performance differences between unstructured data in PostgreSQL and MongoDB database technologies. According to the research, MongoDB is six times faster than PostgreSQL at writing unstructured data, and PostgreSQL performs significantly better at compression than MongoDB. [5]. In our paper, we will try to compare the performance with both aspects and compare the performance with different sets of write and read between these databases and HarperDB.

7.3 Architecture

7.3.1 HarperDB

HarperDB was created because of the complexity and expense of database systems. The main goal of this software is to be built and scaled without prior knowledge or understanding by developers of any skill level, all of this without sacrificing performance [6]. This software can run in every operating system, allowing users to collect, process and distribute data in their company, from hosted servers to the cloud. With HarperDB, it is possible to use conventional SQL operations such as joins, order by and group by. HarperDB can support document storage, data modeling schema and queries based on API execution.

7.3.2 MongoDB

MongoDB was founded in 2007. It is an open-source database built on a horizontal scale-out architecture that uses a flexible schema for data storage. It is an open-source document-based NoSQL datastore. MongoDB does not use tables, rows or columns, unlike the SQL database. In MongoDB, the database is a BSON document, a binary data representation. Applications can access it through JavaScript Object Notation (JSON) files. This is applied in most modern programming languages. This database allows programmers and developers to store structured or unstructured data, since it uses JSON-type files to store documents. Even though MongoDB is a non-relational database, it contains features and functionalities of relational databases, such as sorting and secondary indexing. MongoDB also contains relational database operators such as create, insert, read and update [4].

7.3.3 PostgreSQL

PostgreSQL is an open-source relational database that uses SQL language combined with features that allow you to scale even the most complicated database schemes. It was created in 1986 as the University of California at Berkeley project. PostgreSQL allows compatibility in several operating systems. It follows the atomicity, consistency, isolation, durability (ACID) concept. These properties guarantee the transactions in the database, and even if errors occur during the transition, PostgreSQL ensures that data is not lost [7].

PostgreSQL has gained an excellent reputation for its architecture, reliability and data integrity. It can be used on most operating systems, has trendy add-ons, and is used by many people and companies worldwide. PostgreSQL is a good option because it is easy to use, it is open-source, has a big community that can support

it when needed, has a user-defined data type and many advantages that make this tool so popular. Nevertheless, it also has some disadvantages. For example, many open-source apps support MySQL but may not support PostgreSQL.

7.3.4 HarperDB Versus MongoDB

MongoDB is a document store that stores data in JSON-like documents that can vary in structure offering a dynamic, flexible schema [8]. MongoDB was also designed for high availability and scalability, with built-in replication and auto-sharding, which is excellent for storing unstructured data. It is a database that optimizes the data value chain for any size company without sacrificing features, functionality and stability. HarperDB is designed to run from the edge to the cloud, and it is a distributed database with a REST API and dynamic schema that supports NoSQL and SQL, including joins. (For example, it is possible to ingest data via NoSQL JSON and then immediately query it via SQL), contains an enterprise-level ACID SQL capability for storing documents. It includes a native REST API that supports SQL over JSON files. MongoDB is more optimized for large-scale writes, but not reads. HarperDB's write algorithm allows large-scale reads and writes, which results in better performance generally.

7.3.5 MongoDB Versus PostgreSQL

MongoDB and PostgreSQL are different types of databases, and both serve different purposes [9]. PostgreSQL is one of the most popular relational database management systems (RDBMS) and is entirely open-source. It can support complex procedures, designs and integrations. It is a SQL database, and it follows the standard SQL queries. It is mainly used to store data that follows a particular structure. MongoDB is a NoSQL database model often used for unstructured data and application development. It is a document-based database. MongoDB, a NoSQL database, is not relational and can have a dynamic schema. MongoDB gives us the flexibility to change the data schema at any time. MongoDB can handle operational, transnational and analytical workloads easily. MongoDB must be applied in a use case where it is needed to save unstructured data or if it is needed to handle massive data, and in the future that same data will keep growing. It is also good if the application is cloud-based.

PostgreSQL is good if the data is structured and follows a specific pattern to perform a significant amount of joins in the application. This database should be used if the application does not have much data. The main difference between those two is that MongoDB is a NoSQL database, and PostgreSQL is a SQL database. In MongoDB, the data is saved as a collection, but in PostgreSQL, the data is held in tables.

7.3.6 PostgreSQL Versus HarperDB

HarperDB scales horizontally, which allows for speed. It has bidirectional table-level data replication and uses a simple pub-sub model; data is replicated by publishing data to different "chat rooms" to which different nodes subscribe and can be distributed horizontally [10]. Otherwise, PostgreSQL scales vertically (as it gets bigger, more space or memory is needed). Therefore, it requires downtime to upgrade. HarperDB and PostgreSQL have enterprise-grade ACID SQL transactions, meaning data validity is quite reliable. The problem with PostgreSQL is that there is not a PostgreSQL cloud-like like HarperDB Cloud and MongoDB Atlas, but some cloud providers offer PostgreSQL-as-a-service. HarperDB is more flexible than PostgreSQL, which is a good option for complex or strict data. On the other hand, HarperDB is simpler to install, configure and administer. It allows developers to use SQL and NoSQL knowledge for the same data model.

7.4 Experimental Setup

In order to do the performance tests of the three different databases, we installed MongoDB and PostgreSQL on a computer to have the exact specifications allowing us to compare their performances, and we installed HarperDB on Docker on the same computer. We did the tests, each one at a time, to ensure that the condition of the tests was the same. This computer has Windows software installed and has the following specifications: Intel i5 processor and 8 gigabytes (GB) of random access memory (RAM). We inserted a dataset of 10 gigabytes in each database, generated with the benchmark TPC-H, and then proceeded with the performance tests. The free version of HarperDB has the limitation of 500 megabytes (MB) of RAM, limiting some tests done on HarperDB compared with the performance tests done in the other databases.

As we mentioned earlier, the dataset of 10 GB was generated with TPC-H. TPC-H is a benchmark that simulates a decision support system database environment. The components of the TPC-H database are defined to consist of eight separate and individual tables (the base tables). However, we focused our tests on the lineitem table because it is the one with more data.

For this work, we focus on the insert test, which consists of inserting data into the database and selecting the test where we will execute some queries.

To load the data to PostgreSQL and HarperDB, we used the file generated by the benchmark. However, to load the data to MongoDB, we needed to convert the data to JSON format. To do this, we used a script in NodeJS (code available in https://github.com/Sworks99/Conver_to_json). However, we could not load all the datasets into HarperDB due to his limited RAM (0.5 GB of RAM) on the free version. These will also affect the queries we executed on HarperDB to perform the tests.

After inserting the 10 GB dataset into each database, we selected queries 1, 6 and 5 from the TPC-H benchmark to test the performance of each one of them. As we

mentioned earlier, we could not insert all the datasets on HarperDB because of the limitations of the free version. MongoDB has a different syntax, so we had to convert the queries used to the MongoDB syntax. For HarperDB, we had to adapt one of the queries and execute it on each database because of the TPC-H queries. We were getting a timeout when executing on HarperDB. Next, we present the custom query created for each database (PostgreSQL, MongoDB and HarperDB, respectively):

Custom Query on PostgreSQL

```
SELECT *
FROM lineitem
WHERE lineitem.l_orderkey = 599456
      AND lineitem.l_partkey = 1321613
      AND lineitem.l_suppkey = 21614
      AND lineitem.l_linenumber = 3
      AND lineitem.l_quantity = 1;
```

Custom Query on MongoDB

```
DB.lineitem.find({
    “l_orderkey”: “599456”,
    “l_partkey”:"21614”,
    “l_suppkey”:"3”,
    “l_linenumber”:"1321613”,
    “l_quantity”: “1”});
```

Custom Query on HarperDB

```
SELECT *
FROM AEABD.lineitem
WHERE lineitem.l_orderkey = 599456
      AND lineitem.l_partkey = 21614
      AND lineitem.l_suppkey = 3
      AND lineitem.l_linenumber = 1321613
      AND lineitem.l_quantity = 1
```

So basically, for the select queries, we will execute the three TPC-H queries mentioned before on MongoDB and PostgreSQL and another one on all three databases. For inserting data, we performed two tests: one with around 750 MB inserted into PostgreSQL and MongoDB and another with a file of 10 MB inserted on HarperDB. We did these two tests because HarperDB has the size of the file insert limited to 10 MB. The tests with HarperDB are done for more straightforward queries and smaller datasets.

7.5 Results and Analysis

With all the queries prepared, we proceeded to execute the performance tests. Executing the three TPC-H queries on MongoDB and PostgreSQL, we obtained the following results:

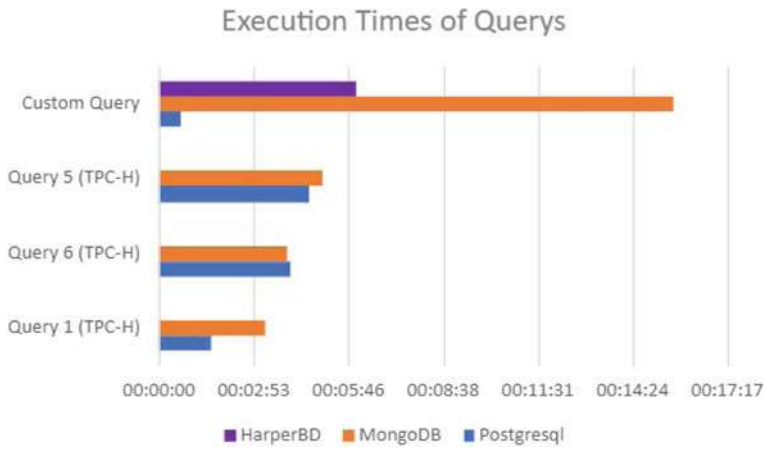


Fig. 7.1 Execution times of querys

As shown in Fig. 7.1 generally, MongoDB takes more time to execute the TPC-H queries, especially on the execution of query 1. On the others, the performances of both databases are similar. With each database's custom query execution results, we can conclude that MongoDB has worse performance than PostgreSQL and then HarperDB and that PostgreSQL has a better performance executing this query.

However, we have to consider that in HarperDB, we do not have all the dataset loaded, so the difference between MongoDB and HarperDB in this query is not that different. With this graphic, we can see that performance improves each time we execute the queries.

With the selected queries done, we advanced to test data insertion in each database. For this, we generated the dataset again with the TPC-H benchmark and used the lineitem table with around 750 MB. To insert the data into PostgreSQL, we used the command "COPY" and converted the dataset into a CSV file. For MongoDB, we again converted the dataset to JSON and used the command "mongoimport" to load the data into the database. With HarperDB, we separated the lineitem CSV file into 10 MB files because it is the limit of upload defined by the database, originating 77 files in total. On HarperDB, we only inserted one of the files because it takes much time to insert each file, as shown in Fig. 7.2.

As we can see in the graphic, MongoDB performs better, followed by PostgreSQL with times of around 2 min, with a minimum difference between these two. However, HarperDB uploading only one file takes more than three times more than the other databases. This is a considerable setback for HarperDB if we want to use essential data.

With these results, we can conclude that the database with better performance for structured data is PostgreSQL. MongoDB performance-wise is not that far from PostgreSQL. However, to work with the data and execute complex queries is more complicated and a lot more complex. HarperDB, we consider that is valuable if it



Fig. 7.2 Results inserting data

is needed to work with NoSQL and SQL, allowing us to work with both in a single database solution.

7.6 Conclusions and Future Work

In modern society, nearly every person runs across databases wittingly or unwittingly. For this interaction, people always want a good performance. Database designers are confronted with the task of getting reasonable speed and efficiency. Taking this into account, in this paper, we compared and analyzed the performance between PostgreSQL, MongoDB and HarperDB using the TPC-H benchmark. With the results obtained, we consider that the best database performance of these three is PostgreSQL with MongoDB, with a similar performance in most queries. HarperDB is valuable if it is needed to work with NoSQL and SQL in a single database solution.

7.6.1 Future Work

Although we presented some results and conclusions on the performance of these databases, we think that analyzing the memory consumption during the query execution could add more insights and obtain better results and conclusions.

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Chapter 8
How Much Are Our Customers Worth? Investigating the Ease of Use and Usefulness of Data Coopetition for SME

Tania Kaya and Valerio Stallone

Abstract The authors used the constructs of the technology acceptance model to examine and investigate Swiss SMEs' willingness to use a data coopetition-based customer lifetime value computing tool. The qualitative interviews revealed identifiable and actionable indications of the need for a data ecosystem that should enable the cooperative sharing of data for customer value calculations.

Keywords Customer lifetime value · Digital marketing · Data coopetition · Confidential computing

8.1 Introduction

The top priority for marketers is to understand and map the customer journey and then determine the value that the company can provide and that customers are willing to pay for [1]. To properly nurture customers, it is imperative to know the customer value. The computation of customer lifetime value (CLV) is intended to accomplish this [2]. However, companies seldom have the necessary data on their customers to calculate the CLV. This can be due to several reasons: The company is too young and has little transactional data or it is an older company, which has slept through the previous digitization of customer databases [3]. The enrichment of these databases is done either by making users more comfortable in sharing their data (zero-party data), by generating the data from the company itself (first-party data), by purchasing these data from external parties (third-party data), or by obtaining the data from entities or partners closer to the company (second-party data). Data sharing willingness in the B2B context has already been studied in depth [4], finding that various aspects such as trust, established relationship, type and frequency of product data, and security practices influence data sharing propensity in B2B.

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In the spirit of aggregating customer data points into an enterprise pool to achieve business goals [5], this paper investigates the following research questions. Which forms of (1) CLV calculation exist in Swiss companies and (2) under which conditions these same companies would be willing to share customer data in a secure and anonymized way with other companies to perform mutual enrichment of the data.

The last question examines the acceptance of a confidential computing-based approach to enriching customer data. Solutions of enriching one company's own customer data by those data points of companies in the same industry or also in foreign economic sectors are called data coopetition [6]. Confidential computing is a cloud-based computing technology that enclaves sensitive data in a protected central processing unit and isolates them during the process [7].

This paper deals with the CLV and the resulting data-based business models. In addition, it deals with the data sharing readiness of companies, which has been investigated in more depth. We start the article by introducing the concepts of CLV and data coopetition. We then summarize the results of a two-step methodology starting with expert interviews first and second from an online survey directed to the stakeholders of the consumer data ecosystem. Toward the end of our article, we then discuss the results of our research and derive conclusions for academia and the industry.

8.2 Related Work

8.2.1 Customer Lifetime Value

If a customer has a long-term relationship with an organization, the customer experiences are satisfactory [8]. CLV's computation enables marketers, since it is able to deliver answers, not exclusively though, to the following questions [9]: What is the maximum acquisition costs we should be wanting the spend for new customers? How high are the retention costs for existing customers? Studies have shown that customers who are selected because of their CLV are more likely to spend a higher amount of money in their lifetime than customers who are selected based on several other metrics [10]. Marketers must be careful not only to look at the transactions of the customers and underestimate or overestimate them [11]. Marketing activities of companies must be profitable. This is why marketing organizations tend to incorporate customer value computations into their decision processes [12].

Customers can be categorized into several segments by their behavioral characteristics such as the purchase rate, lifetime duration, and their average amount of spending estimated from purchase history [13]. The same authors show in a different study that customers' lifestyle can explain the heterogenous CLV in different market segments [14].

As shown in this section, the CLV is composed of different data, such as the acquisition costs, the customer contribution margin, the calculation interest rate, and

the time period [9]. If a brand in the food industry, for example, would want to calculate the CLV, this company would need the data of each individual customer over the lifespan of 60 years. Since this is unlikely, this company would have to content itself with shorter time periods and combine and enrich these data with analyses of different customer groups. Since not all companies have these essential data for calculating the CLV in their database, it is advisable to obtain data of their own customers, or at least similar customer behavior from other companies. This includes the data-based business models, which are explained in the next section.

8.2.2 Data Coopetition

Coopetition should be understood as cooperation in value creation and competition in value capture [15]. Building a network for data sharing among competitors can help companies gain unbiased and unprecedented insights that can give them a competitive advantage over non-members [6]. The extent to which data brokers can cooperate while competing has been investigated by Gu et al. [16]: Through coopetition, data brokers can do much more than create value (such as by increasing efficiency) by softening competition at the expense of the downstream (i.e., customers). In addition, a perfectly functioning data market would lead to deeper incentives on the part of the downstream to have to acquire digital skills [16]: Data buying parties who do not perceive inefficiencies due to any costs incurred through data aggregation do not need to educate themselves regarding this knowledge. However, data brokers are not transparent enough to disclose inefficiencies to their customers and are aware of the information asymmetries reflected in competitive revenue asymmetries, which in turn have led to the failure of such "data coopetition" approaches among brokers. Data sharing among different data brokers without prior upstream consent (by data providers, i.e., end-consumers) is considered illegal because the EU GDPR has tightened the conditions for the consent of consumers: The upstream must be explicitly informed about the final use of the data collected to ensure the data security.

Eber et al. [6] add data coopetition to the dimension of key partners according to Osterwalder and Pigneur [17]. In their work dated 2021, the authors highlight the Farmers Business Network (short FBN), which is an information network by and for farmers, which provides useful and accessible data on product performance improvement to each other's availability [18]. The business model of FBN is to collect, clean, and upload data streams that agricultural farms generate with their precision equipment and/or input knowledge. These aggregated data are combined and analyzed with other data, and the resulting recommendations are shared with FBN customers. For example, FBN offers an online tool for calculating the seeding rate, cost, and yield, which farmers can use to determine the most economical seeding rate for their field [19]. A customer data ecosystem consists of upstream (end customers), processing (service providers), supporting (agencies), and downstream (market participants) actors, whereas in a data coopetition setting, up- and downstream actors are both

members of a data coopetition coalition. The customer data ecosystem of FBN consists therefore of the service provider (FBN), the customers (farmers).

The three pillars of data security include the protection of data at rest, during transmission, and in use. Protecting data at rest mean the utilization of encryption or tokenization, to make data no accessible to thieves, even if data are copied in between servers or databases. Protecting data in transit means making sure that unauthorized parties are unable to view data as it is transferred between servers and applications. There are well-established ways to provide both types of protection. However, protecting data during use is particularly difficult: Applications rely on unencrypted data that are not encrypted or otherwise protected to perform computations. Malware could therefore read the contents of memory to steal information. It does not matter if the data on a server's hard drive were encrypted if it is stolen while in memory [20]. Proponents of confidential computing promise to change this.

How this promise might be applied to the context of data coopetition systems that help SMEs to improve their customer dataset, to compute the customer value although not having enough data, will be investigated in the next sections.

8.3 Methodical Approach

Based on qualitative methods, it was exploratively determined which attributes positively influence the acceptance of a CLV calculation tool based on confidential computing ("CoCoCLV"). A quantitative method was then used to determine the level of acceptance for the previously evaluated versions of the CoCoCLV. The exact methodological procedure is shown in Fig. 8.1.

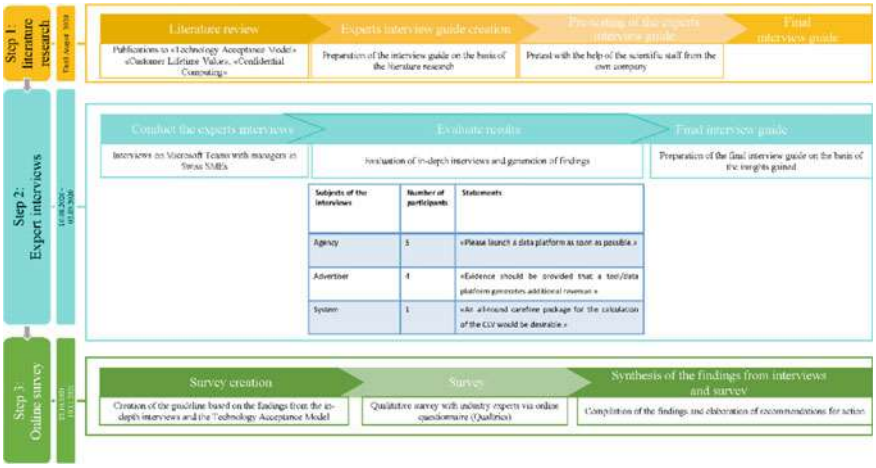


Fig. 8.1 Methodical procedure

In a first step, we undertook a literature review, to find investigations of confidential computing in SME. Due to meager results, we created an interview guideline to be applied with three different stakeholder groups of the customer data ecosystem: up- and downstream actors (advertisers), supporting actors (agencies) and processing actors (marketing technology service providers). Confronted with our CoCoCLV, these experts suggested to create an explanation video,[1] to make our survey clearer to the recipients. In addition, the most important findings from the interviews, such as what data are already being collected in the interviewees' companies, or the desire for a data platform, were included in the online questionnaire.

We pretested the online survey for suitability and used constructs and items of perceived usefulness and perceived ease of use according to the technology acceptance model recommended by Marangunić and Granić [21]. The average time taken to complete the survey was approx. 15 min. The participants were marketing agencies, clients of marketing agencies, as well as service providers of marketing agencies generated through a company. To find out whether the test persons understood the video or not, we asked two control questions, which checked what they had seen. Only when these questions were answered correctly, the questionnaire could be continued.

8.4 Results

A total of 17 actors of the Swiss marketing customer data ecosystem were participated in our study. The respondents were between 25 and 79 years of age, with working experience ranging from 1 to 20 years in marketing and at least holding a bachelor's degree. Nine of the 17 respondents are clients of a marketing agency, and the others are evenly distributed among marketing agencies, service providers of marketing agencies, and management consultancies.

Respondents would like the CoCoCLV to support them mainly in the management of customer experience and the increasing efficiency promotional activities. The respondents see the CoCoCLV as an enabler for a data ecosystem that can help them to calculate their CLV despite the first-party data drought, but they could also imagine that it would help their sales or product development. Other insights from the survey can be seen in Table 8.1.

The results of the survey show that the respondents feel the need to base their targeting measures on the profitability of their customers. They would be happy to use data from other SMEs for this purpose. So far, there is still unclarity regarding the docking to external data and the exact application of the targeting measures. In a further step, it would have to be clarified how CoCoCLV obtains data and how exactly it scatters the data and thus calculates the CLV.

Regarding the willingness to share data, the subjects were asked how they handle it today, if the giving data are based on voluntariness. Today, it is still very mixed. Not

[1] YouTube Link to the video (in German) suppressed because of high identification probability of the authors.

Table 8.1 Outline of the constructs according to TAM

Outline of the constructs according to Technology Acceptance Model (TAM)	Statements	Ø, n = ?
Perceived usefulness	"I would find the CoCoCLV useful in my job"	3.93, n = 14
	"Using the CoCoCLV would allow me to complete tasks more quickly"	3.21, n = 14
	"Using the CoCoCLV would make it easier for me to get my work done"	3.28, n = 14
	"Using CoCoCLV would improve my effectiveness at work"	4, n = 14
	"Using CoCoCLV in my job would increase my productivity"	3.71, n = 14
	"Using the CoCoCLV would improve my job performance"	4.14, n = 14
Perceived ease of use	"I would find it easy to get the CoCoCLV to do what I want it to do"	4.58, n = 12
	"Learning how to use the CoCoCLV would be easy for me"	5.1, n = 12
	"I imagine an interaction with the CoCoCLV to be clear and understandable"	5.08, n = 12
	"I envision interaction with CoCoCLV as flexible"	4.25, n = 12
	"I would find it easy to interact with CoCoCLV in a skilful manner"	5.17, n = 12
	"I would find the CoCoCLV easy to use"	4.8, n = 12

Legend
1 = Extremely unlikely.
4 = Neither likely nor unlikely.
7 = Extremely probable.

everyone likes to share their data, especially not proactively. The main thing people look at here is, what the data are used for and whether sharing brings benefits. The subjects' customers have not yet made any statements about not wanting to share their data with companies.

Our results highlight how CLV is usually calculated manually with the given CRM data. As a tool to collect the data, Google Analytics is the frontrunner among the respondents. Almost all respondents had implemented this analytics tool and use it to measure customer data such as website visits, churn rates. Those who do not yet calculate CLV themselves see the importance of CLV and the advantages that an automated CLV calculation would bring. Something that is not yet included as data by the companies but is desired by the companies is data on when customers would order again, so that specific offers can be worked out.

Finally, respondents were asked if they would like to have CLV calculated on historical or future data. The calculation on data that has already been there was clearly in the lead. This seemed to the subjects to be closer to the truth and thus to predict a more accurate CLV.

8.5 Discussion

A solution based on confidential computing for data coopetition between using SMEs to calculate CLV can be classified as a semi-radical innovative technology, which will result in a change in all dimensions according to the TOE framework based on [22]. So far, the calculation of CLV succeeds mainly with first- and second-party data. In general, SMEs feel the need to know their end-consumers according to profitability to be able to carry out precise targeting measures, which makes a data ecosystem indispensable.

The technological infrastructure in a company is of great importance, as it can determine the extent to which a company can adopt a new technology [23]—for example, the compatibility of the newly added services from the perspective of the accepting party is essential. The advantages in the use by service providers of confidential computing into service-creating core processes have been sparsely studied [24] and the security of this technology remains to be experienced. The service-providing party to such a solution would need to ensure that the use of data across SMEs is as confidential as necessary and as transparent as possible.

SMEs using such a service would need to ensure that top management is on board: these considerations can help or hinder the adoption of new technologies [25, 26]. Top management support can be defined as the extent to which top management understands the importance of the new technology and the extent to which it is involved in the technology adoption process [27]. Top management support can be translated into human (who operates the solution? Who is responsible for the internal and external interfaces?), financial (from which budget pot will license costs be paid?), and infrastructure resources (how will it be ensured that the necessary data lakes are available?), which must need to be in place.

The solution presented in this paper and to the respondents would provide competitive advantages for the participating SMEs (= Data Community) similar to the Farmers Business Network according to Eber et al. [6]. The question of regulation and data protection also arises and is, at the latest since the EU DVSGO, a criterion for Swiss companies in their choice of the right service provider. From the point of view of the service provider, there is no need for any discussion about the need to create a data community: the first mover advantage could soon lead to an almost monopoly position, which in turn could only be shaken by the decentralized implementation of such a data community by customers of the data community provider itself. The only question is what role the end-consumers will have: The final say in data use remains with them and—in view of the latest developments—is not an issue that can be swept under the carpet [28].

8.6 Conclusion

A data ecosystem would be the solution for enterprise data enrichment. Due to data protection laws and the still prevailing lack of willingness to share data, this is a difficult task. The surveys showed that most data are still recorded manually in the CRM. In addition, there are other data, such as Google Analytics, which the respondents like to use. Third-party data is only used in the very rarest cases already and then only for inclusion on Google. Here, there would be a large potential of people who do not yet use third-party data. Very few of the respondents already have models for calculating CLV, but many are already working on them with agencies. The respondents do not see any social pressure to measure CLV. Also, the restriction of the data protection law that the data disclosure is based on voluntariness has not yet led to any drastic experiences with the interviewees. Ultimately, the model of the future is that data can be shared, thus generating a much larger treasure trove of data. However, the survey could not conclusively determine when we will be ready for this, as opinions differ widely here.

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Chapter 9
Impact of SARS-COV2 on University Students. A Socio-economic Resilience and Emotional Intelligence Approach

Gustavo Hermosa Vega and Giovanni Herrera-Enríquez

Abstract University students are exposed to several changes related to their families and economic independence. The academic demands impose greater responsibilities and difficulties (Trigueros et al, The influence of emotional intelligence on resilience, test anxiety, academic stress and the Mediterranean diet. A study with university students. Environ Res Public Health 17(6):2071, 2020 [1]), a reality that worsened as a result of the pandemic between 2020 and 2021 due to the loss of social contact, economic problems, and the search for sources of income to help with family expenses, generating in students the need to abandon or postpone their studies; however, it has been possible to identify factors related to their emotional intelligence and resilience, which have allowed them to successfully cope with these difficulties. This study aims to analyze the validity and reliability of the Trait Meta-Mood Scale (TMMS-24) by combining an exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) model. The influence of emotional intelligence of Ecuadorian university students on resilience and academic performance in the context of SARS-COV-2 is analyzed using structural equation modeling (SEM) in a sample of 302 Ecuadorian university students aged 18–24 years following the impact of the COVID-19 pandemic. The EFA and CFA validated the TMSS-24 with acceptable fit indices, demonstrating construct validity. Through SEM modeling, resilience was found to have a significant and positive mediating role between emotional intelligence and academic performance.

Keywords Resilience · Emotional intelligence · RSA · TMSS-24 · University students

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9.1 Introduction

9.1.1 Resilience

There are several approaches to conceptualizing resilience from various disciplines, but no consensus has been reached on a standard definition of this construct based on its multidimensional nature [14]. In the present study, resilience is considered a positive personality trait that is the product of a series of individual attributes that allows an individual to adapt or recover from stressful situations or adverse events that disturb and alter their normality [18]. Resilience is one of the primary psychological factors associated with an individual's adaptation to adversity.

Resilience plays an essential role in academia; its development promotes social, academic, and personal skills, which enable an individual to overcome an adverse event [1]. Resilience has three stages, in the first, an individual is in physical and psychological homeostasis, lacking resources or skills to cope with unexpected events; the second stage is characterized by the individual's attempt to readjust to return to a state of equilibrium; and finally, in the last stage, the individual recovers equilibrium with new skills. The main limitation of these stages is the linearity of the model [9, 34] which defines resilience as a multidimensional psychological capacity that allows an individual to adapt to an adverse event thanks to inter- and intra-personal protective factors.

Resilience in education has been approached from different perspectives, but focused on the external aspects of students; despite this, it has been found that resilience is positively related to academic performance [44] and positive emotions [6]; however, research is limited, generating the imperative need to investigate the relationship between resilience, academic performance, and emotional intelligence.

9.1.2 Emotional Intelligence

The first scientific definition of emotional intelligence (EI) was proposed by Salovey and Mayer [37] as the ability to monitor one's own and other people's feelings, segregating them and using them as a guide for thought and action [37]. EI is the ability to perceive, value, and express emotions adequately and accurately, generating feelings that facilitate thinking, understanding, and regulating emotions, promoting emotional and intellectual development [43]. According to Salovey et al. [38], the components of emotional intelligence are (a) adequate perception of emotions, (b) emotional assimilation to communicate emotions and other cognitive processes, (c) understanding of emotional causes and consequences, and (d) emotional regulation; the components are built hierarchically from adequate perception of emotions to adequate management of emotions. Perception refers to the ability to identify and appropriately express emotions. Assimilation refers to generating and using emotions to enhance thinking, gain new perspectives, and improve problem-solving.

Understanding includes the ability to comprehend emotions, their causes, and ways of combining them, and regulation refers to the ability to be open to feelings and modulate them.

In recent years, several models of EI have been developed that consider it as a skill and a personality trait [40]. From a skill, emotional abilities are assessed using methods of maximum performance, and personality traits are assessed using a self-report of self-perception of emotional skills [28]. Emotional intelligence is a significant predictor of interpersonal relationships [20], social support [11], subjective well-being [2], academic performance [42]. On the other hand, emotional intelligence is negatively related to depression [15], stress, and negative emotions [31].

Emotional intelligence, resilience, and academic performance of university students have been examined separately in cross-national studies. However, there are no studies investigating the relationship between the three variables; previous studies linking emotional intelligence and resilience are scarce, even though both factors are related to the successful adaptation of an individual [43]. Research in this area has shown that individuals with higher EI scores have higher resilience scores. All four EI skills promote a resilient response to stress [41], but emotional repair correlates most strongly with resilience [5].

Armstrong et al. [3] affirm that EI is positively related to psychological resilience, concluding that people with greater emotional intelligence have a better response to stressful situations due to their ability to perceive and value their emotions more accurately and how and when to express their feelings, effectively regulating their moods.

9.2 Methodology

9.2.1 Design and Sample

The study population is university students from the five best universities in Ecuador, according to Quacquarelli Symonds [33], whose ages range from 18 and 24 years old, impacted in their academic, social, and economic activities by SARS-COV-2. The study sample consists of 302 participants, 192 females and 110 males, of which approximately 80% belong to Public Universities and 20% to Private Universities. The research applied convenience sampling due to the confinement measures established in Ecuador in March 2020, and at the date of the surveys, the universities were in virtual mode. The information was collected from July to September 2021 through institutional emails, and the academic record of each student was requested on the date of answering the survey.

9.2.2 Procedure

This research uses a non-experimental methodology with a qualitative cross-sectional approach to explore the relationships between EI, resilience, and academic performance through an explanatory design with latent variables in which structural equation models allow us to test the effects of resilience mediation between emotional intelligence and academic performance, comparing the fit with alternative models. To measure resilience, we used the modified Resilience Test for Adults (RSA), consisting of 31 indicators divided into seven factors with a semantic differential scale, validated for university students in Ecuador [13], to measure emotional intelligence we used the Trait Meta-Mood Scale 24 (TMMS-24) [39] made up of 24 indicators divided into three factors: emotional attention, emotional clarity and emotional repair [8] with a five-point Likert-type scale ranging from one (do not agree at all) to five (strongly agree); this scale evaluates people's beliefs about their emotional intelligence from three dimensions and presents good internal consistency and convergent validity according to various investigations [27, 39]; however, this test needs to be validated before its application.

The validity of the cross-cultural TMMS-24 test is done through an exploratory [23] and confirmatory [21] factor analysis. The exploratory factor analysis allows the identification of the dimensions in which the 24 variables of the TMMS-24 are grouped, choosing the most relevant indicators in each dimension, excluding, based on statistical techniques, the indicators that do not contribute to the measurement of the corresponding factor according to the literature and their exclusion allows improving the reliability index. In the validation of the test, the 24 indicators (TMMS-24) were considered, and it was not necessary to apply a previous factor analysis within each of the factors identified theoretically since the one-dimensionality of each indicator was ratified in the global factor analysis; the sample adequacy measure KMO (>0.5) and Bartlett's test of sphericity (<0.05) were applied; the method of factor extraction was Principal Components; to estimate the number of factors, Kaiser's rule, and the Sedimentation Chart were used; and the rotation of the factors was carried out using the varimax method because the correlations are less than 0.7. Finally, reliability was assessed by indicator, and the model was subjected to a fit assessment by comparing it with other models proposed in theory using confirmatory factor analysis.

For the confirmatory factor analysis, the univariate normality assumption was checked for compliance using the CR (ratio of kurtosis or skewness to its standard error), a value (>7) indicating a substantial problem with normality [4]. For multivariate normality, the multivariate normality coefficient of kurtosis is used, and values of multivariate kurtosis (>5) denote problems with multivariate normality [4]. The CFA allows assessing the validity of the TMMS-24 model resulting from the EFA through different statistical tests to determine the model fit, using the estimation of maximum likelihood (MLM) statistics, a method that provides consistent, efficient, and unbiased estimates, even if the assumption of multivariate normality is not met [13]. The fit indices used in the model are presented in the following Table 9.1.

Table 9.1 Adjustment indices' confirmatory factor analysis

Index	Very good	Good	Acceptable	Unacceptable
RMSEA	≤ 0.05	]0.05, 0.08]	[0.08, 0.10]	> 0.10
CFI	≥ 0.95	[0.9, 0.95]	[0.8, 0.9]	≤ 0.8
NFI	≥ 0.95	[0.9, 0.95]	[0.8, 0.9]	≤ 0.8
SRMR	≤ 0.05	[0.05, 0.08]	[0.08, 0.10]	> 0.10
GFI	≥ 0.95	[0.9, 0.95]	[0.8, 0.9]	≤ 0.8
TLI	≥ 0.95	[0.9, 0.95]	[0.8, 0.9]	≤ 0.8
AGFI	≥ 0.95	[0.9, 0.95]	[0.85,0.90]	< 0.85
PGFI	≥ 0.8	[0.6, 0.8]		≤ 0.6
PNFI	≥ 0.8	[0.6, 0.8]		≤ 0.6

Source (Own information)
Comparative fit index (CFI), incremental fit index (IFI), normalized fit index (NFI), goodness-of-fit index (GFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), adjusted goodness-of-fit index (AGFI), normalized parsimony fit index (PNFI), parsimonious goodness-of-fit index (PGFI)

Chi-square, one of the fit indexes, is a necessary indicator but not conclusive and is not analyzed in this research because it is susceptible to the sample size [10].

Validated the TMMS-24 test; before applying the hypothetical model, the measurement part of the model must be specified. In this study, the two-step procedure is used. According to this method, the development and testing of the structural model are twofold: the first step is to perform a confirmatory factor analysis (CFA) of the measurement model, which includes the relationships between observed variables and latent variables, and the next step includes a CFA of the causal relationships between the constructs of the model according to the previous theoretical review [4]. Next, to assess the fit of the hypothesized model on the potential mediating role of resilience between EI and academic performance, the structured equations procedure (SEEM) was applied. The maximum likelihood (ML) estimation method was used to analyze the hypothesized model. The model fit was assessed using the fit indices detailed in Table 9.1, together with the bootstrap method, with 2000 replications and a 95% confidence interval for the hypothesized model in which resilience is a mediating variable between emotional intelligence and achievement. This method allows estimating the empirical distribution of statistics using random sampling with replacement. Therefore, the estimates are robust without being affected by non-normality in the residual distribution [40].

For the statistical analysis, SPSS version 25 statistical software was used to perform descriptive statistical analysis, reliability analysis, bivariate correlations, and exploratory factor analysis. Additionally, the AMOS version 24 statistical program was used to apply the confirmatory factor analysis to the TMMS-24 test and to elaborate the structural equation model (SEM) that analyzes the relationships established in the hypothetical model.

9.3 Results

9.3.1 Validation of the TMSS-24 Test for University Students in Ecuador

The TMMS-24, proposed by Fernández-Berrocal et al. [8], meets the assumption of normality and is appropriate for the development of an EFA with a KMO of 0.930, a significant Bartlett's test of sphericity ($\chi^2 = 5045.555$; gl = 276, ptt < 0.001) [7]. The communalities matrix yielded values between 0.32 and 0.788 (>0.3) which are acceptable [25]. The final result of the EFA is the rotated component matrix, and the principal component extraction method is used (see Table 9.2).

The final instrument consisted of 31 items grouped into three dimensions: clarity component (eight items), attention component (eight items), and repair component (eight items), and the highest mean is recorded in the repair component (3.66) and the lowest attention (3.33). The asymmetry for the three dimensions is between −0.613 and −0.307, the overall variance explained by the model is 63.33%, and the clarity component records the highest contribution to the variance with a value of 40.63%. Cronbach's alpha for the 24 indicators has a value of 0.930, and for each dimension, it registers values between 0.887 and 0.916. The factor loadings for the 24 items register values above 0.4; results demonstrate the unidimensionality in the measurement of each factor, and the indicators reflect a high degree of predictability of the factors, all of which are relevant in the measurement of the components of emotional intelligence in university students in Ecuador.

The TMSS-24 test complies with the multivariate normality assumption by yielding kurtosis values (<5). However, non-compliance with this assumption does not affect the ability of the method to make unbiased estimates, and the maximum likelihood method used does not strictly require multivariate normality to be met [22]. A first-order confirmatory factor analysis applied to the resulting EFA model resulted in the following fit indices (see Table 9.3).

The three-factor structure proposed by Fernández-Berrocal et al. [8] yielded acceptable and excellent fit indices. The Chi-square value was not considered in the analysis as it is susceptible to sample size. The graphical illustration of the first-order CFA with three factors is presented below (see Fig. 9.1). Of the modifications suggested by the Amos software, seven modifications were applied to the three-factor model. The modifications are minor and theoretically justifiable because the associated items belong to the same factor.

Table 9.2 Rotated component matrix

	CC	CA	CR
Range	1 a 5	1 a 5	1 a 5
Media	3.41	3.33	3.66
Standard deviation	0.913	0.952	0.895
Asymmetry	−0.347	−0.307	−0.613
Variance explained	21.93	21.61	19.78
Cronbach's Alpha	0.916	0.909	0.887
Indicator	Factorial loading		
59. I can understand my feelings	0.804		
52. I am clear about my feelings	0.795		
54. I almost always know how I feel	0.788		
53. I can often define my feelings	0.777		
57. I can always say how I feel	0.718		
56. I am often aware of my feelings in different situations	0.683		
58. I can sometimes tell what my emotions are	0.679		
55. I usually know my feelings about people	0.670		0.316
50. I often think about my feelings		0.833	
51. I pay a lot of attention to how I am feeling		0.826	
46. I usually take time to think about my emotions		0.823	
49. I think about my moods constantly		0.821	
45. I usually worry a lot about how I feel		0.792	
47. I think that my emotions and moods are worth paying attention to		0.715	
44. I pay a lot of attention to feelings		0.667	
48. I let my feelings affect my thoughts		0.610	
63. I try to think positive thoughts, even if I feel bad			0.853
61. Even when I feel bad, I try to think pleasant thoughts			0.844
60. Even though I sometimes feel sad, I tend to have an optimistic outlook			0.815
62. When I am sad, I think of all the pleasures in life			0.726

CC component clarity; *CA* component care; *CR* component repair

9.3.2 Descriptive Statistics and Relationships Between the Study Variables

For statistic analysis (EI, RSA, and academic performance), the mean, standard deviation, and reliability analyses of each were determined, complemented with a Pearson correlation analysis between the three study variables to analyze the existing

Table 9.3 TMSS-24 fit indexes

Index	VG	G	A	U	Finding	Result
RMSEA	≤ 0.05	]0.05, 0.08]	]0.08, 0.10]	> 0.10	0,07	Good
CFI	≥ 0.95	[0.9, 0.95[	]0.8, 0.9[	≤ 0.8	0,922	Good
NFI	≥ 0.95	[0.9, 0.95[	]0.8, 0.9[	≤ 0.8	0,880	Acceptable
SRMR	≤ 0.05	]0.05, 0.08]	]0.08, 0.10]	> 0.10	0,10	Acceptable
GFI	≥ 0.95	[0.9, 0.95[	]0.8, 0.9[	≤ 0.8	0,85	Acceptable
TLI	≥ 0.95	[0.9, 0.95[	]0.8, 0.9[	≤ 0.8	0,911	Good
AGFI	≥ 0.95	[0.9, 0.95[	[0.85,0.90[	< 0.85	0,85	Acceptable
PGFI	≥ 0.8	]0.6, 0.8[		≤ 0.6	0,687	Good
PNFI	≥ 0.8	]0.6, 0.8[		≤ 0.6	0,768	Good

Very Good (VG), Good (G), Acceptable (A), Unacceptable (U)

relationships between EI, resilience, and academic performance. The results are presented in Table 9.4.

Table 9.4 shows the means of IE, RSA, and AP, and their values are significantly above the midpoint of the scale. Internal consistency for the RSA and TMSS-24 was acceptable, as shown by Cronbach's alpha coefficients. The correlations yielded a positive and significant association between emotional intelligence, resilience, and academic performance. However, resilience was found to be more strongly positively related to academic performance and emotional intelligence to resilience.

9.3.3 Structural Equation Model Analysis

The measurement model consists of two latent variables, emotional intelligence with three indicators, and resilience with seven indicators. Structural equation modeling (SEM) methodology was applied using maximum likelihood estimations to assess the mediating effect of resilience on the influence of EI on academic performance. The results of this analysis revealed a good level of model fit, as seen in Table 9.5.

The results in Table 9.5 aligned with the established parameters, and the proposed model was accepted as adequate. Each factor's contribution to academic performance prediction was also examined using standardized regression weights.

The relationships obtained between the different factors integrated into the model are described below (see Fig. 9.2).

Emotional intelligence positively predicts resilience ($\beta = 0.96$, $p < 0.001$), resilience positively predicts academic performance ($\beta = 85$, $p < 0.001$), and emotional intelligence alone does not significantly predict academic performance $p > 0.001$. According to the results, the effect of EI on academic performance is completely mediated by resilience.

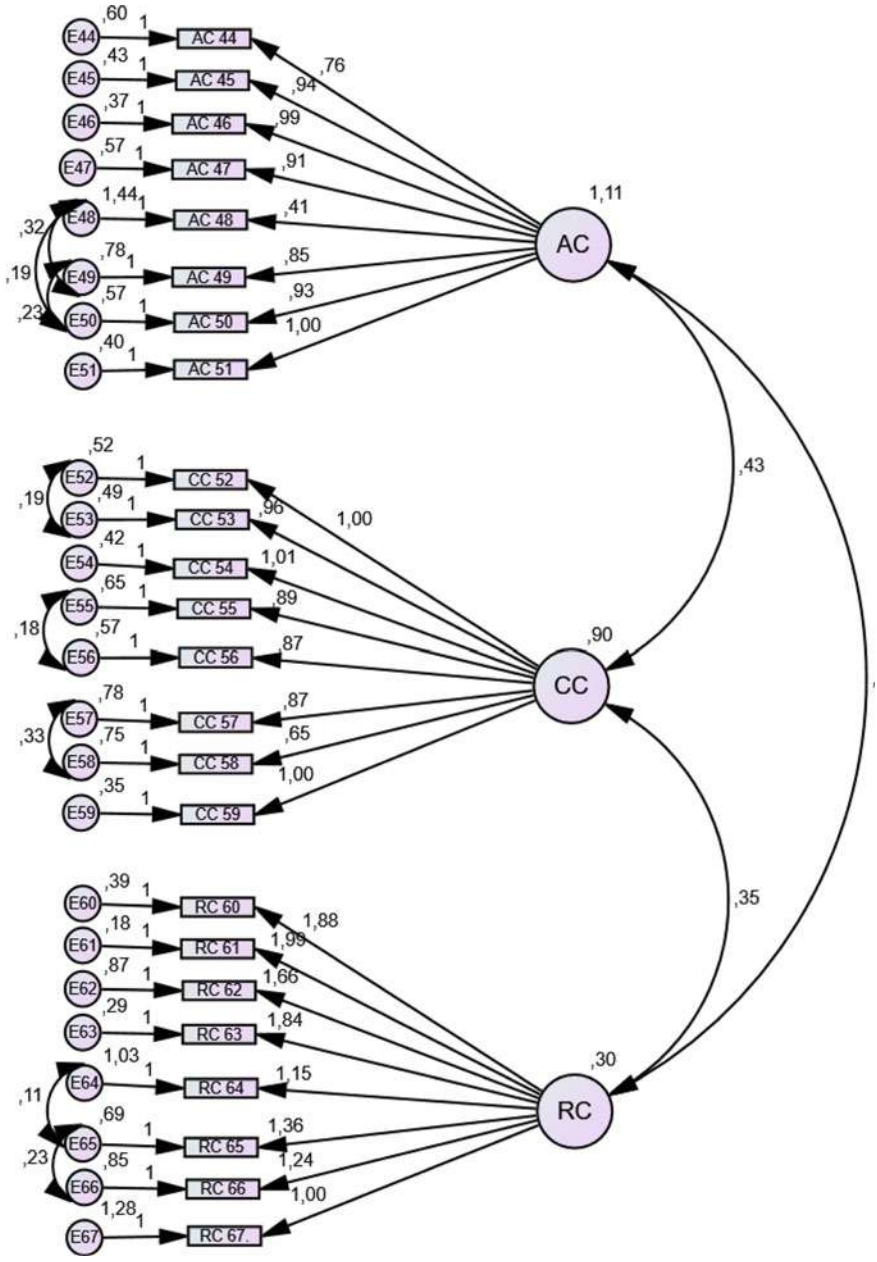


Fig. 9.1 First-order CFA (TMMS-24)

Table 9.4 Descriptive statistics

Measures	1	2	3
(1) RSA	1	0.518**	0.600***
(2) EI		1	0.308***
(3) AP			1
M (0–5 scale)	3.68	3.47	3.48
SD	0.58	0.73	0.5
Cronbach	–	0.93	0.904

RSA resilience scale for adults; *EI* emotional intelligence; *AP* academic performance
** The correlation is significant at the 0.01 level (bilateral)

Table 9.5 TMSS-24 adjustment indexes

Index	VG	G	A	U	Finding	Result
x^2					86.08	
x^2/df			]0.0, 3.0]	> 3.0	2.44	Acceptable
RMSEA	≤ 0.05	]0.05, 0.08]	]0.08, 0.10]	> 0.10	0.06	Good
CFI	≥ 0.95	[0.9, 0.95[	]0.8, 0.9[	≤ 0.8	0.96	Very Good
NFI	≥ 0.95	[0.9, 0.95[	]0.8, 0.9[	≤ 0.8	0.930	Good
SRMR	≤ 0.05	]0.05, 0.08]	]0.08, 0.10]	> 0.10	0.03	Very good
GFI	≥ 0.95	[0.9, 0.95[	]0.8, 0.9[	≤ 0.8	0.951	Very good
TLI	≥ 0.95	[0.9, 0.95[	]0.8, 0.9[	≤ 0.8	0.934	Good
AGFI	≥ 0.95	[0.9, 0.95[	[0.85,0.90[	< 0.85	0.910	Good
PGFI	≥ 0.8	]0.6, 0.8[		≤ 0.6	0.6	Good
PNFI	≥ 0.8	]0.6, 0.8[		≤ 0.6	0.609	Good

Very good (VG), Good (G), Acceptable (A), Unacceptable (U)

9.4 Discussion and Conclusions

9.4.1 Discussion of Results

SARS-CoV-2 had generated several changes in the lifestyles of university students, worsening their social, economic, and psychological conditions, which before the pandemic were already severely affected due to the transition from school to the university stage, and has had an impact on their academic performance and consequently the abandonment of their studies.

Psychological, social, and economic problems are those that most hinder students from finishing their studies and these problems arise at the beginning and end of their studies [19], making it a challenge to study resilient capacities to focus on interventions to generate better health conditions and promote their adaptability to changes or adverse events [16]. Resilient young people reflect adequate control of

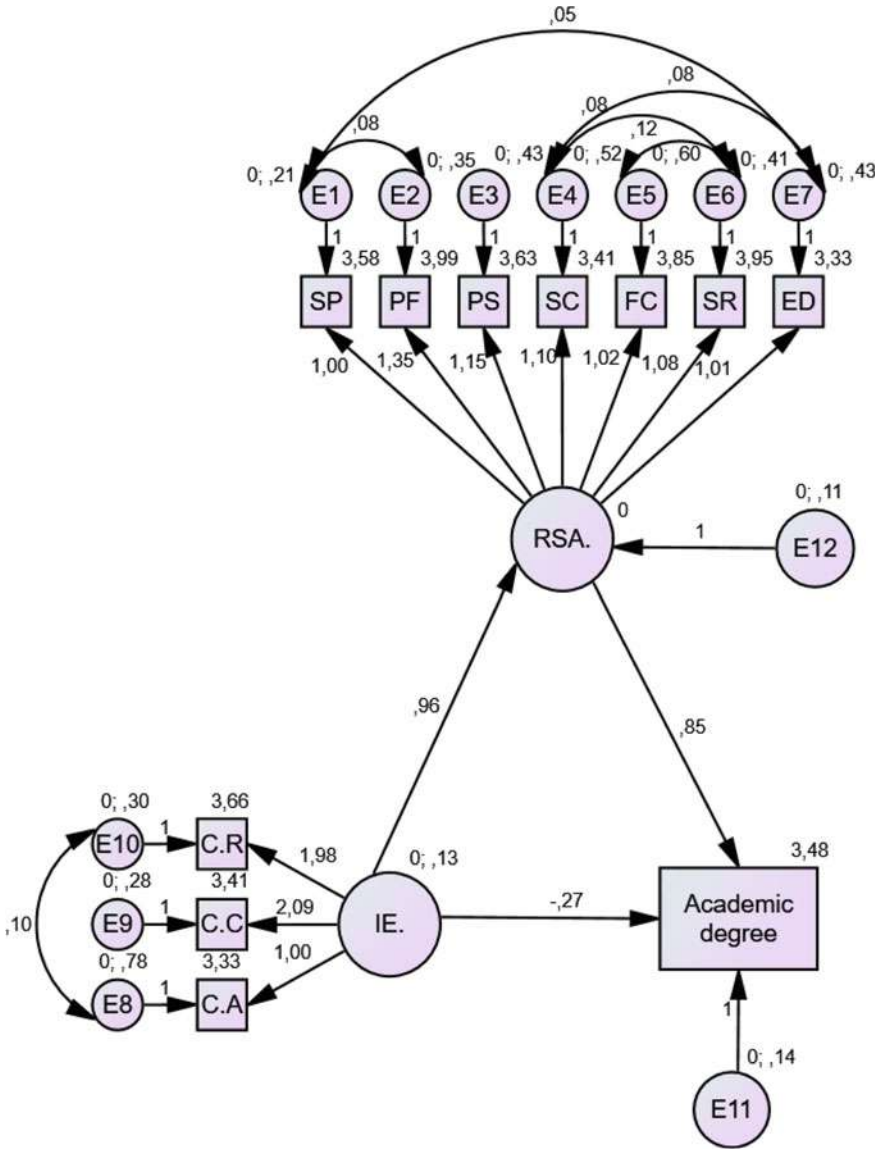


Fig. 9.2 SEM emotional intelligence and resilience

their emotions in risky situations, optimism, and persistence in the face of adversity; an excellent response to situations of pain, frustration, or anger; assertiveness in the face of problems; good social resources; financial autonomy; self-confidence; a good sense of humor, among other characteristics [32]. Emotional intelligence can contribute to people becoming more resilient [30, 41], being a protective factor that

plays a key role in the development of strategies that contribute to good psychological adjustment [17], increasing interest in the study of protective factors to develop resilience.

To measure resilience and emotional intelligence in the present study, the modified RSA test validated for university students in Ecuador, consisting of 31 items distributed in 7 factors, is a reliable instrument [13], which allows assessments of protective mechanisms within multicultural contexts, and is the most stable scale according to the test–retest that assesses family and social protection factors, going beyond a self-assessment and analysis of an individual's internal resilient characteristics by recognizing the importance of perceived environmental resources [29]. To measure emotional intelligence, the TMSS-24 was used, considered a valuable and practical tool to assess EI in adults in different cultures [12]. This study confirms its validity in a group of university students in Ecuador during the pandemic's impact. It is a precious study for the literature since an individual's protective factors are more active in adverse life circumstances [29].

Using the EFA, the TMSS-24 construct was obtained, which consists of 24 items distributed in three dimensions and a reliability > 0.9. The dimensions mentioned are component clarity, attention, and repair; the dimension that recorded the highest score is component repair, resulting in an adequate ability of university students to regulate their feelings [35]. The clarity component registered the lowest score, but all three dimensions register adequate scores, which translates into a good ability of university students to recognize their feelings, know what they mean, and know and understand emotions, knowing how to distinguish between them, results that are consistent with the study conducted by Rodríguez et al. [35]. The model obtained in the EFA was subjected to validation using a CFA, fulfilling the assumptions of univariate and multivariate normalities. The resulting model is over-identified, and with good fit indices despite the Chi-square fit statistic (x^2) significant $p < 0.01$, it is rarely used as a conclusive test of goodness-of-fit, being very sensitive to sample size.

The main objective of this study was to simultaneously analyze the association between EI, resilience, and academic performance in Ecuadorian university students in SARS-COV-2 contexts. In congruence with the study's central hypothesis, the findings revealed a significant positive effect of EI on resilience with good statistical fit indices. In agreement with the findings of [3, 5, 24, 40], EI precedes resilience and they are directly related by buffering the effects of adverse events [26]. College students who can identify and manage their own and others' emotions are better able to cope with adverse events, which translate into better academic performance.

Greater emotional regulation and resilience help to achieve academic success [36].

9.4.2 Limitations and Future Research

Due to the cross-sectional design used in this study, only the relationships and predictive capacity between emotional intelligence, resilience, and academic performance

variables are demonstrated, but no cause–effect associations are shown. Another limitation of the study is related to convenience sampling for data collection. While cross-sectional convenience samples can help explore theoretical models, such as the one developed in this research, care must be taken when generalizing results to the whole population. Future research should be aligned to test the model with longitudinal data to establish causal relationships and include an analysis of socio-demographic predictors of resilience and emotional intelligence.

9.4.3 Conclusions

SARS-COV-2 has impacted low academic performance and dropout rates among university students, and it is necessary to formulate socio-emotional intervention programs to improve this situation. The results obtained validate an instrument for measuring emotional intelligence in university students in Ecuador, such as the TMMS-24, considering the mediating role of resilience between emotional intelligence and economic performance. It is also a valuable contribution to designing intervention programs focused on developing emotional intelligence and resilience, which have a significant association, as opposed to the direct association between emotional intelligence and academic performance, which is not very significant. These findings are relevant in explanatory models that predict higher education academic success.

Of the variety of instruments that measure resilience and emotional intelligence, the modified RSA is one of the best psychometric tests of great relevance in cultural contexts characterized mainly by good social resources. Including an economic dimension enhances the multidimensional study of resilience. The RSA has a good reliability index which, when combined with the study of emotional intelligence using the TMMS-24, provides various lines of action for formulating intervention programs that universities should propose.

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Chapter 10
Subscription Retailing Research Evolution Analysis Using Bibliometric Indicators and Content Analysis



Joaquim Pratas, Carla Amorim, and José Luís Reis

Abstract The aim of this investigation is to analyze subscription retailing research's main topics and evolution over time. A bibliometric study and a content analysis were carried out on the documents published in Web of Science database about subscription retailing. The findings show that research after the COVID-19 pandemic was reinforced. The main researched industries are e-commerce, physical retail, and e-marketplaces, and the main topics are business model definition, typologies of subscription services, namely surprise boxes, the likelihood to use subscription services, and promotions, coupons, and relationship marketing. This study contributes to the area by providing scholars with the subscription retailing research state of the art and trends, helping to guide future researches. From a managerial view, it gives insights on how to use subscription retailing.

Keywords Subscription retailing · Bibliometric study · Content analysis · Business model · Surprise boxes

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10.1 Introduction

In the subscription business model, a consumer pays a set amount on a regular basis, generally monthly or annually, in order to access a product or service. Customers typically gain from lower costs of using the products or services (*versus* the cost of purchase and ownership) and increased accessibility. Organizations have a more consistent and predictable revenue source over time [1].

In the retail sector, this business model has significantly expanded, and it is expected to continue rising [2]. According to Statista [3], the product categories of food and beverage, personal care products, home products, clothing, toys/games/books, and pet products have the most consumers of subscription services globally. The leading product category, Food and Beverage, has just 41% of total consumers as subscribers, which demonstrates a huge potential development. In the USA in 2021, Amazon Prime was subscribed by 51% of consumers. Other top subscription services such as Chewy, Walmart Plus, Dollar Shave Club, Instacart Express, Shipt, Hello Fresh, Grove Collaborative, Barkbox, and Thrive Market have between 7 and 1% of consumers as subscribers [4]. The market for automotive subscriptions is also expanding, particularly among luxury vehicles. For instance, Cadillac introduced an SUV and car subscription concierge service in 2018. Through a smartphone app, the service enables consumers to request delivery and pickup of the company's vehicles [5].

Despite the recent large development in subscriptions, particularly for consumer items, study in the field is still in its infancy, and more research must be done [2].

According to Statista [6], the market for subscription-based products and services will grow by more than 130% between 2020 and 2025, with e-commerce serving as the main driver of change. Thus, the aim of this work is to analyze and assess the body of scientific literature that was produced over the time on the topic of subscription retailing. It is specifically meant to assess and synthesize the current state of the art, highlighting the key topics and industries where the research was done. Additionally, it aims to understand trends in research topics. From a scholarly perspective, it is anticipated to contribute to the current status of subscription retail and develop a list of priorities for follow-up research. In terms of business, it should assist firms in adopting or improving this business model and related marketing strategies.

10.2 Literature Review

10.2.1 Subscription Retailing Business Model

According to UBS Group [7], the subscription economy offers investment opportunities in a large number of industries.

Media and telecommunications (5G subscription services, video and music streaming, dating services, and online/cloud gaming), information technologies

(cloud computing, cybersecurity), real estate (real estate marketplace pass, co-working and co-living spaces, high-specification industrial and computing facilities), financial services (subscription services for data, news, and research, index and price services, e-trading pass, robo-advisory, subscription payment services, and accounting and reporting services), consumer services (subscription boxes/e-commerce, after-school tutoring and online personal development courses, fitness subscriptions, meal subscription plans, mobility pass, and car/electric vehicle utilization subscriptions), industrial services (digital twins services and equipment as a service), health care (telehealth, over-the-counter subscriptions, vitamin subscriptions, dental membership plans, and services for mental health and wellness services), and energy (subscription-based power/energy systems) are some examples.

The study of UBS Group [7] claims that the benefits of using subscriptions for consumers include cost savings over one-time purchases, enhanced convenience (due to the lack of specific orders or purchases and pre-scheduled deliveries), and offers customization.

For organizations, the benefits are related with consistency, predictability, timely planning and programming, optimized cash-flow management, and the availability of customer information (which enable the development of programs in order to increase the commercialized value and customer decreased churn rates). Both the costs and the churn rate for acquiring new subscribers are extremely high in subscription retailing business model. Churn rates in markets with high levels of competition can reach about 70% [8].

10.2.2 Types of Subscriptions

Bischof et al. [9] proposed three different types of subscription groups based on their empirical research with a sample of 1356 British consumers. The access subscriptions provide complete access to a product or service, in exchange for small, regular payments; replenishment subscriptions distribute frequently used products on a regular basis; and discovery subscriptions: delivering sample sizes or "surprise" packs of luxury and often expensive products and/or services. The subscription retail offers are likely to be more valued by time-poor customers and those seeking "surprise" in their consumption, due to less effort being put forward by consumers [10].

10.2.3 Motivations and Barriers to Subscribe

According to Bray et al. [2], the customer's likelihood of subscribing is affected by perceived convenience, ease of use, offer's value for money, access to a wide range of products and/or services, being up to date, and the desire to learn new things. Value for money, compromise, preferring self-selection, low quality, and too many

or the incorrect products being supplied were the barriers found. In their online survey of 5093 US consumers, McKinsey discovered that recommendations, online evaluations, and word-of-mouth are crucial in getting customers to subscribe [11].

10.2.4 Subscription Retailing, Customer Relationship Programs, and Churn Rates

To ensure customer loyalty, reward repeat customers, and use the correct incentives to persuade each repeated customer to make more frequent purchases at greater per-purchase values, subscriptions can be a useful addition to customer relationship management (CRM) programs [12]. By sustaining high levels of customer satisfaction and service quality, organizations can impact customer retention. Since incentives are important to get customers to sign subscription contracts, businesses must carefully assess the incentive's value in order to remain profitable [8].

10.3 Research Questions and Methodology

10.3.1 Research Questions

In order to achieve the outlined research objectives, the following research questions were formulated:

- Q1: Which scientific documents had the greatest impacts in terms of their citations?
- Q2: How has the publication of scientific documents about subscription retailing evolved to date globally and per industry?
- Q3: What key topics were explored by industry?
- Q4: What are the main research trends in the field of subscription retail?

10.3.2 Methodology

The used methodology involved conducting a bibliometric analysis and a content analysis of documents about subscription retailing. Bibliometric analysis is a rigorous statistical set of methods for analyzing large volumes of scientific data. It is used to synthesize and structure the information on broad research questions. Other methods such systematic reviews generally involve narrow focused questions, so bibliometric analysis was the chosen method.

In order to collect a representative sample of relevant knowledge, we retrieved data from Web of Science Core Collection (WoSCC) (all editions), in the categories

of Business, Management, Economics and Communication, in August 28, 2022, searching on the options Title or Topic, the keywords: "subscription retail" or "subscription retailing". The WoSCC is considered the most impactful and qualitative database with several source types such as journals, books, and conference proceedings. It also provides cleaner data, with less duplication than other databases (such as Scopus). No criterion has been established regarding the date of publication.

Sixty-five scientific documents were identified. We further read the title and abstract of all the documents, to guarantee that the sample was complete and accurate. We found that fourteen articles were not related to the topic we wanted to study, as they had to do with the subscription of financial products, namely securities in initial public offering (IPO) processes. Thus, fifty-one documents remained to be analyzed.

Using the Web of Science software, we retrieved all bibliometric information of these articles, such as the source or journal name, article title, authors, keywords, year, and references. We further collected citation and co-citation data for each article. Then, manually, we normalized the authors' names and works and corrected for different editions of books. The data were analyzed with SciMAT, and networks were identified using the software VOS Viewer, to perform the analyses necessary to tackle the identified research questions.

10.4 Results

10.4.1 Most Cited Documents

To tackle first question "Which scientific documents had the greatest impacts in terms of their citations?", we have performed a citation analysis. Citation analysis quantifies the importance and influence of a published article within its field, as assessed by their citation frequency [13]. Jointly, the 51 documents had 488 citations in WoS Core. This means that on average each published work had about ten citations. Listing such a large list was considered unfeasible; thus, the list with ten documents with more citations is listed in Table 10.1.

10.4.2 Evolution of Documents Publication About Subscription Retailing Globally and Per Industry

To address the second question "How has the publication of scientific documents about subscription retailing evolved to date globally and per industry?", we have done a content analysis in which two trained coders were used to classify the documents. The results are shown in Tables 10.2 and 10.3, where the number of documents between 2020 and 2022 (after COVID-19 pandemic) to date is also detailed.

Table 10.1 Top ten most cited documents

Title	Authors and data	Source	Number of citations
Demand response in wholesale electricity markets: the choice of customer baseline	Chao, H.P. (2011)	Journal of Regulatory Economics	81
The Energy and Climate Change Implications of Different Music Delivery Methods	Weber, C.L.; Koomey, J.G.; Matthews, H.S. (2010)	Journal of Industrial Ecology	75
Online Grocery Retail: Revenue Models and Environmental Impact	Belavina, E.; Girotra, K.; Kabra, A. (2017)	Management Science	61
Now that California has AMI, what can the state do with it?	Woo, C.K.; Kollman, E.; Orans, R.; Price, S.; Horii, B. (2008)	Energy Policy	41
Product form bundling: Implications for marketing digital products	Koukova, N.T.; Kannan, P.K.; Ratchford, B.T. (2008)	Journal of Retailing	31
Relationship Marketing at Wanamaker's in the Nineteenth and Early Twentieth Centuries	Tadajewski, M. (2008)	Journal of Macromarketing	26
Fuzzy Modeling of User Behaviors and Virtual Goods Purchases in Social Networking Platforms	Jankowski, J.; Kolomvatsos, K.; Kazienko, P.; Watrobski, J. (2016)	Journal of Universal Computer Science	23
Competitive electricity markets with consumer subscription service in a smart grid	Chao, H.P. (2012)	Journal of Regulatory Economics	19
A critical analysis of the dialogic communications potential of sub-Saharan African Police Service websites	Madichie, N.O.; Hinson, R. (2014)	Public Relations Review	17
Modeling consumers' intention to use fashion and beauty subscription-based online services (SOS)	Ramkumar, B.; Woo, H. (2018)	Fashion and Textiles	16

Table 10.2 Number of documents per period

Year	2000 a 2004	2005 a 2009	2010 a 2014	2015 a 2019	2020 a 2022
Number	2 (4%)	5 (10%)	11 (22%)	12 (24%)	21 (41%)

Table 10.3 Number of documents per industry and by period

	Total	Between 2020 and 2022	% 2020–2022
Fashion and beauty	7	4	**57.1%**
Media and entertainment	7	2	28.6%
E-commerce	6	4	**66.(6)%**
Telecommunications	6	1	16.(6)%
Physical retail and e-marketplaces	4	3	**75.0%**
Energy	4	1	25.0%
Retail banking	3	0	0.0%
Applicable to all sectors	3	2	**66.(6)%**
Music industries	2	0	0.0%
Cloud computing	2	1	**50.0%**
Educational institutions	2	1	**50.0%**
Public sector—police	1	0	0.0%
Social media online gaming and virtual worlds	1	0	0.0%
Perishables	1	1	**100.0%**
Personal pension plans	1	1	**100.0%**
Automobile	1	0	0.0%
Total	51	21	41.2%

10.4.3 Key Topics Per Industry

To solve the third question "What key topics were explored by industry?", a content analysis was performed in order to analyze each of identified topics per industry.

10.4.3.1 E-Commerce

Six documents analyze subscriptions in e-commerce. According to Belavina et al. [14], the subscription model (where customers pay a set fee and receive free deliveries) encourages smaller and more frequent grocery orders, which decreases food waste and increases value for the customer, as opposed to the per-order model (where customers pay for each delivery). Per-order model has less delivery-related emissions but high food waste emissions.

Customers who subscribe to delivery services spend more per month, buy more items, and do so more frequently than non-subscribers, according to [15] study of omnichannel retail through the analysis of online transactions of a food retailer and the adoption of the subscription model in its deliveries. Additionally, the authors note that a minimum order threshold in a subscription plan fosters cross-selling by motivating customers to shop more widely and buy more items overall.

Balakrishnan et al. [16] stated that more coupons may serve to strengthen consumers' propensity for impulsive buying and consumption, which in turn may alter post-purchase cognitive and affective dissonance as well as future repurchase intentions.

Xu [17] examined the surprise box strategy, when the company sends to subscription program participants, non-repeated new product mailings, and consumer feelings are expressed in online reviews. Customers' review behavior is influenced by their membership length, experience, and overall happiness level and is based on the specific attributes they comment on.

Bischof et al. [9] created a typology of subscription services, taking into account the element of surprise in each delivery's content. These authors looked at both ends of the content delivery spectrum, namely curated surprise subscriptions and pre-defined subscriptions. Given that customers delegate their decision-making to the service provider, curated surprise subscriptions carry a risk of receiving an unattractive product that can be reduced by the free-return option.

With a research about environmental exchanges associated with auction services in which subscription services are provided to customer in order to access trends and status information about trade environmental pollution credits, assets associated with regulatory offsets, and other products, Keever and Alcorn [18] came to the conclusion that these services provide the reinforcement for the market.

10.4.3.2 Physical Retail and E-Marketplaces

Iyengar et al. [19] analyzed the relationship between subscription programs and consumer behavior and found that access to a range of unique privileges through a subscription in a physical store or e-marketplace significantly increases consumer spending.

In an experiment with a car wash network that offers tier-based subscription services to customers in the USA, Wang et al. [20] examined how customer email contacts with the organization influences the outcomes of subscription services in terms of profitability. Increased customer retention and service consumption trigger this mechanism, but it can also lead to a decline in profitability if the operating costs associated with serving retained customers rise too quickly relative to their advantages.

The subscription programs may also be used to make up for retail customers' hurted feelings. In a study of the compensation provided by Home Depot following its 2014 data breach, Hoehle et al. [21] assessed the efficacy of such compensation offers, finding that non-appropriate compensation can result in lower repurchase intention.

In business-to-business (B2B), a connection between subscription programs and the services used by merchants, specifically the CRM system based on cloud computing, is also possible [22].

10.4.3.3 Retail Banking

The retail banking industry has demonstrated the relationship between subscription services and the global management system and organizations' business model and marketing-mix [23]. Consumers are increasingly using their mobile phones as tools for banking, payments, budgeting, and shopping, enabling a variety of financial applications offered not only by banks but also by other providers like telecommunications companies or Fin Tech, using subscriptions [24]. Mobile devices are also used by banking professionals for work purposes, with impacts in time management, information, and knowledge supply chain [25].

10.4.3.4 Fashion and Beauty

Johnson et al. [26] investigated clothing subscription, suggesting that shops should develop plans to convert visitors into subscribers and reduce hesitancy in first-time buyers.

Using focus groups, Tao and Xu [27] examined how customers perceived fashion subscription services and the likelihood to use them. Convenience, customization, consumer excitement, possibilities to test new designs, and opportunities to better manage one's clothing budget were cited as benefits by customers. The biggest issues are the difficulty of the canceling process and the lack of social shopping experiences.

Email marketing was researched by Nobile and Cantoni [28], specifically using newsletters from fashion brands. They concluded that email marketing it is still a significant means of communication and that messages sent to consumers to encourage them to subscribe have three basic themes: financial, emotional, and cognitive. Additionally, the data gathered during the subscription process are registered and can be used to define customized offers for each customer.

The antecedents of utilitarian motivations, hedonic motivations, fashion consciousness, consumer innovativeness, desire for unique products, and online transaction self-efficacy were tested by Ramkumar and Woo [29], as predictors of consumers' attitude toward and intention to use fashion/beauty subscription online services (SOS) known as box retailing. The findings show that attitudes toward fashion/beauty SOS, fashion consciousness, and online transaction self-efficacy all indirectly influence the intention to use fashion/beauty SOS. Utilization of fashion/beauty SOS is strongly influenced by consumer ingenuity and desire for distinctive products.

Lee et al. [30] examined the factors that influence subscription intentions for beauty subscription box retail services (SBRS) using online survey. They conclude that product attributes like product quality, variety, and novelty were effective predictors of customers' opinions about SBRS. Additionally, word-of-mouth and repurchase intention is positively impacted by customer attitudes toward SBRS.

Bhatt et al. [31] through in-depth interviews analyzed motivations and benefits for consumers associated with curated subscription fashion boxes, delivered on a regular basis. They highlighted the significance of stylistic and/or algorithmic customization,

lifestyle adaptation (finding value and convenience), diversity and experimentation, excitement of the surprise, self-gratification, and sharing experiences (buying with friends and family). Gen-Y men's interest in novelty had a positive impact on their attitudes and, consequently, their intention to utilize retail style subscription boxes [32].

10.4.3.5 Perishables

Sitaker et al. [33] examined the effects of subscription in perishable products, using the Farm Fresh Food Box (F3B) case. This is a pre-ordered produce box similar to a Community-Supported Agriculture (CSA) that is offered through rural retail establishments. According to the data, people would be more likely to buy F3B if they thought that it offered good value on fresh local goods without requiring a subscription. Retailers and farmers believed that it was worthwhile to grow their customer base, promote their brands, and strengthen their cooperation despite the fact that F3B's innovative business innovation only produced a little profit. The authors claim that this initiative provides high-quality, locally grown produce that is touch-free and available for curbside pickup at a convenient location.

10.4.3.6 Automobile

Koroth et al. [34] examined disruptive innovation in the automobile retail sector. The identified trends include the move toward using rather than owning things, as well as enclosed dwellings in megacities. It is clear that developments like the rising popularity of battery electric vehicles, driverless vehicles, and mobility as a service have a significant impact on the retail dealership model. The need and desire for personal automobiles will decline, and services for large fleets will expand, such as car subscription services or fewer maintenance requirements, which should significantly lessen the role of traditional dealerships.

10.4.3.7 Social Media, Online Gaming, and Virtual Worlds

Jankowski et al. [35] investigated the relationship between the characteristics of users of platforms, social networks, online games, and virtual worlds with subscriptions and purchases of virtual goods. The findings highlighted the differences between less experienced and more seasoned users in terms of purchase frequency and value, involvement with the use of virtual products, and gift-giving habits.

10.4.3.8 Cloud Computing

Everman et al. [36] draw attention to the COVID-19 pandemic's significance and the consequences it has had on the growth of e-commerce, which compels additional data centers to offer new cloud services (based on subscription services), or drastically upgrade existing ones in order to handle the loads more effectively, studying Alibaba system. They conclude that the system suffers from both oversubscription (resulting in resource waste and low utilization) and undersubscription (resulting in performance degradation). The influencing factors that influence the intentions of retailers to adopt cloud-based point of sale system were studied by [37], in a sample of retailers in Malaysia, using a model that combines Technology, Organization, Environment (TOE) and Technology Acceptance Model (TAM).

10.4.3.9 Media and Entertainment

Fernandez-Steeger et al. [38] stated that retail and subscription distribution channels in the publishing industry which are complementary rather than just rival. The authors create a model to calculate the maximum value and average lifetime of conjoint subscription.

Koukova et al. [39] analyzed information media retail sales, such as newspapers and books, that contained either pure digital content or traditional material. The authors confirmed that manipulating different situations of use significantly increases the purchase intention of printed and electronic forms, as long as the second item is discounted.

Flath [40] studying newspapers in Japan conclude using an econometric analysis, that Japanese newspaper membership prices are much below the amounts that would maximize joint profit. The preservation of the permitted resale price appears to be driven by factors other than the prevention of cartelization.

Abrahams et al. [41] examined the factors that affect sponsored research success in a number of long-term subscription market subsectors, using information from four businesses that offer such services and generate recurring monthly revenue.

A novel recommender system model is put forth by Rizkallah et al. [42] and is based on the word vector embedding technique, which is widely utilized in natural language processing. The suggested method is tested on real-world datasets from subscription providers including MovieLens, ModCloth, Amazon: Magazine Subscriptions, and Online Retail. Following studies on the impact of leaflets on consumer behavior, Ieva et al. [43] recommend that retailers review their leaflet distribution plan and reevaluate the function of shop leaflets in their communication and marketing strategies, using retailer's loyalty program suggesting a tailored approach to leaflets.

Frieden [44] looked at how the growing usage of the Internet for bandwidth-intensive video transport has caused significant changes in the interconnection and compensation arrangements between content suppliers and operators. Two new models were noted: interconnection and compensation agreements that raise total

payments from end users, upstream Internet Service Providers (ISPs), and content providers to ISPs; and tactics used by content producers and distributors to achieve congestion-free delivery at the lowest cost. The authors suggest that the two new models will lead to increased conflicts as the connected parties become less motivated to work together to develop solutions to balance traffic flows and instead look for ever-greater trade-offs. Even when congestion solutions no longer require broadband network capacity, retail ISPs can lower the value of Internet access subscriptions or drive up costs by causing this bottleneck.

10.4.3.10 Music Industries

A hybrid approach that blends subscription-based and ad-based models should be used. Given that Internet users are still accustomed to free music downloads, advertisements and free music embedded with sound commercials from sponsors should be used [45]. Subscriptions can help a customized approach. The findings of the study performed by Weber et al. [46] demonstrate that despite the rise in energy use and emissions linked to Internet data streams, purchasing music digitally reduces energy use and carbon dioxide (CO_2) emissions linked to delivering music to customers by between 40 and 80%.

10.4.3.11 Telecommunications

Chang et al. [47] examined the offers of an integrated telecommunications service provider in Singapore for a variety of packages (portable phones, Internet services, fixed telephone, and cable TV), after smartphones launch. Their findings lay the groundwork for more effective management of pricing and bundling strategies for retail services.

A research about retention analysis from the prepaid segment (customers without a contract who use telecoms services based on prepaid cards) and from the postpaid segment can be a very excellent source of information for the innovation process (i.e., retail customers who use telecommunications services on the basis of regular monthly payments) [48]. The consequences of termination rate regulation, including income effects on demand, are examined by Tangeras [49], who demonstrates that these effects are both statistically significant and favorable. If a sufficient number of customers want on-net/off-net contracts and their subscription demand is relatively inelastic, operators earn from higher-than-cost termination rates under second-degree pricing discrimination. The telecommunications' industry, which has shifted away from fixed rates and increased tariff diversity, is the subject of the study of [50] that analyzes the effects of price discrimination. The author concludes that increasing tariff diversity significantly increases the uptake of broadband services. With an empirical investigation about user behavior and the efficiency of remediating isolated infected machines on broadband networks, Cetin [51] found that notifications from ISPs to their consumers are essential in the fight to clean computers with malware,

and walled gardens seem to be a rather useful method to enhance end user security. Mothobi [52] looked at how regulatory measures affected mobile retail prices in 8 African nations, between 2010 and 2014. The findings demonstrate that mobile termination rates (MTRs) significantly influence mobile retail costs.

10.4.3.12 Energy

In order to encourage effective risk management and competitive electricity markets, Chao [53] offers a theory of consumer subscription service that combines priority service and dynamic pricing inside a two-deal structure. The subscription service for consumers entails transactions in two time periods: a forward transaction that enables customers to choose service choices to hedging financial risks and a spot transaction that enables customers to secure power on demand. Spot prices chosen in a competitive wholesale electricity market are used to resolve the discrepancy between term subscription and actual use. It makes it possible for customers to participate in the industry's transition to a smart grid future by facilitating a crucial link between competitive wholesale and retail markets. In order to restore an effective demand response, Chao [54] suggests a contractual consumer baseline approach that outlines clear rights and obligations. The demand subscription service and demand response programs serve as a crucial link between the wholesale and retail markets.

Woo et al. [55] examined the California Public Utilities Commission's (CPUC) installation of an advanced metering infrastructure (AMI) for two investor-owned local distribution companies (LDCs) that serve retail customers. Through service alternatives, the State's AMI will assist new tariff initiatives for energy users, from the requirement for resource adequacy (RAR) to lowering greenhouse gas emissions (GHG). Based on each customer's willingness to pay, these alternatives can allocate limited capacity in an efficient manner. The writers also provide the general demand subscription/subscription service as an option.

On a research about the adoption of renewable electricity by consumers, Shittu and Weigelt [56] found that especially in low–moderate income (LMI) homes, the affordability can be shaped by complementary policies and factors. The authors indicate that utilities are more likely to encourage LMI homes affordability to their community solar projects (CSPs) in the presence of governmental interventions like solar incentive programs for rooftop solar installations and retail choice markets when a major portion of their customer base consists of LMI households. In contrast to rooftop solar panel access, subscription LMI access is actually more prevalent in retail choice marketplaces.

10.4.3.13 Educational Institutions

Whelan [57] described the program created by Killester College of Further Education (KCFE) in Dublin, which provides Post Leaving Cert (PLC) courses for individuals of various ages. In one of the components of the course, each student should acquire

a job placement and attend once a week throughout the academic year. This component is referred to as the Work Experience. The institution has created the Killester College Internship Program to give students an one work one day per week in order to secure this placement. This program is made possible thanks to formal agreements the institution has made with a significant IT solutions' company, an international investment bank, and a significant retail pharmacy chain. The college created incentives during this process to draw additional employers to the internship model. Larger time blocks for the business to utilize, IT training for staff members, and the choice of an annual online subscription to college course materials are all included in this. Buck [58] analyzed how to solve the complications in compensation models can help libraries save money and time spent on boring administrative tasks. In this regard, the author researched academic journal subscriptions, where the customer pays in advance for a journal that he can obtain later and may be eligible for a partial refund (depending on the journals he received or not). In compensation models, the customer makes an upfront payment, then makes a subsequent payment, and occasionally uses vouchers; the customer may receive a discount the following year and then receive their money back (or not). However, the new academic economic model is predicted to shift from subscription costs to publications. The author's work makes it evident that the current publication paradigm will change and suggests a new approach to the present subscription business model.

10.4.3.14 Personal Pension Plans

The preference for insurance-based personal pension plans (PPPs), that involve subscriptions, was researched by Marotta [59]. The author comes to the conclusion that the explanatory power of financial soundness indicators was enhanced by the salience effect on knowledge of the advantages of augmenting lower-perspective public pensions with PPPs.

10.4.3.15 Public Sector—Police

The socio-economic development potential of discussion on Sub-Saharan African police service websites (SSAPWs), which cover nations from Angola to Zambia, was examined by Madichie and Hinson [60]. The authors support more proactive public sector marketing tactics that make use of the SSAPW platform for efficient crime detection, reporting, and combating in a joint effort between law enforcement and residents of the participating states. By joining these venues, the study advises community dialogue in policing. The authors highlight the importance of these websites to engage the audience in fruitful conversation (i.e., dialogic loop), enhancing visitor retention and repeated visits. They also appoint that the majority of Internet users are underreported because the data are often drawn from shady PC Internet subscriptions rather than from mobile social media usage.

10.4.3.16 Generic (Applicable to Various Industries)

Several researches were conducted, and they can be used in a variety of businesses. CRM can be seen in numerous interactions between businesses and consumers in the consumer market [61]. These authors use John Wanamaker's business principles and practices to present a historical analysis of CRM that can be related with subscription business model. Bray et al. [2] investigated the subscription in retail and create a typology of subscriptions as well as a consumer profile most likely to participate in these programs. They evaluate the causes and obstacles to underwriting, delivering retailers' concise advice on the best ways to position and sell their products.

The churn rate was researched by Dheekollu et al. [62]. According to their research, there are two types of friction: passive (silent) attrition, which occurs when customers stop doing business without giving formal notice, and asset attrition, which is typically associated with subscription-based business models and is frequently observed in the telecommunications industry. It might be challenging to distinguish between lost and inactive customers in this form of attrition. The authors suggest a machine learning-based methodology that allows for the prediction of churn rates using data that are already available in businesses.

10.4.4 Main Research Trends in the Field of Subscription Retail

To answer forth question "What are the main research trends in the field of subscription retailing?", we have used a bibliographic coupling analysis. Bibliographic coupling between two documents occurs when there is an item of used as reference by these two documents. Their bibliographic coupling strength is then the number of references they have in common [63]. A bibliographic coupling analysis was performed using VOS Viewer, in order to extant and enrich the knowledge about the intellectual ties between documents. The methodology used was based on a minimum number of citations per document of five and fractional counting. Seventeen documents met these criteria, and seven documents were connected to at least one other document (Fig. 10.1).

In this analysis were identified four different clusters. The documents in the first cluster are represented in blue color and seem to analyze the subscription services business model showing the advantages *versus* per-order model, and the consumer antecedents to use subscriptions.

In the second in red color, the documents seem to analyze the typologies of subscription services, namely the evolution of surprise boxes business model.

In the third in yellow, the document analyzes how customers perceive fashion subscription services and the likelihood that they will use them.

In the fourth cluster in green color, the effects of promotions using coupons and CRM in subscription services are analyzed.

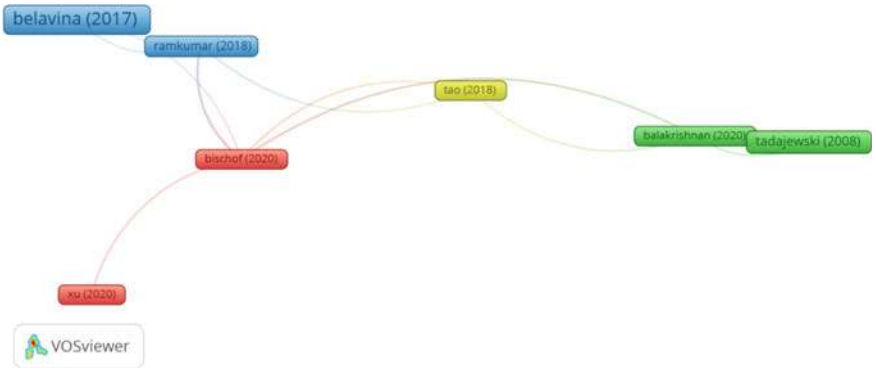


Fig. 10.1 Results of bibliographic coupling analysis. Research trends clusters

10.5 Final Considerations

This investigation contributes to the study of subscription retailing, identifying the documents with the most impact, and highlighting the evolution and the growing interest in the recent years. Finally, key topics per industry were detailed, and research trend clusters were analyzed. Several research avenues and organizational implications were highlighted: in the factors that affect subscription model adoption by consumers, the promotions and CRM to maintain the customer, the identification of subscription services' different typologies, and specific topics in each industry. Academics can develop each of these research topics and join different research streams. For example, studying specifically the factors that influence subscription adoption in each industry and type of subscription service. Organizations can use this research to outline their strategies to increase subscriptions and develop the relationship with the underwriting program, taking into account common and specific aspects of each industry. They can also have access to several real case-studies that can be easily replicated or adapted to their strategies and actions.

However, there are several limitations in this study. We have only analyzed research documents published in sources covered in Web of Science database. Other research databases could be used in order to represent a broader research documents' base. However, Web of Science database is the world's leading scientific citation search and analytical information platform. It is used as both a research tool supporting a broad array of scientific tasks across diverse knowledge domains as well as a dataset for large-scale data-intensive studies [64]. Also, other bibliometric techniques could have been used.

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Chapter 11
Kappa Matching Groups to Remove Subjectivity from Experimental Observations



Hector F. Gomez A, Mg. Bolívar Villalta Jadan, Olivia Altamirano Guerrero, and Alex Criollo Rodriguez

Abstract It is vital to determine the precision with which subjective aspects are recognized in studies, especially when working with subjective elements. Emotions are thus subjective aspects since their interpretation relies on a skilled expert or program to detect them on people's faces, in writing, in speech, and elsewhere. What happens if a group of observers has differing viewpoints on the same goal? Try to eliminate subjectivity by using the Kappa index or manually checking what is going on with the environment through surveys or interviews. The Kappa index is used in this study, and the degree of coincidence is validated; however, various findings were discovered for the same aim, which is the expressions on a person's face while watching a movie. Because of the wide range of outcomes, a solution was sought, and it was proposed that the many coincidences might be grouped together using clusters. That even responded to the dominating emotion, a centroid that appears to control the type of subjective judgments made or the start of them when categorizing the emotion. In this experiment, the neutral feeling served as the beginning point, and it appeared to command the kappa coincidences, which were bolstered by three clusters, with a focus on cluster 2.

Keywords Kappa · Subjectivity · Clusters

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11.1 Introduction

In experiments, especially when working with subjective elements, it is necessary to establish the precision with which these elements are recognized. Thus, emotions are subjective elements because their interpretation depends on an expert or software trained to recognize them on people's faces, in text, in voice, and more. Now, what happens when a group of observers has different opinions on the same objective? That is, when watching a movie or a demonstrative class, they can have different subjective appraisals of what happens in it? You can try to reduce subjectivity by applying the Kappa index or perhaps manually verifying what is happening through surveys or interviews with the environment. In this work, the Kappa index [5] is taken, and the degree of coincidence is verified, but different results were found for the same objective, in this case, the emotions that occur in the face of a person while watching a movie. The variation of results caused a solution to be sought, and it is suggested that the different coincidences can form groups of coincidences by means of clusters. That even responded to the dominant emotion, a centroid that apparently commands the type of subjective decisions or the beginning of them when classifying the emotion. In the case of this experiment, the neutral emotion was the starting point, and it seemed to command the kappa coincidences, strengthened by 3 clusters, but concentrating on cluster 2, with dominance of the neutral emotion. The importance of this work is based on the way in which it is intended to eliminate subjectivity by means of clusters. In fact, kappa already does that, but the experimental contribution is based on saying what happens when there is such a variation of coincidences between several observers. We continue with the description of works that use kappa to verify coincidences. The methodology is proposed, and the necessary experimentation and conclusions of the experimental work are provided.

11.2 Art State

Mosaicing is the process of using a registration and blending approach to combine information represented by many photographs. A face-mosaicing approach that creates a composite face picture based on evidence supplied by an individual's frontal and semiprofile face photographs during enrollment. Face mosaicing eliminates the need to keep track of many face templates for different postures of a user's face picture. The side profile photographs are matched with the frontal image in the proposed technique using a hierarchical registration algorithm that takes advantage of neighborhood features to identify the transformation between the two images. The side profiles are then blended with the frontal picture using multiresolution splining, resulting in a composite facial image of the user [8]. This study created a photograph and video database of 4-to-6-year-olds showing the seven universal emotions provoked and posed, as well as a neutral expression. Children took part in photograph and video sessions aimed at eliciting emotions, and the resulting photographs were

judged in two rounds by impartial judges. The accuracy of emotional expression by 4-year-olds was shown to be lower than that of 6-year-olds. The highest levels of agreement were found in the areas of happiness, disgust, and contempt. After a sub-analysis review by all four judges, there was 100 percent agreement for 1,381 stimuli that made up the compound [6]. When the participants saw the photograph lineup, their eye movements were monitored to see if they followed the instructions. Participants who were given absolute judgment instructions had a lower hit rate than those who were given relative judgment instructions in the current perpetrator lineup. There were no differences between the two teaching conditions in the missing perpetrator lineup. Furthermore, no correlation was detected between "before" and "post" confidence and accuracy in the study, as predicted [2]. We assessed the prevalence rate of prosopagnosia according to developmental prosopagnosia cutoffs using a large, unselected web-based sample of 3116 adults. Used cluster analysis to see if a more natural limit for prosopagnosia existed. There was no evidence of one, implying that prosopagnosia is a spectrum. There were no significant connections between stricter vs. more flexible cutoffs. The study found a link between strictness of cutoffs and face perception accuracy [3]. Many well-developed Visual Question Answering (VQA) models are highly influenced by the linguistic prior issue, according to recent studies. Instead of reasoning on visual contents, it refers to formulating predictions based on the co-occurrence pattern of textual inquiries and responses. In particular, propose a unique interpretation technique in which the loss of mis-predicted frequent and sparse replies from the same question type is clearly displayed during the late training phase. It explains why the VQA model frequently produces a clearly incorrect response to a query whose correct solution is scarce in the training set. Based on this finding, we offer a unique loss re-scaling method for predicting the final loss that assigns different weights to each response based on the training data statistics. The experimental findings on two VQA-CP benchmark datasets clearly indicate the usefulness of our technique, which we apply to six strong baselines. Furthermore, we demonstrate the applicability of the class imbalance interpretation approach on additional computer systems [4]. During their time on the site, they are likely to display a variety of emotions such as engaged, bored, annoyed, bewildered, furious, and others cues that are either engaged or disengaged. The goal of this research is to develop a convolutional neural network.

(CNN) and providing it with residual connections that can increase the network's learning rate and performance. Because of the addition of residual learning, which carries over extra learning from the previous batch, the network performs well. Increased picture size for greater resolution, optimized hyperparametric (OHP) setting, and added layers to the next batch cues that are either engaged or disengaged. The goal of this research is to develop a convolutional neural network [9]. Sensors and technological advancements (e.g., virtual reality) (e.g., eye-tracking tools) have been employed in the creation of realistic virtual worlds and the tracking of eye movements. Adding more objective data to evaluations than can be gained through typical methods measures. The goal of this research was to identify between autistic and normally developing children [1]. The study's findings revealed that there is practically full agreement between determining Mizaj by face traits and the

experts' Mizaj differentiation and moderate agreement with the Mizaj questionnaire. The findings revealed that the facial-based Mizaj identification program has a high level of validity when it comes to detecting the Mizaj of people in the research group. However, bigger sample size investigations are needed to corroborate the findings [7]. The previous studies use the Kappa index as a measure of comparison of the studies, to verify the consistency of the results, as proposed in this work, where the hidden ones verified the emotions on the people's faces, and the index of kappa manages to obtain the coincidence percentage of them.

All the experiments of the investigations described in this section use kappa, but the objective of this work is to verify what happens when there is many observers and how the error of taking kappa can be eliminated directly to decide if there are true coincidences or when they are created as it is in this investigation in which emotional group they are created.

11.3 Methodology

The methodology is based on determining what happens when there is many observers on a single objective with coincidence differences for kappa. Here, the observers get together spontaneously, observe a class or movie, and verify their coincidences on the application of the Kappa index. The objective is to determine how much variety exists between the opinions and, definitively, to find which may be the emotion that commands a possible domain of coincidence over the others, in the case of this experiment, the neutral emotion. After that, and when different matching emotional values are obtained, what decision is made to observe if emotional groups can be obtained and in which and in what percent does the cluster that contains the greatest amount of emotional coincidence fall and assess said cluster to check if the coincidence is significant. Cluster 2 for this experiment. Once the group formation graphs have been analyzed and observed, it is possible to opt for the cluster formation and its recommendation as a coincidence indicator based on kappa.

11.4 Experiment

Experiment consists of obtaining the degree of coincidence of the 21 observers (Table 11.1). As can be seen, there are differences between observers for the kappa values, so it is necessary to verify such a difference by means of obtaining groups and analyzing whether there is a coincidence with the average or emotional centroid. The averages of the emotions can be seen at the end of Table 11.1, which in the case of neutral is 43%.

Table 11.1 Kappa values

Emotion	Neutral	Angry	Happy	Sadness	Scared	Disgust	Surprise
Percent	80	80	62	8			
			58	40	80		
		57	58	58	19		
			58	40	19		
			55	91		87	
			60	41	31		
			50	42		45	
			6		38	32	
	52		34	48			
	54	50	43	44	56	37	41
			56	90		86	
			59	40	30		
			57	80			
	51	100	39	75	50		100
	54	37	43			36	41
	19	67	38	68	43	43	
		9		48		43	
		8		39	20	28	
		50		49			
		92		61	80	72	
		3		47			48

(continued)

Table 11.1 (continued)

Emotion	Neutral	Angry	Happy	Sadness	Scared	Disgust	Surprise
	28	32	10	11		38	22
		3		42		48	
	6	80	1	65	70	8	50
Sum	344	668	787	1127	536	603	302
Average	**43**	**47,7,142,857**	**43,7,222,222**	**51,2,272,727**	**44,6,666,667**	**46,3,846,154**	**50,3,333,333**

11.5 Conclusions

It is evident that the coincidences between the different experts are concentrated between 50 and 60% of moderate to substantial values, although it is also observed that there are insignificant values (Fig. 11.1). That emotional group of agreement does not prove a connection to the neutral value. What has been said is corroborated by producing clusters on the obtained coincidence values.

The coincidence clusters show, in effect, 3 emotional groups extracted from kappa (Table 11.2).

From the cluster analysis we can see the coincidence with the average of the values obtained by kappa. Cluster 2 can then be used as a measure of coincidence since even that is where the largest number of values obtained by kappa occur. It is therefore recommended to use this method, especially when there are many observers, as was the case in the present experiment. In Table 11.1, many differences between opinions are observed, and subjective judgments can be obtained about the clarity or measure of kappa, but when it is observed that groups or clusters can be created, it means that these values can be taken as coincident degrees of the observations.

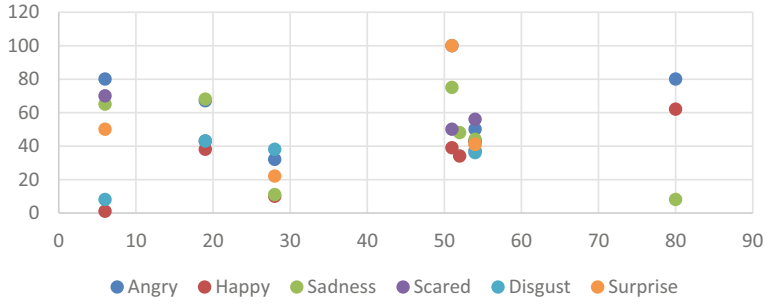


Fig. 11.1 Kappa values

Table 11.2 Kappa clusters

Attribute	Full data	Cluster#		
		0	1	2
	(24.0)	(4.0)	(17.0)	(3.0)
Neutral	43	55	432,353	256,667
Angry	477,143	674,286	421,008	532,381
Happy	437,222	516,806	465,654	56,667
Sadness	512,273	38.25	558,369	424,091
Scared	446,667	651,667	387,451	506,889
Disgust	463,846	504,423	490,271	26
Surprise	503,333	48	525,686	407,776

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Chapter 12
Families of ROC Curves Are Applied to the Methods of Comparison of Emotional Analysis Results

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Abstract This paper proposes integrating expert perspectives and building families of ROC curves to assess the validity of the observation model against a case study. In this regard, it was revealed that by studying emotions in the face and employing computer software, coincidences may be produced. In practice, the formation of various ROC curves highlights the importance of computer and statistical analysis in such situations, as the subjectivity in these types of investigations grows. Utilize a family of ROC curves as a measure of experimental coincidence, which has shown a 60% success rate in routine testing.

Keywords Face emotions · ROC curve · Emotions analysis

12.1 Introduction

Research has been undertaken over the decades to add to human–computer interaction. Emotions are triggered by any brain activity and are detected by the face, which has the greatest sensory organs. Facial expression is an important part of human communication that may be employed in several situations in real time. Thanks to the application of deep learning technologies, facial expression recognition has

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become more important in the field of human–computer interaction in recent years. In a statistics experiment video, several learning processes and consequences are produced. Facial expression is a nonverbal type of communication that lies in the space between verbal and nonverbal communication. It expresses a person's current mental state, feelings, and ideas.

Over the decades, a study has been conducted to add to human–computer interaction. Emotions are caused by any activity in the brain and are recognized through the face, which contains the most sensory organs. Facial expression is an essential form of human communication that may be used in a variety of real-time scenarios. Facial expression detection has been more essential in the field of human–computer interaction in recent years, thanks to the use of deep learning technologies. In an experiment film on statistics, a movie produces diverse learning processes and consequences. Facial expression is a nonverbal method of communication that exists between verbal and nonverbal forms of communication. It expresses a person's thoughts, feelings, and present mental state. In this work, the different points of view of non-coincidence between expert criteria to identify emotions in the face of a case study are analyzed. This investigation worked with computer software[1] and with the analysis of experts in educational psychology. The result shows possible coincidences, but also exaggerated inconsistencies that would reflect the need to eliminate the subjectivity of emotional analysis in a person's face, either from computer software or from the capacity of didactic preparation for the manual inference of emotions. Figure 12.1 shows the case study: a person who was asked to watch a documentary in which facial emotions were obtained both automatically and manually.

This would allow humans to survive and be employed in a variety of sectors, including as education and medical's multiple human sensations, such as expressions, facial pictures, physiological indications, and neuroimaging methodologies, can be used to describe procedures (Fig. 12.1). The objective of this work is to verify if the software and the points of view of the experts coincide. The ROC curve was used for the coincidence mechanism, and the results were verified. The state of the art and the experimental methodological applications were analyzed. The results are conclusive that there are values greater than 60% for accuracy, sensibility, and specificity with a 20% error. To better explain the revision of the family of ROC curves, the following sections describe the related works, methodology, experiments, and conclusions of this work.

[1] https://demo.morphcast.com/sdk-features/index.html?video=https%3A%2F%2Fdemo.morphcast.com%2Fsdk-features%2FBreeze_Woodson.mp4&sv=false&cta=vp.

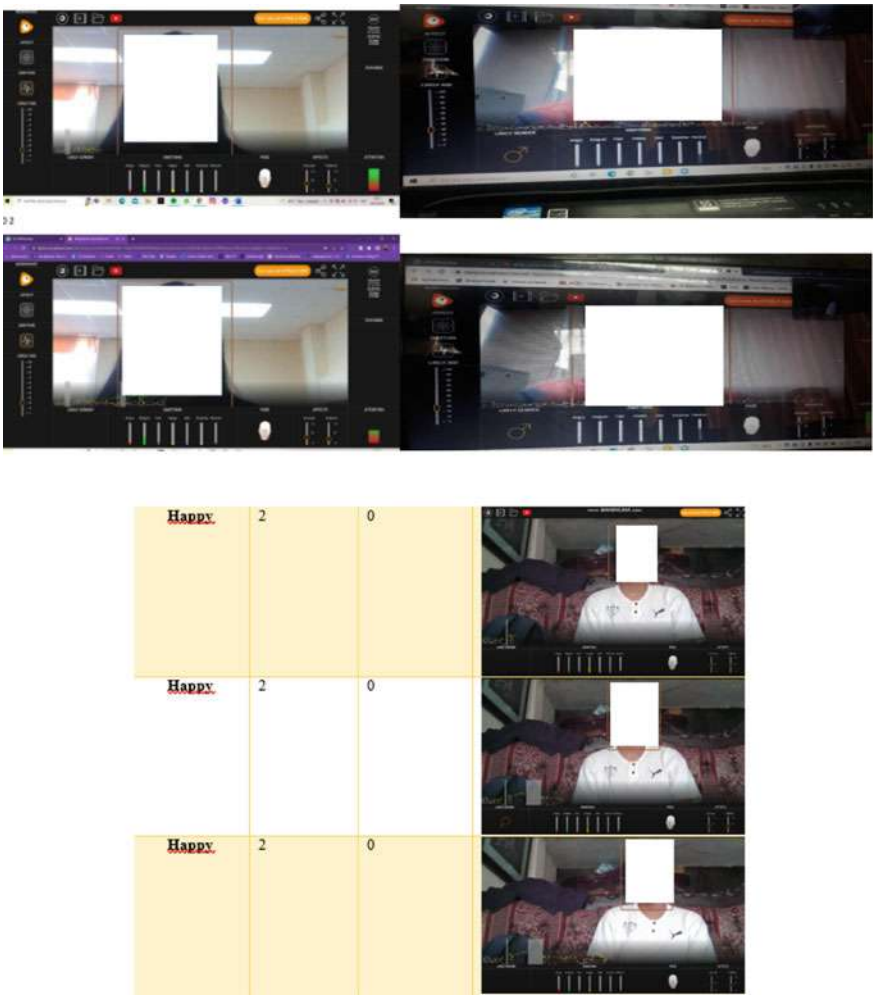


Fig. 12.1 Face emotions

12.2 Art State

Any publications present an overview of the research on face emotion detection utilizing various transformations or fiducial points, as well as various classifiers, to extract emotional traits from facial pictures. It gives an overview of the facial expression detection system and compares facial expression recognition systems [9]. In this study, a lightweight network model was created for real-time emotion classification to recognize person facial expressions. In terms of expression classification, our model surpasses existing state-of-the-art algorithms, according to the experimental findings database. In addition, our model has fewer parameters, making network

training simpler. Comparisons and reviews of studies [5] highlight the advantages of using multimodal inputs in affective computing systems, such as deep learning for emotional recognition. These systems are more accurate and easier to implement compared to unimodal. In a 2 × 2 setup, participants were randomly assigned to one of two groups [2]. The number of emotions seen, the features gathered, the classification method, and the database all have an impact on accuracy and consistency. This would encourage study into physiological indicators of present levels of knowledge as well as emotional awareness difficulties [3]. Humans may benefit from these encounters, but machines do not. Convolutional neural networks (CNN) are utilized in this article to interpret seven different human facial emotions. Fear, anger, disgust, sadness, happiness, surprise, and neutral are the seven classes [1]. Face emotion detection with noisy multitask annotations is a fresh challenge to reduce human labeling effort on multitask labels. Formulation of this innovative challenge from the standpoint of joint distribution match aims to learn more reliable correlations between raw face pictures and multitask labels while lowering noise. In our formulation [1], we propose a new technique to enable emotion prediction and joint distribution learning in a unified adversarial learning game formulation [1, 10]. In an offline environment, all these strategies are effective. The information for emotion classification is permanently preserved and available. When data is flowing in, however, mode approaches are ineffective for real-time emotion categorization. At any given time, the model can only see a continuous stream of data and also demand rapid responses based on one's emotional state [7]. Emotions are important in an e-learning system because they aid student learning. Emotions' role in improving performance has been extensively researched. All these tactics work well in a traditional context. The information used to categorize emotions is saved and made available indefinitely [4]. To train the best model, many optimizers are utilized. It was evaluated based on its training and testing accuracy, as well as other aspects such as the confusion matrix. The ROC curve is a graph that depicts the relationship between two variables. The most accurate model, with a 91.89504 percent accuracy, outperforms prior state-of-the-art models [7]. The investigation provided a thorough examination. The performance of the underlying model for this thesis study is compared in terms of accuracy, training duration, and training loss utilizing convolutional neural network (CNN). CK+ and CK are two publicly available datasets [6].

12.3 Methodology

To know the different points of view in relation to the behavior of a software regarding emotional management, you need to execute the following points:

- Prepare the case study: a student watching a documentary.
- Locate the computer software for automatic emotion recording when a person sees a movie.
- Every 5 s, the emotions are recorded.

- The most prevailing emotion is verified every 5 s.
- The ROC curves are obtained because of the analysis.
- The conclusions are verified.

The apparatus of the various points of view on emotions in the face is the gateway for decision-making regarding the application of tests or other biomarkers that are necessarily useful for decision-making. Through experimentation, it is possible to verify the methodological application.

12.4 Experimentation

The ROC curves show the different points of view regarding the software and the experts. For this experiment, 21 experts worked to establish the coincidence of the automatic and manual recording of emotions (Fig. 12.2).

In total, 21 ROC curves were obtained in order to verify if the results could be comparable since these curves work with sensitivity, accuracy, and specificity. The results are described in the conclusions of this work.

12.5 Conclusions

It is evident that the diversity of opinions of the experts generates different ROC curves and, therefore, different indicators.

Results obtained are eminently conclusive (Fig. 12.3). As the sensitivity of a ROC test increases, the number of people who have the emotions, but test negative (false negatives), will decrease. Specificity refers to the probability that a test result will be negative if you really do not have the emotions, but if it exists similar means between precision and sensitivity, which can favor precision and the task of how sensitive the software is in eliminating subjectivity emotions. The recommendation is considered to verify if the ROC curve is a good indicator when verifying the emotions on the faces of the participants. The average results are:

Accuracy: 56.6
Sensitivity:57.7
Specificity:50.2
With maximum and minimum values of
Accuracy: 85.8–20.7
Sensitivity: 100–6.1
Specificity: 98–1.9
With error = 20%, the average results are:
Accuracy: 68.6
Sensitivity:62.7
Specificity:71.2

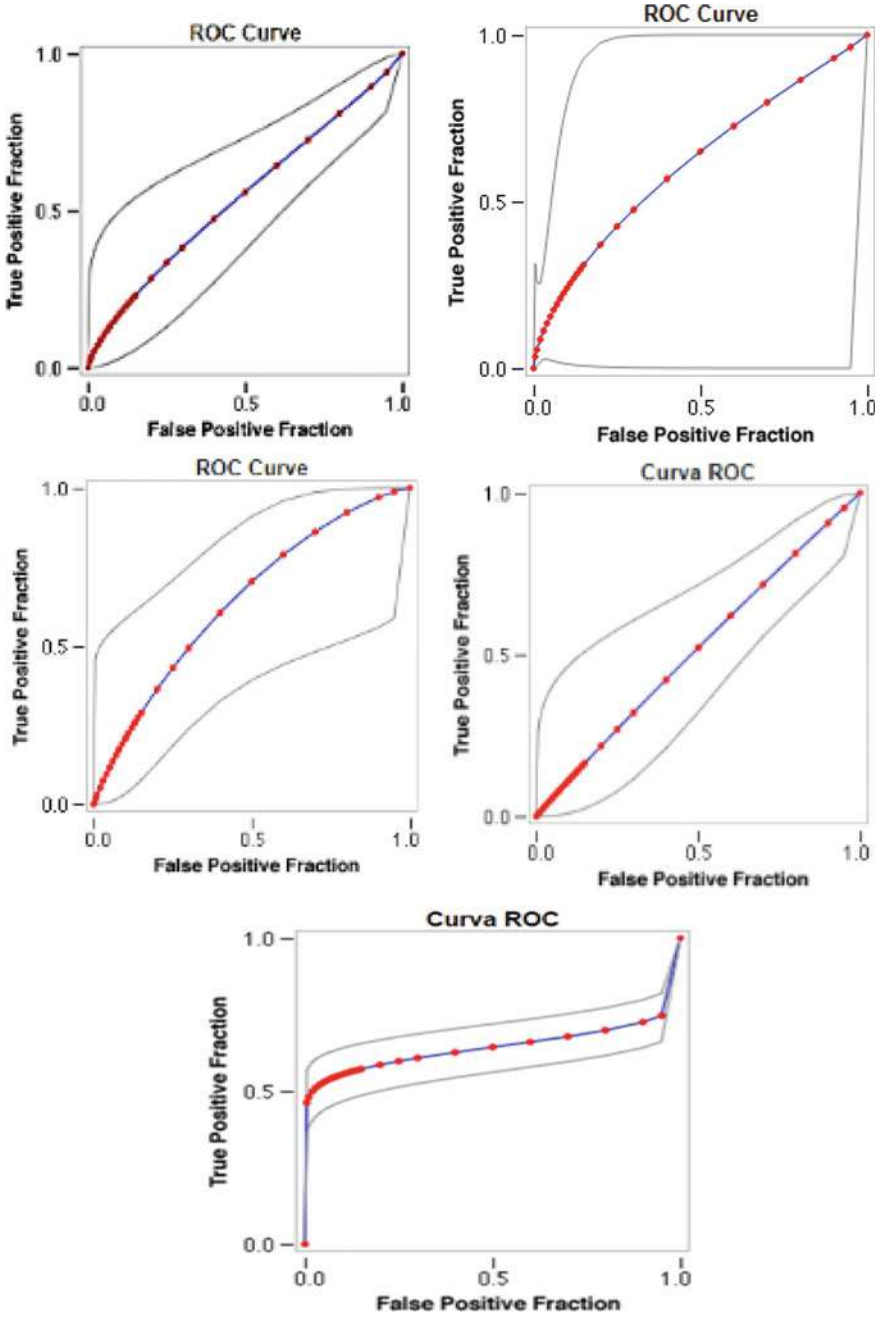


Fig. 12.2 Family of ROC curves example

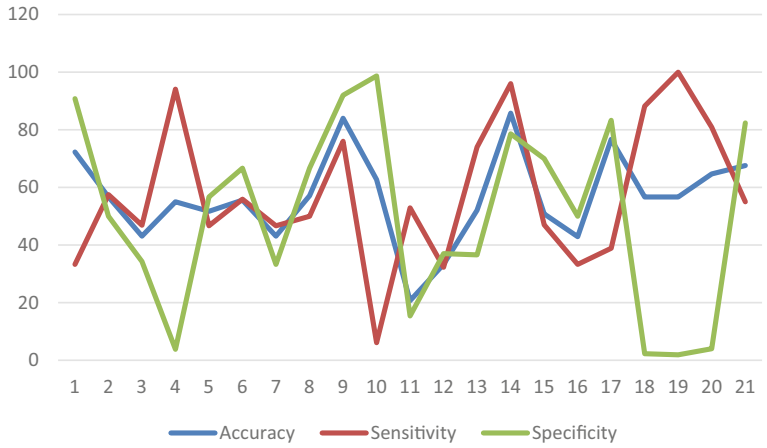


Fig. 12.3 ROC curve

Conclusion to apply a family of ROC curves to use them as a degree of experimental coincidence has worked with a regular test, perhaps, and indeed, its application to individual experiments is better, and not as a comparison mechanism, for which it is perhaps recommended to verify contexts where the object of study is, insisting on the ROC curve as a means of comparison of experimental results. One can speak of individual conclusions, but not as an observation criterion for these cases that perhaps require other types of statistical procedure alternatives.

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Chapter 13
Impact of Personal and Contextual Factors on Food Decision-Making



Azucena Calderón-Rangel, Luis Novo Moreira, and Eduardo Sánchez Vila

Abstract The understanding of the key factors underlying the decision-making processes behind the eating behavior is a great challenge for food marketing. Government organizations as well as an increasing number of food companies are interested in motivating healthy dietary habits. However, it turns out to be a complicated task due to the high number of internal and external factors involved that must be taken into account when considering a marketing strategy. This work tries to discover if it is possible to reveal new personal (internal) and contextual (external) variables in order to explain and predict both the nutritional value and category of the foods chosen by a given individual. The results suggest that variables such as personality, satisfaction, or productivity may help to predict the nutritional characteristics of food choices.

Keywords Decision-making · Eating behavior · Personal state · Context · Food marketing

13.1 Introduction

Decision-making is of great importance in any field, both socially and economically, as it directly affects the results obtained in the short, medium, and long terms. The time and resources required to make a good decision increase with the importance of the decision, so decisions that have a greater impact can rarely be determined immediately. This is due to the limited processing capacity in the human brain [1],

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for which a compromise must be found between the amount of information that is taken into account to make the decision and the total time of the decision-making process.

To understand how the brain makes decisions, particularly within the food domain, it is essential to combine knowledge from two fields that are not yet well integrated: the neural and computational bases of decision-making and the homeostatic regulators of food [2], as well as the possibility of introducing other emotional or cultural variables that help us understand how and why nutritional choices are made. According to Rangel (2013), decisions are controlled by three different systems:

- Pavlovian controller. Organisms automatically display many types of preprogrammed responses when exposed to specific stimuli. The exact number of Pavlovian controllers is unknown, and it is likely that different types of responses involve different neural subsystems.
- Habitual controller. More flexible behavioral responses can be generated using stimulation associations. Concretely $r^O(a|s)$ tells us the reward produced by performing action a in state s. The habit system learns to assign a value to each state–action pair, denoted by $V(a|S)$ which is proportional to the value of the rewards that follow. The system then selects the stocks with the highest value when exposes to signals associated with a given state.
- Control by objectives. This controller allows even more flexible behaviors by performing control based on models. Let us let $p(o|a, s)$ denote the probability of obtaining the result o by taking action a in state s. This controller assigns a value to each action–state pair given by:

$$U(a|s) = \sum_o p(o|a, s) r^D(o|s). \tag{13.1}$$

As shown in this expression, the model of the choice situation has two components: the association's action-outcome represented by the probability function and the outcome-reward associations represented in the reward function. The superscript indicates that this is the reward function used to evaluate the rewards potential outcomes at the time of decision. In contrast to the habit system, values are now calculated using the model of action-result-reward, which is a process oriented in the future. In particular, the in-formation about the results can used to update values without having to experiment with them. In this way, the values can reflect consequences delayed long before experiencing them.

In the case of nutritional decision-making, Rangel [2] indicates that food choice can be regulated by any of the three controllers, and Pavlovian and usual controllers are likely to be important for feeding decisions. Other behavioral decisions share some of these properties, but only feeding ones combine them as shown in Table 13.1.

In addition to Rangel's proposals, there are other strategies for the decision-making process such as the dual process theory [3], which considers two main types of cognitive processes introduced by psychologist Daniel Kahneman [4]: The

Table 13.1 Properties of different decision-making problems [2]

	Nutrition	Breathing	Sex	Shopping	Drugs	Altruism
Frequent and necessary consumption	✔	✔	✘	✘	✘	✘
Regulated by multiples controls	✔	Possible	✔	✔	✔	✔
Dedicated homeostatic mechanism	✔	✔	?	✘	✘	✘
Dedicated Pavlovian controls	✔	✔	?	✘	✘	?
Dedicated Learning Systems	✔	?	?	✘	✘	?
Strong hedonistic activation to consumption	✔	✘	✔	✘	✔	✘

first (S-I) is fast, unconscious, and does not require effort, linked to intuition and driven by emotional factors; the second (S-II) is slow, conscious, and consumes energy, and it is related to reasoning and rational results. Although human beings have traditionally been considered rational and attempts have been made to explain the selections by utilizing System II processes, the rise of behavioral economics has revealed significant deviations between human behavior and the predictions of rational models.

Several identified cognitive heuristics models suggest that logical decision-making might not be as important as we initially assumed. Antonio Damasio introduced the so-called emotional markers and determined an important relationship established between these with effective decision-making [5] and placing the System I as the best candidate for achieving an accurate prediction of the decision process [6].

13.2 Goal and Hypotheses

The goal of the research is to understand food choices focusing on the System I and the personal and contextual variables probably involved on its processes. The specific hypotheses driving the study are as follows:

H1. Positive personal states, such as positive feelings, high satisfaction, etc., may set a long-term focus in the subject that would emphasize the value of food with high nutritional value/category.

H2. The social context in which the food choice is made may condition either positively or negatively depending on the role of the person in the group.

H3. By means of choosing the relevant explanatory factors, it is possible to build a model to predict both the nutritional value and the nutritional category of the chosen food.

13.3 Methodology

13.3.1 Experimental Design

We worked with two different datasets. The first of them, which we will call Dataset A has been created through a survey of 38 individuals observed over 14 occasions, obtaining a sample of 532 observations. During the experiment, they were presented with various questions with the intention of acquiring information related to the explanatory variables of interest. The second set of data, which we will call Dataset B, has been obtained from a survey carried out to 10 individuals on 9 occasions, obtaining a sample of 90 observations. The variables of the two experiments are shown in Table 13.2 [2].

In both cases, the calculation of the average nutritional value was made by averaging the nutritional values of each dish of the menu through a two-step process: (1) an estimate of the nutritional composition of each dish using the information provided by the nutritional value Nutrition value, and (2) an estimate of the nutritional value (Nutriscore) of each dish using the calculator created by Colruyt Group.

In addition to the numeric variable for nutritional value, we also created two new nutritional category variables discretizing these numerical values according to the following criteria: for the new variable nutritional category I, we will use the values "high," "medium," and "low" with the following thresholds:

- "High" if the mean nutritional value is greater than 3
- "Medium" if the average nutritional value is between 2 and 3 (included)
- "Low" if the mean nutritional value is less than or equal to 2.

Likewise, for the new variable nutritional category II, we will use the values "high" and "low" with the following thresholds:

- "High" if the mean nutritional value is greater than or equal to 2.5
- "Low" if the mean nutritional value is less than 2.5.

Table 13.2 Variables

DataSet A		DataSet B	
Variables		Variables	
Name	Energy	Name	Nutritional value
Age	Stress	Company	
Sex	Satisfaction	Stress	
Origin	Productivity	Menu type	
Food group	Emotions	Intolerance	
Personality	Nutritional value	Choice type	
Company		Energy	

13.3.2 Statistical Analysis

To determine if the explanatory variables obtained were significant when explaining the result variable, in this case, both the numerical data of the nutritional value and that of the corresponding categorical variables generated from there, we have carried out the corresponding tests of significance [7, 8]: ANOVA, Chi-squared, and t-Student based on the data of each of the variables through the following steps [9]:

- We established the null hypothesis and the alternative.
- We established a level of significance $\alpha = 0.05$.
- We established the test statistic and consider its distribution under the null hypothesis.
- We established the regions of acceptance and rejection of the null hypothesis.
- We computed the value of the statistic for the observed sample and check in which region it lies.
- We reached the conclusion, accepting or rejecting the null hypothesis, with the established level of significance.

13.3.3 Predictive Models

For the validation of some of the hypotheses raised, we used a series of learning models, in particular linear regression, decision trees, and ensembles such as XGBoost and random forest, as they are the ones that, a priori, best should work for datasets of these characteristics [10].

13.3.4 Evaluation and Selection of Models

A fundamental part of our work lies in the evaluation of the trained models. After a first phase of data cleaning, and creating new variables, we created two sets, one for training and the other for testing in a percentage of 80% and 20%, respectively, using stratification by the output variable so that all the classes were correctly represented in both sets [11]. The training set was used so that the model could "learn" using cross-validation, and the test model was used for the final evaluation of the model.

Cross-validation with stratification

For the evaluation of the models, we used the cross-validation method with ten partitions, so that each one was used ten times using 9/10 of the training sample, validating with the remaining 1/10. Furthermore, we created the partitions stratified by the output variable in each case, so that the partitions were balanced in each of them. With these results, we created a ranking that allowed us to choose the best

model with which to make a last training, this time using all the samples of the training set and, finally, we checked the result using the test sample.

Metrics

For the evaluation of our models, we used different metrics depending on the problem:

- For the case of the regression, we used mean square error (RMSE) and R^2 that shows the proportion of the variance that is explained by the independent or explanatory variables.
- For the case of the classification, we used the precision (Accuracy) that indicated the proportion of samples correctly classified against all available samples.

Selection of hyperparameters

For the selection of the best hyperparameters for each of our models, we used a strategy that is based on two basic pillars:

- Configuration of the hyperparameter grid. As the number of hyperparameters to be optimized increases, testing combinations increment very quickly; therefore, we must think of a strategy for creating our most efficient set of hyperparameters.
- We opted to use a "space-filling" design, such as maximum entropy, which tries to find a configuration of points that cover the hyperparameter space with the smallest probability of overlapping the redundant styles trying to maximize the determinant of the spatial correlation matrix between coordinates.
- Selection of the best combination of hyperparameters. Most machine learning models have hyperparameters that we must adjust to obtain an optimal result; using cross-validation, we evaluated a set of candidate values and chose the best one based on the selected evaluation metric. The main drawback is that this process can take a long time [13], so in this case, we used methods that sped up the fitting process by adaptive resampling of the candidate values, so that they can discard those that are clearly suboptimal before the cross-validation process is complete.

13.3.5 Analytics Tools

To carry out this work, R, a free software environment for statistical computation, has been used. In particular, the collections of packages Tidyverse [14], Infer [15], and Tidymodels [16] have been used for the realization of statistical tests as well as the implementation of the different predictive models, and the VIP package [17] to obtain the most important characteristics of each of the models.

13.4 Results

13.4.1 DataSet A

Statistical tests

In the first place, we carried out a first exploratory descriptive analysis to verify the main statistical values statistics of the variables in our dataset. Using the statistical tests, we calculated the response variable "mean nutritional value" (numeric) where the null hypothesis H_0 would be the independence between the explanatory and response variables or where there was no difference between the means of the groups of that. The variables are shown in Table 13.3.

We repeated this procedure for the response variable "nutritional category." The results are shown in Table 13.4.

Table 13.3 Test results for the mean nutritional value response variable

Variable	Statistical	Value	*P*-value
Age	F	3.547349	0.018
Sex	t	0.2571226	0.381
Origin	F	4.880274	0.001
Food group	F	1.502285	0.213
Personality	F	3.790546	0.007
Company	F	0.954661	0.407
Energy	t	−0.3700045	0.683
Stress	t	−0.5134311	0.69
Satisfaction	t	−3.71382	0
Productivity	t	1.983605	0.032

Table 13.4 Test results for the nutritional category response variable

Variable	Statistical	Value	*P*-value
Age	X^2	18.91068	0.006
Sex	X^2	9.763975	0.003
Origin	X^2	25.40283	0
Food group	X^2	15.29431	0.002
Personality	X^2	16.21802	0.019
Company	X^2	8.112446	0.229
Energy	X^2	0.6505509	0.754
Stress	X^2	1.403825	0.499
Satisfaction	X^2	9.815715	0.007
Productivity	X^2	6.471395	0.047

Regression problem

We also calculated the results of the multiple regressions for the training partition of Dataset A, both for the explanatory significant variables (age, origin, personality, satisfaction, and productivity) and the entire set of available variables are shown in Tables 13.5 and 13.6, respectively.

Table 13.7 shows the metrics obtained in the evaluation carried out on the test samples for the values RMSE and R^2 for both models.

Classification problem

For the classification in three different classes of nutritional category, we used the classifiers based on decision trees, XGBoost, and random forest. We did it by using two approximations, with all the variables and doing a preselection of the seven previously used variables. The ten best results of the evaluation using the ten-partition cross-validation method are shown in Table 13.8.

In addition, we can also see a graphical representation of all the models, where it can be seen a clear difference between the different types of models evaluated (see Fig. 13.1).

The best classifier turned out to be an XGBoost, with preselection of variables and with the combination of hyperparameters indicated in Table 13.9.

Using this combination, we performed one last training to the complete dataset of training, and we validated the test data, obtaining an accuracy value of 0.5.The most important variables were identified for this model (see Fig. 13.2).

For the classification in two classes of nutritional category, we used classifiers based on decision trees, XGBoost, and random forest. Also by means of the two previously mentioned approximations, with all the variables and making a preselection of the seven previously used variables.

Table 13.5 Linear regression coefficients using the variables age, origin, personality, satisfaction, and productivity

	Estimate	Std. error	t-value	Pr($>\|t\|$)
(Intercept)	2.178e + 00	1.467e-01	1.485e + 01	3.079e-40
Age less than 20	−9.677e-01	1.858e-01	−5.208e + 00	3.017e-07
Age between 21 to 40	−1.63e-02	8.923e-02	−1.827e-01	8.552e-01
Age more than 61	−9.419e-02	2.150e-01	−4.388e-01	6.616e-01
Origin South Europe	−2.532e-01	8.533e-02	−2.968e + 00	3.175e-03
Origin North Europe	−9.193e-02	1.520e-01	−6.046e-01	5.458e-01
Personality constructor	4.055e-01	1.144e-01	3.545e + 00	4.381e-04
Personality director	1.517e-01	8.104e-02	1.872e + 00	6.192e-02
Personality socializer	8.415e-01	1.720e-01	4.891e + 00	1.440e-06
Satisfaction satisfied	3.662e-01	1.246e-01	2.939e + 00	3.476e-03
Productivity unproductive	3.979e-02	9.173e-02	4.337e-01	6.647e-01

Table 13.6 Linear regression coefficients using all variables

	Estimate	Std. error	*t*-value	Pr(> |*t*|)
(Intercept)	2.179e + 00	2.165e-01	1.007e + 01	2.049e-21
Age less than 20	−9.745e-01	1.902e-01	−5.123e + 00	4.676e-07
Age between 21 to 40	1.106e-02	1.079e-01	1.026e-01	9.184e-01
Age more than 61	1.435e-02	2.642e-01	5.432e-02	9.567e-01
Sex men	−2.447e-02	9.516e-02	−2.571e-01	7.972e-01
Origin South Europe	−2.377e-01	1.009e-01	−2.356e + 00	1.894e-02
Origen North Europe	−8.480e-02	1.612e-01	−5.260e-01	5.992e-01
Food group: intolerance	−1.203e-01	1.451e-01	−8.291e-01	4.076e-01
Food group: allergic	2.394e-01	2.484e-01	9.638e-01	3.357e-01
Personality: constructor	4.246e-01	1.193e-01	3.559e + 00	4.166e-04
Personality: director	1.460e-01	8.974e-02	1.627e + 00	1.044e-01
Personality: socializer	8.395e-01	1.922e-01	4.368e + 00	1.599e-05
Company: partner	−8.139e-03	1.093e-01	−7.449e-02	9.407e-01
Company: friends	−1.121e-01	1.257e-01	−8.919e-01	3.730e-01
Company: alone	−1.305e-01	9.252e-02	−1.411e + 00	1.591e-01
Energy: without energy	4.404e-02	8.381e-02	−5.255e-01	5.995e-01
Stress: stressful	3.533e-02 1	1.222e-01	2.892e-01	7.726e-01
Satisfaction: satisfied	3.483e-01	1.330e-01	2.620e + 00	9.128e-03
Productivity: unproductive	7.283e-	9.726e-02	7.488e-01	4.544e-01
Emotions	1.023e-02	3.652e-02	7.796e-01	7.796e-01

Table 13.7 Results obtained for multiple linear regression

Model	RMSE	R^2
Lineal regression 7 variables	0.69635	0.12622
Lineal regression all variables	0.71096	0.09033

The ten best results of the evaluation using the ten-partition cross-validation method are shown in Table 13.10.

We show the results of all tested models graphically (see Fig. 13.3).

The best classifier turned out to be a random forest, without preselection of variables and with the combination of hyperparameters indicated in Table 13.11.

Using this combination, we performed one last training to the complete dataset of training, and we validated the test data, obtaining an accuracy value of 0.60748, which we present using the confusion matrix (see Fig. 13.4).

Table 13.8 Best ten results for cross-validation for classification in three classes

Wflow_id	.config	.metric	Mean	Std_err	*n*	Model	Rank
v7_xgb	Preprocessor_ model113	Accuracy	0.5289	0.0197	10	Boost_tree	1
v7_xgb	Preprocessor_ model119	Accuracy	0.5243	0.0178	10	Boost_tree	2
v7_xgb	Preprocessor_ model35	Accuracy	0.5242	0.0175	10	Boost_tree	3
v7_xgb	Preprocessor_ model114	Accuracy	0.5216	0.0194	10	Boost_tree	4
full_xgb	Preprocessor_ model46	Accuracy	0.5160	0.0167	10	Boost_tree	5
full_xgb	Preprocessor_ model21	Accuracy	0.5139	0.0094	10	Boost_tree	6
full_xgb	Preprocessor_ model50	Accuracy	0.5114	0.0160	10	Boost_tree	7
full_xgb	Preprocessor_ model03	Accuracy	0.5113	0.0170	10	Boost_tree	8
full_xgb	Preprocessor_ model40	Accuracy	0.5075	0.0177	10	Boost_tree	9
full_dt	Preprocessor_ model28	Accuracy	0.5028	0.0189	10	Decision_tree	10

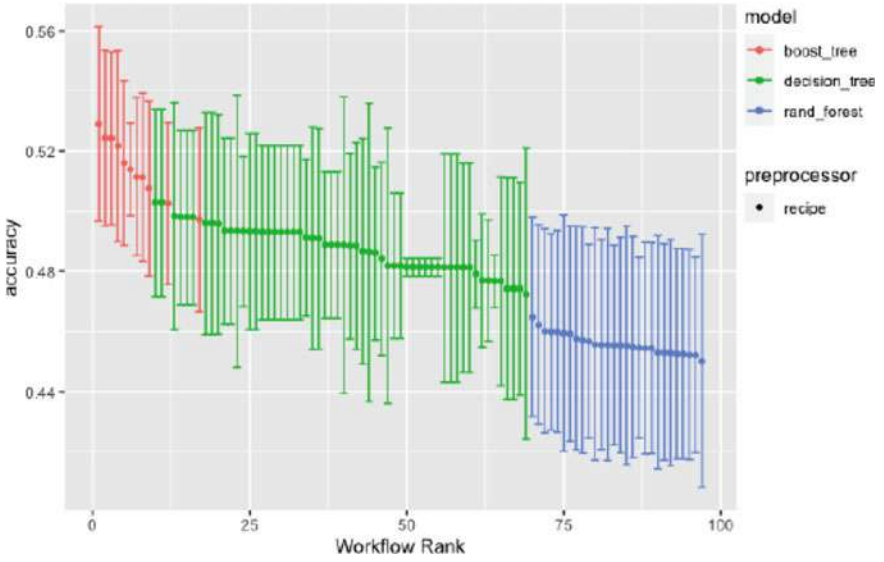


Fig. 13.1 Accuracy values of the cross-validation for the classification in 3 classes

Table 13.9 Combination of hyperparameters for the best model

Mtry	Min_n	Tree_depth	Learn_rate	Sample_size
12	38	6	0.025746	0.7477004

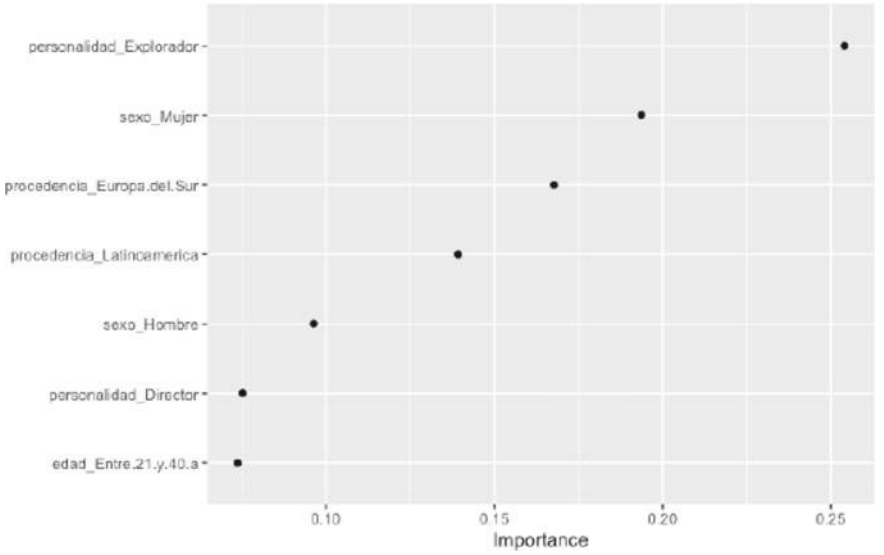


Fig. 13.2 Most important variables in the XGBoost model for the classification in three categories

13.4.2 DataSet B

Statistical tests

Analogously we analyzed Dataset B, using the statistical tests for the response variable "mean nutritional value" (numeric) where the null hypothesis H0 would be independence between the variables explanatory and response or where there is no difference between the means of the groups of the former. The results are shown in Table 13.12.

In the same way for the response variable, "nutritional category" intolerance is significant in the tests. The results are shown in Table 13.13.

Regression problem

Since only one variable was found to be significant, we decided to fit all the models using all variables without prior selection, and we calculated the multiple regression of all the variables. The results are shown in Table 13.14.

Table 13.15 shows the metrics obtained in the evaluation carried out on the test set for the values RMSE and R^2.

Table 13.10 Best ten results for cross-validation for classification in two classes

Wflow_id	.config	.metric	Mean	Std_err	*n*	Model	Rank
full_rf	Preprocessor_ model33	Accuracy	0.67526	0.01662	10	Rand_forest	1
full_rf	Preprocessor_ model12	Accuracy	0.66137	0.01873	10	Rand_forest	2
full_rf	Preprocessor_ model08	Accuracy	0.66114	0.01741	10	Rand_forest	3
full_dt	Preprocessor_ model43	Accuracy	0.66092	0.01596	10	Decision_tree	4
full_dt	Preprocessor_ model46	Accuracy	0.66092	0.01596	10	Decision_tree	5
full_dt	Preprocessor_ model37	Accuracy	0.66092	0.01596	10	Decision_tree	6
full_dt	Preprocessor_ model06	Accuracy	0.66092	0.01596	10	Decision_tree	7
full_dt	Preprocessor_ model07	Accuracy	0.65887	0.02083	10	Decision_tree	8
full_dt	Preprocessor_ model05	Accuracy	0.65887	0.02083	10	Decision_tree	9
full_rf	Preprocessor_ model30	Accuracy	0.65881	0.01740	10	Rand_forest	10

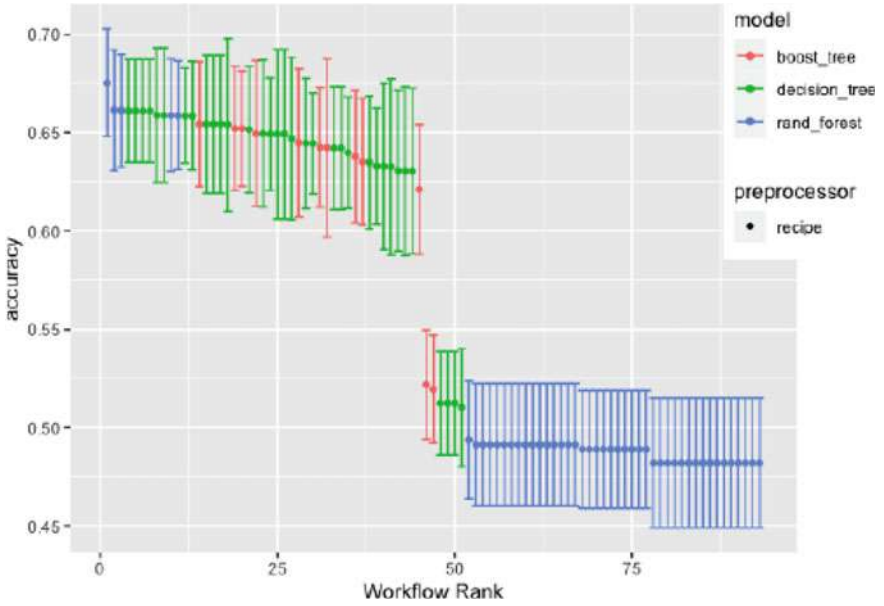


Fig. 13.3 Cross-validation accuracy values for classification into two classes

Table 13.11 Combination of hyperparameters for the best model

Mtry	Min_n
22	8

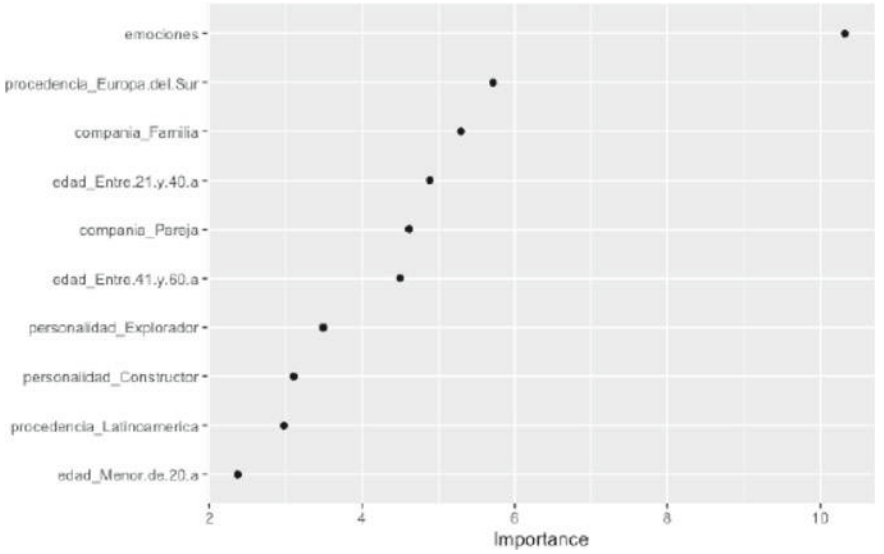


Fig. 13.4 Most important variables in the random forest model for the classification in two categories

Table 13.12 Test results for the mean nutritional value response variable

Variable	Statistical	Value	*P*-value
Company	F	0.9803894	0.39
Stress	F	1.423701	0.264
Menu	F	2.722313	0.057
Intolerance	F	10.74718	0
Election	F	1.74979	0.152
Energy	F	1.238927	0.32

Table 13.13 Test results for the nutritional category response variable

Variable	Statistical	Value	*P*-value
Company	X^2	5.240582	0.219
Stress	X^2	9.892882	0.128
Menu	X^2	7.39482	0.117
Intolerance	X^2	21.10745	0
Election	X^2	9.869176	0.131
Energy	X^2	4.521933	0.627

Table 13.14 Linear regression coefficients using all variables

	Estimate	Std. error	t-value	Pr($>\|t\|$)
(Intercept)	2.116e + 00	2.969e-01	7.128e + 00	2.551e-09
Company: alone	2.550e-01	1.776e-01	1.436e + 00	1.568e-01
Company: partner	−1.075e-01	3.518e-01	−3.054e-	7.612e-01
Stress: calm	1.039e-01	1.869e-01	5.562e-01	5.804e-01
Stress: very stressed	1.367e-01	2.205e-01	6.201e-01	5.378e-01
Stress: very calm	2.285e-01	2.455e-01	−9.306e-01	3.562e-01
Menu: "caprichito"	2.488e-01	2.219e-01	−1.122e + 00	2.670e-01
Menu: healthy	1.755e-02	3.152e-01	5.568e-02	9.558e-01
Intolerance: Intolerance	1.776e-01	1.720e-01	1.033e + 00	3.064e-01
Intolerance: vegetarian	9.862e-01	3.089e-01	3.193e + 00	2.352e-03
Election: different	−3.193e-01	2.520e-01	−1.267e + 00	2.107e-01
Election: suggestion	−2.743e-	2.231e-01	−1.230e + 00	2.242e-01
Energy: low	2.175e-01	2.734e-01	7.955e-01	4.298e-01
Energy: medium	1.670e-01	2.485e-01	6.723e-01	5.043e-01
Energy: high	2.955e-01	2.720e-01	1.086e + 00	2.822e-01

Table 13.15 Results obtained for multiple linear regression

Model	RMSE	R^2
Lineal regression all variables	0.61465	0.11769

Classification problem

For Dataset B, the best model to carry out the nutritional classification in 3 categories turned out to be a simple decision tree with the hyperparameters shown in Table 13.16.

We performed a last training on the complete set of training data and validated with the test data, obtaining an accuracy value of 0.5 and the most important variables for this model (see Fig. 13.5).

For the case of the classification in two categories, the best model turned out to be a random forest with the hyperparameters which are shown in Table 13.17.

We performed one last training using the entire dataset with the established combination of the hyperparameters for our model, and we obtained an accuracy value of 0.68421. We also determined the most important variables for this model (see Fig. 13.6).

Table 13.16 Combination of hyperparameters for the best model

Cost_complexity	Tree_depth	Min_n
5.10084e-09	6	9

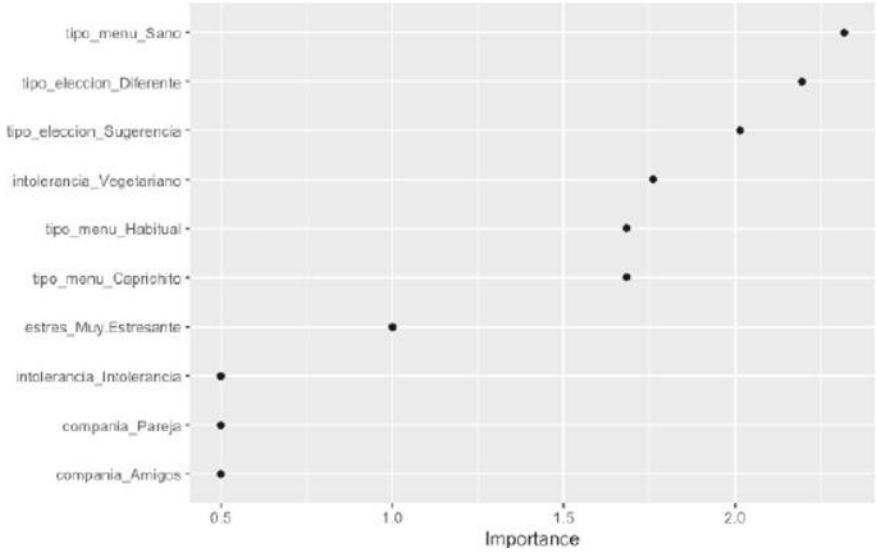


Fig. 13.5 Most important variables for classification into three categories

Table 13.17 Combination of hyperparameters for the best model

Mtry	Min_n
22	8

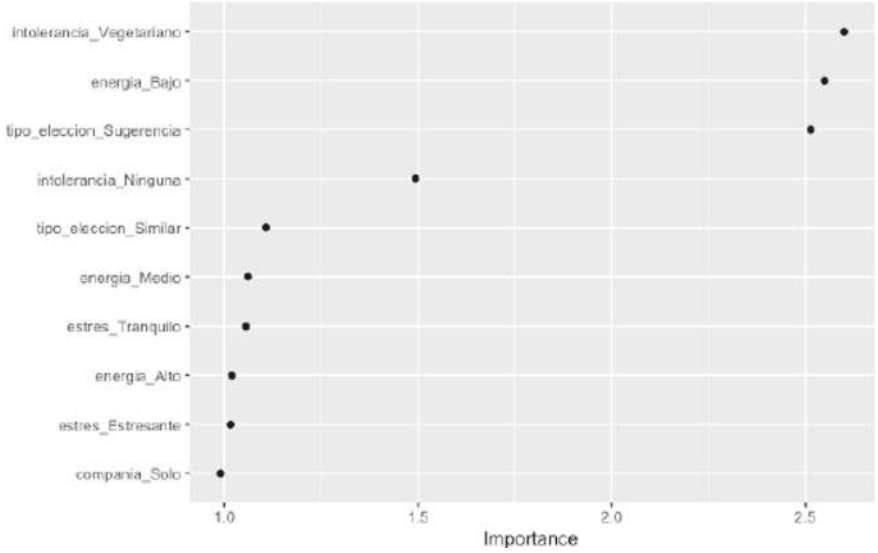


Fig. 13.6 Most important variables for classification into two categories

13.5 Discussion

The design of efficient marketing plans requires to understand the hidden factors driving the user's behavior. In the quest of uncovering those factors, we have studied both personal and contextual variables that may explain the decision-making process. We believe that these variables are the key components behind the workings of the so-called System I.

Our results show that personal variables, such as personality, satisfaction, and productivity, are significantly related with both the nutritional value and category of the chosen food. This finding confirms our hypothesis H1 that positive personal states could facilitate a long-term focus that motivates the consumption of more healthy food.

On the other hand, the hypothesis H2 was not supported by our analysis. The statistical tests analyzing the relationship between the "social company" factor and the nutritional variables do not show a significant dependency. We probably have to gather more samples or to explore different social context to confirm if our intuition is right or not.

As for hypothesis H3, we have found that the classification problem is easier than the regression one. It seems that our explanatory variables are not suitable enough to estimate a number such as the nutritional value. However, we were able to obtain a reasonable accuracy on prediction the nutritional categories. With regard to the three-level problem, we have got good predictions on two of the three categories. With regard on the two-level problem, the accuracy was good with the two levels, being the predictions much more précised when classifying the "low" nutritional category.

In summary, our research has shown that is possible to predict the nutritional characteristics of the chosen food on the basis of personal and contextual variables. This work motivates the application of more powerful techniques to discover the psychological factors that may explain the decision-making process underlying the eating behavior.

13.6 Conclusions

This work aimed at analyzing the impact of contextual and personal characteristics during the choice of food. In light or our results, the future work should be focused on increasing the sample of users as well as including more explanatory factors. For instance: temporal variables (time of year, day of the week, or time of the day when the decision occurs), climate factors (outside and inside temperature); physiological factors of the decision-maker (mass index or heart rate), and also socio-economical variables. On the other hand, we also plan to apply neuro-marketing techniques to measure the emotional variables in a direct way. We hope that all these efforts will contribute to understand the difficult problem of eating behavior.

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Part III
Digital Marketing and Branding

Chapter 14
Dominant Communication Strategies and Digital Platforms for Personal Brand Management in the "Post-pandemic" Job Market

Evelin Machado, Sandra Miranda, and Vania Baldi

Abstract The objective of the article is to investigate what are the most appropriate communicational strategies for social media in the context of personal brand management, which digital platforms are dominant and how they can be used in the "post-pandemic" job market of COVID-19. To this end, data collection was conducted with professionals specializing in personal branding, the process responsible for personal brand management, in the scenario of Portugal and Brazil. The research seeks to contribute to fill scientific gaps concerning the personal branding theme and provide the labor market with an updated vision aligned with the best practices used by market specialists, from the countries under analysis, in addition to the use by society in general.

Keywords Social media · Communication · Personal brand · Labor market

14.1 State of Art

In a time full of social, economic, and technological evolution marked by increasingly turbulent, competitive and disruptive competitive landscapes, being different and making a difference is crucial for any company, brand, or person. Given this context, there has been, in recent years, a concern on the part of people in the search for differentiation through the creation and cultivation of a personal brand. According

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to Khedher [13], this is a recent phenomenon, based on an effort that the individual adopts in order to promote himself in the environment where he moves.

Analyzing the literature, we find that the theme of personal branding is permeated by a multidisciplinary approach (such as sociology, psychology, marketing, advertising, and communication) [11], being undeniable the pioneering contribution made by Peters [18], who introduced the concept of personal brand in his iconic article "The brand called you" and according to which our personal brand is a "sign of distinction," that is, the idiosyncratic essence of any person, differentiating him as a unique being. Characterized by a personality, extrinsic and intrinsic characteristics, ideals, dreams, and behaviors distinct from any other human being.

After Peters' pioneering proposal, different approaches, points of view, and attempts to define the concept have emerged, from which stands out, for being one of the most consensual, Suddaby's [21, p. 5): "Personal brand is a strategic process of creating, positioning, and maintaining a positive impression of oneself, from a unique combination of individual characteristics, which signal a certain promise to the target audience, through differentiated narrative and imagery."

From here emerges the premise that the creation and construction of a personal brand are the result of an organic, evolving, and self-improving process, which interferes and has effects on the way we are perceived by others and should be based on authenticity and truth [8]. For Khedher [13], it is a process that inevitably develops an active communication of the personal brand identity, for specific targets, with effects on the personal image and reputation.

As far as communication is concerned, it is generally accepted that the advance of the network society [3] and the exponential increase of social media have become the strategic and privileged stage for individuals to communicate their personal brand and position themselves in their circles of influence [5]. Potgieter and Doubell [19] argue that due to technological progress and new media, current societies have become closer and more connected, but at the same time more competitive, creating the need for people to manage their online presence and personal brand, with an impact on their offline world [1].

Certainly, the Web 2.0 environment [16] by silencing the one-way communication and giving voice to the two-way paradigm blurred the separation between production and consumption, witnessing instead an agglutination between both [10]. The user is naturally a prosumer [22]—someone who receives, but who additionally intervenes actively and deliberately in the production of information, content, meanings, and identities, of participation by all and for all [15]. It is a process that involves the creation of meanings by the user, who appropriates spaces that previously belonged to the institutionalized production process, leading to an extension of his contribution and a more demanding exploration of his creativity [17].

Social media is thus found to reconfigure communicational and discursive practices a crucial "stages" for personal branding, challenging users in strategically managing, and caring for online content and interactions to cultivate and enhance their reputation.

14.2 Methodological Strategy

The methodological strategy that subsidizes the study is a qualitative approach in the analysis of the interviewees' answers.

To this end, interviews were conducted with professionals specialized in personal branding, in the scenario of Portugal and Brazil. From the collected sample, which totaled about 15 interviewees, a "cut" was made concerning three specific questions, respectively, in the categories "Social Media Communication" and "Personal Brand Management," to discuss the main points identified with four interviewees, acting in different geographic locations in the referred countries.

For data collection, the same script was used with the said professionals, seeking to provide the same opportunity to respond to all of them.

For the preparation of this article, three questions were stratified from the mentioned Guide, which were broken down into two categories, as detailed in Table 14.1.

The sample scenario is Portugal and Brazil, in predominant metropolitan areas such as Lisbon, São Paulo, Rio de Janeiro, and Rio Grande do Sul. The choice of countries with the same language seeks to understand which are the best practices, strategies, and tactics to work the personal branding process, responsible for the management of the personal brand. Table 14.2 details some sociodemographic data of the interviewees.

The interviewees were invited by the author, by e-mail, from the contacts made available in the social media most used by the professionals, which varied between LinkedIn and Instagram. The interviews were conducted and recorded by the Zoom

Table 14.1 Categories in analysis

Categories	Analysis and discussion questions
Social Media Communication	Communication strategies for social media
	Dominant platforms for communicating the personal brand
Personal Brand Management	Benefits of personal branding in the "post-pandemic" labor market COVID-19

Table 14.2 Interviewees—sociodemographic data

Interviewers				
Name	Business market	Location geographic	Area of operation	Genre
"A"	Portugal and Brazil	Lisbon	Personal branding and digital marketing	Female
"B"	Brazil	São Paulo	Personal branding and executive presence	Female
"C"	Brazil	Rio Grande do Sul	Personal branding	Male
"D"	Brazil	Rio de Janeiro	Personal branding and career management	Female

platform, upon authorization of the interviewees, for the purpose of producing academic and scientific content.

14.3 Data Analysis

In the "Social Media Communication" category, the first question to be analyzed and discussed is "Communication strategies for social media" by detailing the four experts as follows. As the role of social media in individual career management increases, digital storytelling also becomes a powerful mechanism for signaling one's value in the job market [12].

For interviewee "A" social media is a venue for relationships through communication, making it central to a good presence on digital platforms.

The respondent highlights the various ways to communicate on social media, such as through images, writing, or videos, the latter being the big star of these days, as it generates trust, authority, and proximity in a faster way. Another point highlighted is that social media is currently the main channel for seeking information and entertainment by the public in general, and so she argues that these two attributes should be worked in a convergent way. She concludes by stating that the great objective of social media is to keep the public connected, through the algorithms that do the work of offering the best alternatives according to the user's profile.

Interviewee "B" considers that communication strategies will depend on who the client is, in which context he is inserted, and what his positioning objectives are. She considers that there is no winning strategy, because when one thinks about communication, one must consider that there is a sender, a receiver, and who is the public to whom one wants to communicate or position. The personal brand will need to consider who that audience is, what is the most appropriate message to communicate to them, what places that audience frequents. "I think the practice is to understand who I need to communicate with, where that person is, and what do I want with that? What is the feeling I want to leave? What values do I want to convey to these connections, and then build a narrative."

While interviewee "C" conducts a Strategy Workshop to "confront" the reality of a certain client with his team, for example. In his line of work, he considers that social media is not just "exposure." His look at personal branding presupposes the individual as an "enterprise"—which is not only online but also offline. He looks at the perspective of the client's life, their behavior, and seeks to make behavioral adjustments, attitude changes that may converge with his personal branding goal and positioning. He emphasizes that positioning is about fit, fluidity, decreasing friction. "I reduce friction, I get the perfect fit in the market, doing what I am prone to do, what I have the talent to do. And with that, I can not only fit in well but also orchestrate all the signals in the same direction. So, I consider social media as a tactic.

And interviewee "D" argues that communication strategies for social media do not have a recipe. In her work process, she adopts preliminary actions to define the strategy, such as identifying who the brand is, what the strengths of this brand are,

to then understand its positioning. Then she identifies who this brand will talk to, what its target audience is, what its persona is, what kind of content will be created. "So, the communication strategy has a previous step, to understand very well where I want to be, where my audience is, from there I think about some processes."

In the "Social Media Communication" category, the question "Dominant platforms for communicating the Personal Brand" sought to identify from the four respondents which types of social media are most relevant in the brand management process they develop with their clients, especially to be aligned with the changes inherent to the predominantly digital labor market.

Several scientific articles specifically address artifacts of personal branding efforts, such as narrated selfies [6], LinkedIn photos [14], Instagram photos [7], YouTube videos [4], and ePortfolios [12]. The use of these artifacts should be tied to the positioning defined in the brand strategy [9].

Based on the mention of the four experts, it was found that the main digital platforms to communicate the personal brand today are: LinkedIn, Instagram, Twitter, Facebook, YouTube, Medium, TikTok, and Spotify, according to Fig. 14.1, in a percentage and descending perspective, from the most adopted to the least used.

Detailing Fig. 14.1, it can be seen that: LinkedIn and Instagram were mentioned by the four interviewees (100% of the sample) and considered the fundamental media to communicate the personal brand today. Twitter was mentioned by three interviewees (75% of the sample) to be used in a more specific way, because it has an opinion-forming audience. Facebook was gauged by two interviewees (50% of the sample) and characterized as quiet obsolete, especially in the Brazilian market. Medium was suggested by one interviewee (25% of the sample) as a platform that generates very interesting conversations by publishing articles. YouTube was mentioned by one interviewee (25% of the sample) as a channel to generate customer "authority," due to the possibility of longer videos. TikTok was mentioned by one interviewee (25% of the sample) as a media to work on visibility. Finally, Spotify was cited by one

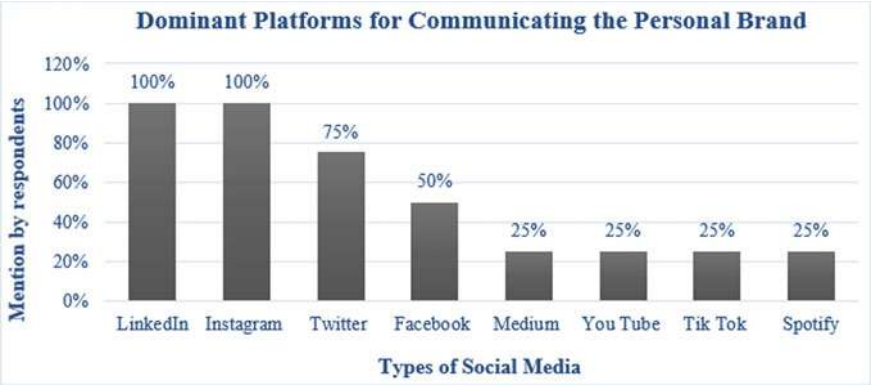


Fig. 14.1 Dominant platforms, respondents' view

interviewee (25% of the sample) as an efficient way to publish Podcasts or audio files.

Fig. 14.2 is detailed by interviewee which shows the types of media mentioned by them and that are adopted by their customers, upon prior establishment of strategy and positioning that the personal brand intends to achieve. It was possible to notice that there is no "winning" media; however, the opinion of the four interviewees converges to the use of LinkedIn and Instagram as the most efficient to communicate the personal brand nowadays.

In addition to the types of social media mapped, we identified which drivers were most cited by the interviewees in this stage of the process, which were: market, strategy, business, channels, content, brand, target audience, positioning, and brand communication, as represented in the word cloud of Fig. 14.3.

Seeking to deepen the answers to this question, the analysis was detailed separately, by each of the four specialists, arriving at the following extract:



Fig. 14.2 Types of social media, mentioned by respondent



Fig. 14.3 Dominant platforms and drivers, respondents' overview

In the view of interviewee "A," before defining which are the dominant platforms to work the personal brand, the first step is to define the strategy, how the individual intends to be recognized by the market and what is his target audience. Regarding social media, LinkedIn is a good platform for the corporate public, and there are those who attract customers using only this media. But to work the personal brand and its connection with a certain public, the respondent considers Instagram to be fundamental, because there is the essence, the personality, which goes beyond the professional aspect, usually prioritized on LinkedIn. In the interviewee's view, the public wants to go beyond looking at the content; they want to know if they connect with a certain profile before hiring that professional, for example. This connection refers to the establishment of a relationship between the parties. Thus, in his view, the personality totally interferes in the purchase decision, in this case, of a service, reason why he considers Instagram an essential tool for brand communication in the market, going beyond passing content, because it generates movement and positioning.

So, in the vision of this professional, the dominant platforms to communicate the personal brand are LinkedIn and Instagram, through prior definition of various aspects, such as: strategy, target audience, market, relationship, and positioning, which will influence the type of content to be produced and published, as illustrated in Fig. 14.4.

According to interviewee "B," there are the media that have the most audience, for example, Instagram, currently, is a place of many daily visits in practically the whole world. But if the focus is on the professional profile, there is LinkedIn. I believe these two are the dominant ones these days. But there are also other platforms with fewer visits, but with higher quality conversations, for example, Medium, which is a platform for publishing articles, where it is possible to generate quite interesting content. There is also Twitter, where you can follow opinion leaders, such as international professors, large universities, professionals who are references, authors of books who are establishing interesting conversations there (and they are not on Instagram). These platforms are the most used by the interviewee to consume information,



Fig. 14.4 Word cloud—interviewee "A"



Fig. 14.5 Word cloud—interviewee "B"

since her interests are academic themes, about identity, brand, and personality, which directs her choice of the channels she uses to connect.

On the other hand, if the demand is for quick response regarding audience growth, perhaps Instagram or LinkedIn is more appropriate, but if the demand is consistency and differentiation, it is worth looking for other networks and channels, according to Fig. 14.5.

In the line of work of interviewee "C," there are two dominant platforms today: LinkedIn, for corporate use, and Instagram, for doing business. Facebook has become very "old," outdated, in the scenario where he works, which is Brazil. He still works with Twitter, Podcasts, and YouTube—but this last platform depends a lot on the type of client. The respondent considers Instagram a great platform for doing business. TikTok, on the other hand, is considered a media to generate visibility. So, in summary, the respondent uses LinkedIn for a career bias and a good presence on Instagram in parallel. On the other hand, YouTube will vary according to the type of business of the client, with the advantage of being able to make longer videos, where it is possible to show more authority of the client and, consequently, do business, as illustrated in Fig. 14.6.

Interviewee "D" highlights that in Brazil, they work very strongly with LinkedIn and Instagram. Twitter uses much less due to the characteristics of its customers. She has also used Spotify to promote her digital presence, according to Fig. 14.7.

On the other hand, the respondent highlights the use of websites as extremely important, being a fundamental strategy to work on digital presence, because through them it is possible to work with "AdWords," which are keywords that are ranked by Google. So, according to the client's positioning, he can buy certain keywords to be referenced by Google every time he is mentioned about a certain subject. But, for that, it is necessary to generate content, especially articles that it replicates in the client's LinkedIn, Instagram or even Facebook profiles, to make the "call" to the site. As-so, the client has the opportunity to relate his personal brand to the keywords



Fig. 14.6 Word cloud—interviewee "C"



Fig. 14.7 Word cloud—interviewee "D"

he will use in the articles that, consequently, will be searched by Google from the AdWords resource.

In the "Personal Brand Management" category, the question "Benefits of Personal Branding in the COVID-19 "post-pandemic" labor market" will be detailed as follows.

As work environments become decontextualized as a consequence of technological advances, people have an increasing need to construct their work identities [2].

For interviewee "A" with the pandemic, "it became very evident to people the total vulnerability in relation to work, to employment, to generating income. But those who had a personal branding process already being worked on, with awareness of it, had more networking, resulting in greater capacity for mobility, for professional repositioning. "In the respondent's work method, networking is one of the four pillars, with the objective of "generating digital presence, generating content," with more

ease and agility, which favored the interface with people in face of the restrictions of face-to-face contact imposed by the lock down periods. Because although personal contact was suspended, the generation of content was maintained, reaching potential customers, including being possible to create new products and services to meet the demands of the "new reality."

Interviewee "B" says she still has no way to measure the benefits of personal branding in the "post-COVID-19 pandemic" labor market. She highlights an aspect that already appears strong in the demand of executives who seek her work, which is the "presence in absence," which would be how to improve professional relationships in the online context of meetings on Zoom or Skype platforms, for example. Another point she highlights is the strengthening of reputation in the face of the absence of physical presence. "Reputation becomes very important when you are absent. It is what represents you in many cases. It precedes you, it speaks about you, it's in the environment. So the choice to do Personal Brand Management would be one of the reasons to do this process of increasing the value of my pass, in the sense of working on how I am perceived, my reputation. Since I am not present at all times, but because I am online a lot, yes, it could be a motivator. I see it as a potential value of the job."

While interviewee "C" stated that the pandemic has accentuated the need to work on personal branding. "The two years of working online have really distanced people from companies. When you distance people in online, it gets very cold and distant. So what was already extremely important to do which is signal management is something that takes on even greater importance, because it is scarce to understand people in the online."

From the respondent's perspective, there are many people interested in social media, but not stemming from the pandemic, but by a natural demand, because these individuals have already realized that their brand in the online environment has "gone cold." "I understand that they will need to work more on their personal brand, but I don't think they realize it."

On the other hand, interviewee "D" states that you need to bring your differentials to the job market, to know who you are, in what way you are going to make a difference. Then you need to know what skills you need to develop. She adds that, "today, self-knowledge, knowing who you are, what skills and talents you can contribute to be a professional that knows the path you can follow."

In professional outplacement, which is one of the focuses of the respondent's work, she highlights that one should prioritize paths aligned with the strengths, potential, and talent of a given individual. "The process of knowing your strengths, knowing what professional you are, allows you to better plan your career and where you can make a difference.

14.4 Conclusions

The main conclusions arising from the analysis of this sample are as follows:

Regarding the "Communication in Social Media" category, the search for answers to the question "Communication strategies for social media" was found with the respondents that social media is a place of relationship, through communication, becoming central to a good presence in digital platforms.

Several ways to communicate on social media were highlighted, such as through images, writing, or videos, the latter being a relevant tool today, because it generates trust, authority, and proximity more quickly with the public.

It was highlighted that there is no winning strategy to work the communicational strategies, because it will depend on who the client is, what his context is, what his positioning goals are. Thus, the personal brand needs to consider who the audience is, what is the most appropriate message to communicate with them, what sensation they want to leave, what values they want to transmit to these connections, and only then build a narrative. Another point highlighted was the positioning of the brand both online and offline, which presupposes behavioral aspects through an orchestration of signals that generates fit, fluidity, and reduction of friction, so that it can converge with the objective of the personal brand.

As for the "Social Media Communication" category, the question "Dominant platforms to communicate the Personal Brand" found a set of digital platforms that are the most used nowadays, where LinkedIn for corporate profiles and Instagram to do business were highlighted. Next came Twitter and YouTube, to a lesser extent. Facebook was characterized as quiet obsolete, especially in the Brazilian scenario. Other media mentioned occasionally were Medium, TikTok, and Spotify. However, it was emphasized by the interviewees that the communication strategy must precede the choice of platforms, as well as be in line with the intended positioning and the target audience to be reached.

And in the "Personal Brand Management" category, the question "Benefits of Personal Branding in the "post-pandemic" labor market of COVID-19" found that the pandemic highlighted the total vulnerability of people relative to the labor market and income generation, in the case of entrepreneurs. In the case of companies, lock down periods have greatly distanced employees from corporations, resulting in a "cooling off" of labor relations. The interviewees emphasized that individuals who had their personal brand already structured or being structured managed to maintain their employability during the lock down periods, maintained their networking, which resulted in a greater capacity for mobility and professional repositioning. While the profile composed of executives, the demand was more focused on enhancing professional relationships in the context of online meetings on the Zoom or Skype platforms, for example, resulting in the strengthening of the reputation, given the absence of physical presence.

It is concluded that the amplitude of social media has caused a reconfiguration in the process of personal brand management and impacted the processing of reputation. In this perspective, it becomes urgent to portray an authentic identity and contribute for an individual to have a credible reputation, especially in online relationships strongly integrated in the work routines in society, nowadays.

Because not being present on digital platforms may represent invisibility to the market today, highly based on algorithms and big data that "scrape" information on the Internet and even before face-to-face contact can influence relationships.

14.5 Clues for Future Research

There has been a growing emphasis on the importance of colleges and universities teaching students how to use social media to build social capital [20].

In this sense, universities can be the link between society and the labor market, preparing students in a more strategic, consistent, and conscious way to position themselves in the current labor market, which is undergoing a profound transformation through the strong adoption of digital platforms, where personal branding becomes a distinctive and competitive factor, both in the search for work in a company and in the search for clients as an entrepreneur.

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Chapter 15
The Role of Online and Offline Consumer Experience on Word of Mouth, Satisfaction and Brand Love

Fernanda Olivas, Flavia Avellaneda, and Martín Mauricio

Abstract The purpose of this research is to demonstrate how the online and offline consumer experience generates satisfaction, in relation to brand love. For the development of the research, a 27-item questionnaire was carried out, measured with a 5-point Likert scale, and a sample of 442 people was collected. To test the hypotheses, the structural equation model (SEM) was used and the PLS technique. Finally, the results indicate that online and offline experience has an influence on word of mouth (WOM) and satisfaction, while they both have an impact on brand love. This research contributes to the study of online and offline experience and can be used as a guide to understand omnichannel in several business.

Keywords Online experience · Offline experience · Brand love · Word of mouth · E-commerce

15.1 Introduction

New ways of technology have influenced the behavior of customers while shopping online or offline [1], as a consequence, businesses have redesigned their online accounts as well as developed new offline strategies [2]. Due to the fact that online consumers tend to have an unexpected behavior, while offline consumers tend to have a more anticipated purchase intention [3], the brand will strive to offer the customer an unforgettable and exclusive experience [4, 5].

That is where the importance of the consumer experience arises as a decisive element that the customer has in terms of a perceived performance of the product or service, online or offline [6]; in addition, it is a precedent within consumer decision making [7]. It even also relates to word of mouth, positively or negatively [8] giving way then to a love for the brand, ultimately generating a bond with it [9].

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In the field of scientific research, studies have been developed on omnichannel and its relationship with hedonic value [10, 11], aggregate value [12], facilitating conditions [13], brand experience [14] and satisfaction [15]

Research has also been found where consumer experience directly influences loyalty [16], hedonic values [17], perceived value [18], among other variables that are of utmost importance, since they affect customer behavior.

However, there is a lack of studies where offline and online consumer experience is an antecedent of brand love in the omnichannel environment, so there is a need for more studies involving how consumer experience generates brand love. Therefore, the objective of this research is to demonstrate how consumer experience, both online and offline, generates satisfaction, WOM, and relates to brand love in an omnichannel environment.

15.2 Literature Review

15.2.1 Consumer Experience Online and Offline

The term experience according to Maslow is an unknown fact that has a positive and short-term effect, likewise, in the 90s, [19] emphasized the experience within marketing; however, [20] indicated there is no clear way to define the marketing experience because there are so many different concepts around it. For this reason, [21] defined experience as a behavioral, emotional and sensory orientation developed through a particular situation.

Due to this, [22] indicates that the consumer experience seeks to generate happiness for the customer, while [23] considers that it is basically a direct and indirect interaction that is generated before and after the purchase.

Consumer experience has been studied both offline and online because the integration of online and offline channels improves the speed of the purchase flow and directly influences customer satisfaction [24].

Likewise, [25] mentions that the clarity of offline and online channels helps consumers to build loyalty, although [26] say that both online and offline customer experiences are being poorly discovered, making them scarce.

Within an online context, [27] consider that this experience achieves trust and satisfaction through a frequency of use. [28] highlight the online consumer experience as one of the most important psychological and functional dimensions within the purchase, while [29] consider that digital not only changed the forms but also the decision making of customers, influencing them cognitively and affectively.

When we talk about an offline context, consumers still use shopping in physical channels [30] due to the fact that the offline consumer experience maintains a stronger and more real experience, generating a superior advantage to online, generating high efficiency and great opportunity to make more immediate changes [31]. That is why

omnichannel behavior generates a seamless integration, allowing consumers to have a successful purchase [32].

15.2.2 Consumer Satisfaction

Satisfaction is defined as the fulfillment of customer's expected desires after comparing expectations and perceived performance [33]. This is why [34–36] and [37] indicate that satisfaction has an effect on brand love.

Based on this, [38] mention that the current context, where online and offline shopping are integrated with each other, helps companies to generate satisfaction, in the same way, [39] say that omnichannel helps to preserve the experience by improving customer loyalty and satisfaction.

Therefore, for [40, 41], offline and online experience is related to customer satisfaction, generating a sustainable bond with the brand. Similarly [42] identify that the experience generates a perceived, emotional and interpersonal image, as well as a favorable satisfaction level, while [43] consider that customer experience is determined by various factors such as functionality, usability, design, among others, which generate satisfaction within online or offline channels. For this reason, [44] say that customer experience and satisfaction are essential tools to improve and strengthen long-term relationships with customers. From the above, the following hypotheses are postulated.

Hypothesis 1: The offline customer experience has a positive and significant effect on omnichannel customer satisfaction.

Hypothesis 2: The online consumer experience has a positive and significant effect on omnichannel customer satisfaction.

15.2.3 Word of Mouth (WOM)

In marketing, [45] define this variable as a conversation between consumers about their experience with a given product or service. Studies on word of mouth, such as those by [46] indicate that it can be both offline and online, while [47] and [48] state that few empirical studies have been conducted based on the differences between online and offline word of mouth. [49] believe that offline WOM is better, as their visitors manage to perceive a more pleasant and trustworthy environment; however, [50] indicated that online WOM conveys richer information, as that allows a close response, validating their opinion. Therefore, [51] says that there are many differences of WOM in the traditional and digital aspect.

It has been proven that there is a relationship between online and offline consumer experience with WOM, as [52] mention that purchase decision making based on an experience is influenced by consumer comments or reviews. Uslu and Ergün [53] indicate that when it comes to experiences, WOM plays an important role

in marketing activities. Similarly, [54] mention that customer experience is influenced by marketing strategies, achieving WOM with cognitive and emotional factors; due to this, [55] and [56] consider that this relationship is determined by customer experience, managing to harm or benefit the brand based on their preferences and predictions. Based on the above, the following hypothesis is postulated:

Hypothesis 3: The offline customer experience has a positive and significant effect on building word of mouth among consumers.

Hypothesis 4: The online consumer experience has a positive and significant effect on building word of mouth among consumers.

15.2.4 Brand Love

Aron and Aron [57] indicated that the word love is something that implies passion, excitement and longing to lose or have something. This opens the door to brand love, since [58] consider that brand love is an emotion that is experienced daily in an interpersonal way toward a brand. For their part [59] consider that brand love begins through need, infatuation and obsession for a brand, that said [60], consider that the creation of brand experiences both online and offline stimulates multisensory feelings generating passionate acceptance.

There is a relationship between satisfaction and brand love since according to [61], satisfaction is given by a personalization of incentives related to brand love, achieving customer favoritism. Likewise, [62] mention that satisfaction with the brand is a precursor of love; however, [63] argue that if there is negativity between customer satisfaction, it can generate negative feelings, being detrimental to the brand. Based on the above, the following hypothesis is postulated:

Hypothesis 5: Satisfaction has a significant relationship with brand love.

It has also been proven that there is a relationship between WOM and brand love, as [64] mentions that brand love originates from recommendations, while [65] say that word of mouth is generated by an emotional attachment of a certain group of people, managing to create a love for the brand in the consumer. Similarly, this relationship has occurred in various fields such as e-commerce where [66] showed that brand love is related by word of mouth. Based on the above, the following hypothesis is postulated:

Hypothesis 6: Word of mouth has a significant relationship with brand love (Fig. 15.1).

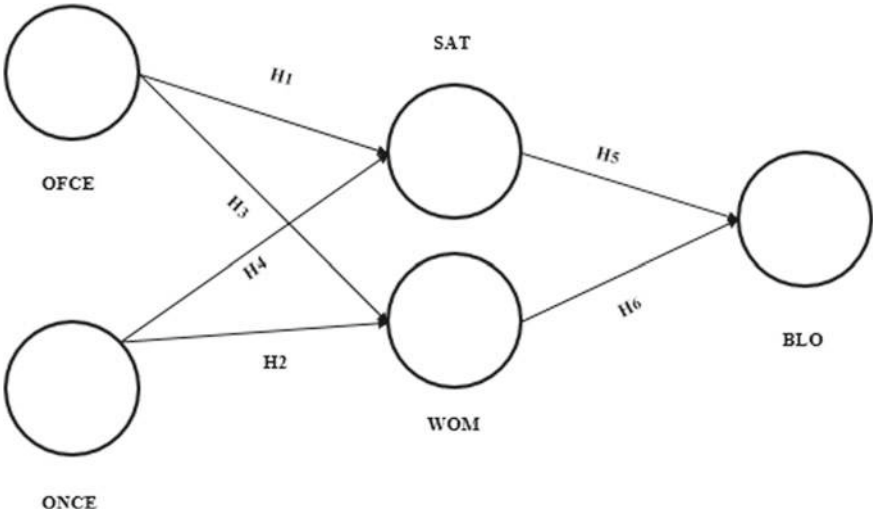


Fig. 15.1 Conceptual model. *Source* Framework of review; Online consumer experience = ONCE, Offline consumer experience = OFCE, Satisfaction = SAT, Word of mouth = WOM, Brand love = BLO

15.3 Methodology

This research was conducted in Lima, Perú, obtaining a quantitative approach and an explanatory scope where it used non-probabilistic sampling. Data collection began with a pilot test so that respondents would understand all items and possible improvements. The actual survey was conducted online between April 7 and May 10, 2022. The questionnaire was intensively distributed on all social networks such as Facebook, WhatsApp, Instagram, Twitter and LinkedIn.

As for the sample, a total of 465 responses were achieved, reaching 442 valid surveys. Therefore, based on demographic data, we can mention that in terms of gender, we obtained a higher prevalence of women with 59.28% between 31 to 35 years old (26.70%). In relation to the preferred channel to make purchases, it is observed that they tend to prefer digital with 75.11%. Finally, in terms of the category, they tend to buy the most, and we can see that there is an advantage of two categories in particular, clothing (23.53%) and beauty (23.98%).

15.3.1 Measures

For the elaboration of the questionnaire, the adaptation of various authors comprising the five variables of the research was carried out. ONCE consists of six items according to [21], OFCE has three items according to [67], SAT has five items

according to [68], WOM has four items according to [17] and finally, BLO has eight items according to [69]. All these variables were measured through the implementation of a 5-point Likert scale, where 1 = strongly disagree and 5 = strongly agree to measure the different constructs [70].

15.3.2 Analysis

Partial least squares (PLS) was employed as the most appropriate statistical technique. The use of PLS is mainly used to analyze structural equation models that include multi-element constructs, with direct and indirect paths.

15.3.3 Results

The internal reliability of each item was analyzed following [71] who state that the loads should be greater than 0.708. The results of Table 15.1 show that all the values comply with what is established. Subsequently, in order to have a more precise investigation, the reliability was measured through Cronbach's alpha and the composite reliability, using the criteria used by [72], who consider that the value obtained must be greater than or equal to 0.70 for acceptable reliability. The results indicate values ranging from 0.74 to 0.88; therefore, it is determined that this model is reliable. The model also indicated the confirmation of both the convergent validity (AVE) were greater than 0.50 for all items where the values range from 0.63 to 0.

Finally, discriminant validity was analyzed using the heterotrait-monotrait (HTMT) ratio based on the proposals of [73] which indicates values below 0.90 for the models of conceptual constructs. The results shown in Table 15.2 range between 0.64 and 0.79, concluding that there is adequate discriminant validity.

15.4 Structural Model Analysis

For the evaluation of the significance of the path coefficients, we performed a bootstrapping procedure with 5,000 subsamples with a significance level of 0.5 [74]. First, to continue with the process, it was sought to show the presence of multicollinearity, through the variance inflation factor (VIF) as indicated in Table 15.1, where values less than 5 are found, which means absence of multicollinearity, ensuring that no there is bias in the regression of the results [75].

The R2 value for BLO is 0.565. This reveals that the SAT and WOM explain 56.5% of the variances of BLO. Similarly, the R2 value for SAT is 0.566, and for WOM, it is 0.437, suggesting that ONCE and OFCE explain 56.6% of SAT and

Table 15.1 Reliability and validity of the measurement model

Item	Loads	Alpha of chronbach	Rho_A	Reliability composite	Extracted variance mean (AVE)	VIF
BLO1	0.781					2238
BLO2	0.740					2174
BLO3	0.790					2314
BLO4	0.817					2415
BLO5	0.830					2692
BLO6	0.827					3058
BLO7	0.816					3118
BLO8	0.788	0.919	0.92	0.934	0.639	2347
ONCE1	0.758					1836
ONCE2	0.772					2107
ONCE3	0.837					2.770
ONCE4	0.834					2599
ONCE5	0.785					2185
ONCE6	0.782					2361
ONCE7	0.826	0.906	0.907	0.925	0.639	2422
OFCE1	0.866					1797
OFCE2	0.876					2171
OFCE3	0.856	0.834	0.839	0.900	0.750	1945
WOM1	0.851					2199
WOM2	0.881					2591
WOM3	0.853					2264
WOM4	0.855	0.883	0.883	0.919	0.740	2234
SAT1	0.809					2113
SAT2	0.825					2272
SAT3	0.859					2.550
SAT4	0.846					2511
SAT5	0.767	0.879	0.88	0.912	0.675	18910

Note Online consumer experience = ONCE, Offline consumer experience = OFCE, Satisfaction = SAT, Word of mouth = WOM, Brand love = BLO

43.7% of WOM. The Q2 value of 0.355 for BLO supports that the model has a relevant predictive capacity (Hair et al. 2013).

The results in Table 15.3 demonstrate that ONCE has a significantly positive influence on WOM ($\beta = 0.406$; $P < 0.001$); thus, hypothesis 4 is supported. ONCE has a significantly positive influence on SAT ($\beta = 0.456$; $P < 0.001$); thus, hypothesis 2 is supported. Later, OFCE has a significantly positive influence on WOM ($\beta = 0.332$; $P < 0.001$); thus, hypothesis 3 is supported. Also, OFCE has a significantly positive influence on SAT ($\beta = 0.384$; $P < 0.001$); thus, hypothesis 1 is supported

Table 15.2 Discriminating validity

	BLO	ONCE	OFCE	WOM	SAT
BLO					
ONCE	0.643				
OFCE	0.662	0.687			
WOM	0.732	0.677	0.665		
SAT	0.792	0.769	0.763	0.783	

Note Online consumer experience = ONCE, Offline consumer experience = OFCE, Satisfaction = SAT, Word of mouth = WOM, Brand love = BLO

Table 15.3 Hypothesis testing

	Beta coefficient	*t*-Statistics (|O/STDEV|)	*P*-values	Hypothesis
ONCE→WOM	0.406	8,001	0.000	Accepted
ONCE→SAT	0.456	8,282	0.000	Accepted
OFCE→WOM	0.332	6,764	0.000	Accepted
OFCE→SAT	0.384	7,453	0.000	Accepted
WOM→BLO	0.322	5,878	0.000	Accepted
SAT→BLO	0.492	9,609	0.000	Accepted

Note Online consumer experience = ONCE, Offline consumer experience = OFCE, Satisfaction = SAT, Word of mouth = WOM, Brand love = BLO

hypothesis. Finally, WOM has a significantly positive influence on BLO ($\beta = 0.322$; $P < 0.001$), and SAT has a significantly positive influence on BLO ($\beta = 0.492$; $P < 0.001$); thus, hypothesis 5 y 6 are supported.

15.5 Discussion and Conclusions

In recent years, companies are increasingly aware that marketing content should not only prioritize internet aspects but also aspects aimed at their physical stores, seeking to highlight the interactions between sellers and buyers. The results of this research generate a relevant contribution to the study of the consumer experience in online and physical channels. This study proposes an extension of the model where three new variables are added, satisfaction, WOM and brand love, which represents a theoretical and relevant contribution to the model to work with these new variables.

The results have proven that online consumer experience has an impact on WOM as well as satisfaction and brand love verified by [17, 67, 68]; this means that the road to the digital age is very close to turning the shopper into a faster, more consistent and selective consumer. Also, it was found that the offline consumer experience is related to satisfaction, WOM and brand love, as indicated by [17, 21, 68]; this means

that the consumer still considers it important to be able to have a closer approach with the product for a safe final decision. Subsequently, we can identify how this new purchasing style achieves to generate a successful lead of the brand making the shopper become a participant in their day to day.

This is based on the fact that some of the people surveyed are constantly buying online and offline due to the pandemic through different websites, communication channels and/or approaching said establishment obtaining an omnichannel purchase where they could evaluate different factors such as the experience of the purchase trip to be able to attribute to it an experience of love toward the brand.

15.6 Implications

This study shows that the importance of the online and offline experience generates satisfaction for omnichannel consumers, so it is important that companies that are carrying out an omnichannel process produce experience in both. For the first hypothesis, it is recommended to prioritize the speed and perception of attention to the consumer by adding environmental elements such as public address, lighting, temperature and decoration, tastings and even interaction with technological devices. For the second hypothesis, it is recommended to converge the research content obtained through the frequent needs received by the different channels of attention of all consumers with the CRM by dividing the characteristics and interests, as it will help to obtain ROI and facilitate the persuasion of consumers who are more responsive.

In regard, for the third hypothesis, it is recommended to innovate and improve constantly through the opinion directly from customers to know the weaknesses of your brand, since in this way they will understand that they are important within your company and will be able to talk about it in front of their closest circle. Also, for the fourth hypothesis, it is recommended that brands focus on content that manages to generate virtualization, since it is scientifically proven that this allows them to improve content and get people to share it, generating social marketing.

Finally, for the fifth hypothesis, it is recommended to constantly offer special gifts for the most loyal customers, since they will not only feel purchase satisfaction but will make the brand their lovemark, motivating them to talk about your brand, recommend your products to others and, of course, continue buying, and, for the sixth hypothesis, it is advisable to give special offers or discounts to people who refer friends to you to encourage word of mouth, since this management motivates customers to exchange information with their friends. Basically achieving a win–win dynamic, where the company, its customers and their friends end up favored.

In order to achieve significant results, companies must take into account various factors that have been found in this study to obtain a good consumer experience [76] such as “clear product information,” “the variety of options in both channels,” “the good management of promotions by channel,” “homogeneous customer service.” Likewise, “homogeneous customer service” was the one that had the highest score

and influence in the surveys, since the good handling of this request helps the customer to become a lovemark.

Finally, within the various studies, it was found that a good positive impact is also oriented toward a more psychological view of the shopper. For this reason, it is necessary that companies seek to carry out complementary studies that lead to a psychology in the knowledge of the consumer in order to understand their tastes and/or preferences as a result of the constant changes due to the increasing opening of multiple brands that sell and offer the same products or services. In addition, it is relevant that the role of companies that seek to generate a good relationship between satisfaction and word of mouth that has repercussions on brand love must be reflected in the creation of group loyalty programs that complement each other in tastes and/or preferences so that they become more faithful like all generations.

15.7 Limitations and Future Research

However, it is necessary to specify that this study has some limitations in terms of data collection and analysis, since the extracted study was limited, being carried out only in Peru. Therefore, for future research, the other regions of Latin America should be covered for a better accuracy of the research model, since this would be an obstacle to understanding any meaning given to it by shoppers from other cities who do not handle the same social reality. Likewise, the major limitation is that the results cannot be generalized, because the type of sampling that was developed was non-probabilistic. Therefore, for future research, the probabilistic method should be used, in order to collect a sample that has various characteristics at the time of having a purchase experience.

As for future research, they should focus on the consumer experience in both channels in order to explore and propose solutions that reduce a negative influence on the total results. Also, we can mention that to include brand love as a result both online and offline could improve the presence and image of the brand. Finally, other future research could focus on making a division of genders, ages, districts and salaries in order to understand which variables are most valued by each group and to be able to specify new actions and/or tactics that achieve a long-term relationship with the company.

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Chapter 16
Strategic Cultural Management and Trend Studies: A Contribution for Articulations in Branding and Strategic Communication

Nelson Pinheiro Gomes and William Afonso Cantú

Abstract This work aims to explore different possible articulations between Trend Studies and cultural analysis for strategy in the scope of a strategic cultural management. Different concepts and methods in both approaches can work together to better produce operational protocols for scientific and applied analysis. Here, we address culture, semiotics, strategy, and branding. Considering that both envision cultural analysis for strategic insights and outputs, these articulations can provide better contextual and cultural mapping exercises, as well as the production of more pertinent concepts and narratives for emerging changes.

Keywords Trend studies · Trends · Branding · Strategy · Culture

16.1 Introduction

Trend Studies [1–3], cultural branding [4], cultural strategy [5], strategic/marketing semiotics [6, 7], tribal marketing [8], Chief Culture Officer [9] theory, among potential others, work on a base premise of cultural analysis with a strategic purpose, most of them connected with strategic communication and branding. In this sense, it is natural and straightforward to consider and review possible articulations between these approaches and even explore core common objectives and practices. Considering this, this paper aims (i) to present different recent contributions to these approaches, (ii) to discuss different practices, technics, and methods of each to identify crossing protocols and connecting steps in analysis and actions, with (iii) a specific orientation toward branding and strategic communication. Although there

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has been some recent research in these different approaches, there is still a sense that each works within its own confines and borders, generating a multitude of different names for similar concepts and practices. There also lack a greater connection and acknowledgment of the different contributions and theories, despite research that already tries to articulate different works or underline theoretical connections [1, 2, 10]. This justifies the need for more systematization, reviews, and protocols that underline and connect the different approaches.

We start our work with a review of Trend Studies and the idea of strategic cultural management, addressing several approaches, authors, theories, and concepts. The next point addresses different protocols for analysis, where we underline specific articulations that can improve the results and add new layers of depth. As a result, the proposed work contributes to (i) a wider discussion and reflection on cultural analysis practices oriented toward strategic outputs, and (ii) a greater articulation of the different operational concepts and analytical/action protocols, mainly for branding and strategic communication.

16.2 Articulations Between Trend Studies and a Strategic Management of Culture

Trend Studies is an academic approach that germinated from business practices and has a set of concepts and instruments to identify sociocultural trends, their objects and practices, and associated patterns and changes in mindsets. This has been fully contextualized in different works [1–3, 11–13, among others]. As the authors suggest, Trend Studies offer potential solutions to generate innovation, to answer contemporary consumer needs, to addresses changes in culture and collective mindsets, and to map new sociocultural dynamics. The same authors have proposed and/or mapped different protocols and procedures to articulate concepts and methods/technics from social sciences, humanities, and business, to harness the potential of change and apply it in strategic or innovation projects, including branding.

Almost in parallel, a strategic management of culture [10] has been in rapid development in the last years, crossing both academia and business. This approach, that in our operations uses cultural analysis to provide information and insights for strategy and management [10], has seen many recent contributions. Grant McCracken [9] proposed the role of the Chief Culture Officer as a professional that studies the external cultural context of the business; Douglas Holt [4] delved on the cultural branding and iconic brands ideas; Mark Batey also reviewed cultural branding [14]; with Douglas Cameron, Douglas Holt [5] developed the former perspective and generated a new concept of cultural strategy; also, others like Laura Oswald [7] have explored the contributions of cultural analysis (using, for instance, semiotics) for marketing, branding, and strategic communication, highlighting this potential of cultural/meanings analysis for strategic exercises. Gomes [10] mapped and articulated these different contributions for cultural branding, cultural strategy, and tribal

marketing within this scope of a strategic management of culture (cultural analysis oriented toward strategy and different strategic needs).

What compels this work is the identification of specific and interesting articulations between Trend Studies and this second body of research.[1] Gomes [10] in 2019 highlighted that trend analysis can have a role in the study of cultural expressions as understood in the work of Holt and Cameron [5]. Devon Powers in her work on trends also mentioned cultural strategy and the authors [2, p. 106] and delved on the concept of the Chief Culture Officer from McCracken [9], suggesting that "trend knowledge is sold as cultural strategy" [2, p. 102]. It is important to highlight that both the Chief Culture Officer and the cultural strategy come about at the same period. Within a space of ten years, the connections with Trend Studies are becoming evident.

In 2021, Gomes et al. [15] underlined, within a framework of cultural analysis for strategy and the possible articulations between branding and cultural strategy, that a cultural analysis with strategic focus can benefit from the study of macro- and micro-sociocultural trends, "adding a macro-perspective on phenomena, narratives, and audiences" [15, p. 222]. As McCracken underlined, culture "is the place to discover advantage, opportunity and innovation" [9, p. 2].

This paper takes these contributions and proposes that there are powerful indications for a greater inclusion and articulation of Trend Studies and the other approaches. We suggest that these works might be the building blocks for a greater understanding and the construction of a subdiscipline within Culture Studies: the "strategic cultural management" (SCM).[2] Cultural strategy/branding has already culture in its DNA, and there have been strong arguments [1] to see Trend Studies as an approach of Culture Studies.[3] The already proposed formulation of SCM has the right tone to harbor these different approaches of cultural analysis for strategy and business and Trend Studies. Again, to do so would mean the emergence of a subdiscipline within Culture Studies, having the contributions of a wide range of approaches, with their specific contexts and objectives, such as Trend Studies, cultural strategy [5], cultural branding [4], tribal marketing [8], strategic/marketing semiotics [6, 7], among others. For this, our research goes deeper into already identified articulations and proposes new comparative views.

The first thing to consider are two major concepts from Trend Studies [1–3, 11–13] and cultural strategy [5]: "trends" and "cultural innovations." Former research

[1] It is important to refer that Grant McCracken [9, pp. 159–160] and Douglas Holt [4] have expressed concerns and critical perspectives regarding trend analysis and coolhunting. Holt even suggested it was a "superficial approach to cultural change" and that coolhunting "is a parasitic strategy" [4, p. 85]. However, he highlights the need for cultural knowledge that "focuses on the major social changes impacting the nation" [4, p. 209]. Nonetheless, it is our perspective that the authors are considering the many superficial practical approaches that took place outside academia, and without considering more scientific protocols, in the last decade of the former century and the first of this one. Trend Studies have gone through a deep review from about 2008 until nowadays.

[2] Although the expression is usually used in the context of the arts and cultural sectors, we follow the operational concept highlighted by Gomes [10] of a cultural analysis with a strategic purpose, focusing mainly on business.

[3] Holt [4, p. 230] also underlined that he drew from "humanities disciplines that are often called cultural studies."

may have just scratched the surface or misinterpreted the equivalences to a point. We see a parallel between sociocultural trends [1] and innovative ideologies plus cultural orthodoxy [5], and another between innovative cultural expressions [5] and cool signals [1, 2, 16]. In the first case, we operate at the macro-level of mindsets, patterns and larger ideas, while in the second case, we go into the objects themselves that compose our visible world.

Holt and Cameron [5] underline the concepts of "ideology" and "cultural innovation." The first deals with a "particular point of view on a cultural construct," and they "enter culture when they are conveyed via myth and cultural codes" [5, pp. 174–175]. Ideologies can be understood here as structured ideas and networks of meanings, and as "opportunities" when they are innovative [5, p. 12], while "cultural orthodoxy" is the more traditional mindsets [5]. A "cultural innovation" takes place when "a brand delivers an innovative cultural expression" [5, p. 173]. As the authors add, "the engine of cultural innovation is historical change in society that is significant enough to destabilize the category's cultural orthodoxy, creating latent demand for new cultural expressions" [5, p. 185]. When we compare this to the work of Gomes et al. [1], we see that ideologies have a connection with the structured mindsets/ideas that compose the invisible components of sociocultural trends (or the more solid elements of culture when addressing more established ideas in terms of cultural orthodoxy), and the cultural innovation proposes a bridge, a connection between the ideologies/mindsets and visible world of objects, including the process of translation for the cultural object (whether is tangible as a physical object, or a digital/image/sound object). All of this is a product of change. As the authors [5] stated, she is the engine for cultural innovations. Trends work in the same fashion, since the main component of a trends' nature is "change" [2, 3, 17]. Trends also are established in mindsets—structured ideas—and go over a process of translation into the visible world where they take the form of objects (practices, artifacts, representations) that are going to generate behavior patterns [1]. These trend objects are the objects of our daily lives. When they assume a set of cultural and creative characteristics [16, 18], they become "cool signals"—objects with a greater potential for impact, meaning, dissemination, and the generation of change. They are, in some points, similar to cultural expressions that gain a new level and become "innovative cultural expressions" [5, p. 173].[4] "Cultural expressions serve as compass points, organizing how we understand the world and our place in it […] and cultural expressions serve as linchpins of identity: they are the foundational materials for belonging, recognition, and status. Cultural expressions permeate society, providing us with the building blocks with which we construct meaningful lives" [5, pp. 173–174]. So, we have two big levels of cultural domains and a process in the middle: the invisible (where the structured mindsets/ideas inhabit); the visible (where practices associated to objects take place); and in the middle the process of translation from the visible to the invisible [1]. Together, all these domains compose the nature of the sociocultural

[4] Gomes and Cantú [18] suggested that there is a general link between Trend Studies and Cultural Strategy and gave a step forward and proposed a joint conception of cool and cultural innovations for an analytical exercise of brand communication pieces in a protocol close to coolhunting.

trend: from the structured mindset/idea (we choose the expression "mindset" over the nomenclature of ideology, as used by Holt and Cameron, due to its current conceptualization in Culture Studies) in the invisible, to the "cool cultural expression/signal" that generates behaviors and behavior patterns associated to them. In the middle, we have the "cultural innovation" as all the process of translation and creation from the invisible to the visible (and that, somehow, also confuses itself with both domains). This cultural innovation process also puts a hand on the adaption "and repurpose what we call source material" from "three types: subcultures, media myths, and brand assets" [5, p. 186], but it can take elements from other forces and repositories of meanings and references to better produce a result of the structured mindset translation.

Within this scope, it is also necessary to understand the tension between the avant-garde (the progressive, change, the cool, the fast culture) and the solid (the conventions, traditions, the mainstream, the slow culture). In a sense, what McCracken considered the cool [9, pp. 65–70] and the status [9, pp. 71–78]. Although both forces have reached a current compromise [9], the tension between both allows us to spot change within the solid mainstream and see opportunities.

In the more specific perspective of cultural branding [4], we can see other relations between cultural analysis and strategy in the context of brands—brands as a set of meanings [14, p. 6]. In this sense, "a cultural approach to branding involves viewing global consumer culture as a symbolic repertoire for the construction of identities and the shaping of consumer preferences" [19, p. 103]. This follows the general process of understanding cultural change and incorporating it in brand strategy, generating what Douglas Holt call "iconic brands" [4, p. 11] with strong myths, leading us to the importance of strategic/marketing semiotics [6, 7] and narrative building.

Within this framework, our articulations must also consider specific contributions from marketing/strategic semiotics [6, 7, 20] and tribal marketing [8]. The first deals with important practices of interpretation and meaning imprinting, while the second underlines the potential to work with urban tribes and co-create with them.

16.3 Articulations in Methods, Technics, and Approaches for Protocols in Branding and Strategic Communication

There is a clear resemblance in the general processes for analysis and action within Trend Studies and already mentioned approaches of cultural analysis for strategy. First, there is the observation, gathering of data and a kind of sociocultural mapping of the context [1, 3, 5]. Second, there is a systematization of the finding [1, 3] that articulates the different information into categories that can be worked with. This may also be the moment where we identify opportunities [5] and insights that unveil potential paths for action. Third, we develop the narratives and concepts that come from the former exercises in the form of trend DNA [1, 3] or as specific trend

narratives to be applied in a concrete context and challenge. Fourth, we activate the knowledge and narratives into solutions, concepts, and strategies [1, 3, 5]. Although it looks as a linear process, it works as a matrix with different paths and possibilities, due to the specific needs of each project, or problem. As Holt states in terms of a consumer culture strategy, "the analytic challenge of CCS research, then, is strategy development—an iterative tacking back and forth between analysis of the issue on the ground, the particular theories that seem to be most helpful in interpreting this data, with a continual focus to build a strategy model that opens up new and better solutions to the issue" [21, pp. 220–222]. There is a discussion with "impactful ideas that are used today to understand major social issues and guide their solutions" [21, p. 223].

Much has been published in terms of models and processes (stage by stage) in terms of Trends Studies [1, 3, 11, 22, among others] and in this strategic cultural management [5, 7, 10, among others]. Our objective in this section is to highlight articulations and underline potential connections in methods/technics/approaches from both perspectives. In this sense, we present our identified potential articulations:

(i) **Desk Research and Cultural Topics**. The definition of sociocultural topics and keywords that define the moment [23–25] via discussion groups and focus groups with invited experts and agents from different fields [1, p. 246] can provide a starting point for the research and provide a general insight into macro-dynamics and movements or help to make sense of the major topics in desk research and literary review. Also, looking into physical and digital secondary sources helps gather information on trends [1, 3] on the sector and general events and forces. Sources like reports and studies from observatories—trend reports can be useful [1] to inform initial premises for projects, not to mention sector or theme reports with quantitative and qualitative data. This is a major starting point for a strategic cultural management.

(ii) **Myth and Semiotic Analysis**. Semiotics has been a topic in development in Trend Studies, being mentioned or operationalized by different authors [2, 12, 15, 2, 26–28]. In a cultural approach to strategy and branding, it has been applied in different protocols [6, 7, 29]. It shows the important interpretation potential of the method. We take here a conceptual approach from Barthes [31] and an applied perspective from Oswald [7] and Holt [4]. This is focused on category analysis according to each project. Laura Oswald highlights that "semiotics can be incorporated into the planning process at the stages of research, analysis, and advertising communication. They include: Decoding the consumer culture of the target market; identifying emergent cultural codes and trends" [32, pp. 46–47]. Here, we review different brand content, mainly from the same sector (but also from other sectors to drive divergent insights), to understand the main myths and the "strings of signs" [20, p. 227] being imprinted in strategic communication objects. As Holt underlines, "the story itself must be the center of strategy, because the quality of the myth, not some abstractions, drives the brand´s identity value" [4, p. 63]. First, we must unveil the stories and themes

that are being produced in an advertising audit to reveal used elements and articulations between the creative path, brand heritage, and patterns in the category [7, p. 50]. This is done by gathering cases and contrasting the adverts with our own brand, using, for example, three semantic categories: "persona, lifestyle, and relations" [7, p. 42], among other possibilities according to each briefing. This analysis should be diachronic and provide a binary logic where we can see contradictions and implications [7, p. 44], finding signifiers for positionings [7, p. 57]; second, we can deconstruct imprinted meanings and myths via semiotics [30, 31, 7], analyzing both denotative and connotative readings and identifying the present myth. As Holt underlines, "the story itself must be the center of strategy, because the quality of the myth, not some abstractions, drives the brand´s identity value" [4, p. 63]; third, we review the cultural codes [5] that were used to build the stories, the cultural formula that correctly articulated each element [18], and the entire plot to create the right message and myth.

(iii) **Map the Mainstream**. What Holt and Cameron understand as the mapping of the cultural orthodoxy [5, p. 196]—it is specific to the category of the project, but here we take a more general approach. By using content analysis [33], we can analyze the production of content online, in publications and different series of data that point to the main concerns of the mainstream and can also help to inform practice. Also, as Cayla and Arnould underline, "a narrative analysis of popular songs, films, literature, theater, the Internet, and other media forms generates a repertoire of mythic resources that can be linked to commercial brands" [19, p. 106]. To this, we add that Coolhunting, one of the major and core methods of trend analysis [16, 34], has an important role here. Its mission is not to single handedly identify changes and major wants/needs/desires in collective mindsets but to provide insight into the latent meanings and mindsets behind the objects. We believe that its main goal is not to identify the next big thing, but: to see how emerging mindsets translate into new objects and understand the nature of this new creative/cultural germ/seed imbedded in each cool signal/object, since it has the potential to be present in other new objects. It is a highly interpretative exercise that goes over cool characteristics, context of the object, insights for projects, and the construction of the narratives themselves. Even in this method, Gomes and Cantú [18] highlighted the importance of considering a semiotic review (denotation and connotation) and the benefit of also considering the cultural formula, already addressed, to construct the object´s narrative when analyzing cool signals. Even in this, coolhunting is already a methodological process of discussion between trend analysis and cultural analysis for strategy.

(iv) **Systematization and Opportunities**. Here, we want to systematize the patterns of change and identify the "social disruption(s) that can dislodge the orthodoxy" [5, p. 197]. With the systematic analysis of data and signals, we can organize the information into categories [1] and change will become apparent, as will the stronger signals for trends and disruptive movements. It is important "to articulate and systematize the data collected within the scope of the methods indicated in the previous phase. The various results differ in terms of nature,

information, and meaning" so we must "systematize and interpret them by thematic affinity, based on similar indications that inhabit each one, that is, the same meanings that they suggest" [1, p. 256]. This is useful for both trend identification as for general change identification. For as Holt and Cameron add, "social shifts eventually disturb consumer´s identification with conventional category expressions […] We focus on those changes that unsettle the category´s ideology, that lead consumers to desire a new ideology or to feel uncomfortable with the existing ideology. The disruptive social shifts can be led by technology, the economy, social structure, demography, social movements, or the mass media" [5, p. 197].

Again, we take inspiration from the perspective of Oswald in semiotic terms, to review and categorize the different information collected on stage 1, since "the theory of codes grants measure of validity to semiotics-based market research that is often lacking in interpretative research, because codes organize meanings in consistent, observable patterns throughout a data set. […] the semiotician infers the presence of these codes by tracing patterns of associations in each set of data, including consumer interviews, advertising, popular culture, retail sites, or a product category" [7, pp. 14–15]. The analysis will track the "recurrence of patterns" in the collected data that structure meaning to see what conforms and breaks from the code [7, p. 17]. The resulting categorized information will be the steppingstone for trend identification and will be transferred to the next stage, but there is more to do here.

This exercise will allow for the identification of "ideological opportunities" [5]. As Holt and Cameron underline, "once we have specified the social disruption, we then detail precisely how this disruption is impacting on category customers. In this phase, we dig into customers' identity projects to ascertain their collective desires and anxieties in relation to the disruption." What is the emerging desire for new cultural expressions caused by the disruption?" [5, p. 198]. With this, and reaching out for the gathered data, we will have the necessary "source material" [5, p. 198] to create new cultural formulas.

(v) **Briefing, Narrative, and Solution**. Cramer, Duin e Heselmans, in the application stage of their protocol underline that trends can support the development of concepts or contribute to generate innovation [11, p. 53]. We must understand how trends are applied in practice in the construction of solutions. This is where tribes and tribal marketing [8] can have an important role as a specific audience with lifestyle patterns that can point to specific needs and solutions. Cova and Cova [8] underline the importance of the link, a link of "shared passion or emotion" [8, p. 602] between the members of the tribe and with the brands that support the community. As Torelli stated, it is important to have "a deep understanding of the cultural characteristics of the different market segments in order to identify those segments with the highest potential for iconic-building purposes" [35, p. 120]. Having identified specific opportunities and source materials, we can respond to them "with a particular cultural expression, made up of ideology, myth, and cultural codes. […] cultural strategy must be far more specific and directive as well. […] cultural strategy directs

everyone involved in the innovation to craft a particular cultural expression into every component of the offering. […] Cultural strategies are detailed documents that specify nuanced direction in terms of ideology, myth, and cultural codes. In cultural innovation, details matter" [5, p. 199]. To compose the cultural document/brief [4], we must: "identify the set of associations (benefits, quality, user imagery, etc.) that the brand should own [4, p. 63]; give a "strategic direction that pushes commercial artists toward creating the right kind of story" [4, p. 64]; prescribe the "kind of story the brand should tell to address a particular cultural contradiction of the day" [4, p. 64]; promote populist authenticity ("procure source material that audiences perceive as credible," without a simple repackaging), since "brands demonstrate literacy through performances that reveal a nuanced understanding of these codes and idioms"); develop a charismatic esthetic (charisma—a distinctive and compelling style); underline elements of the cultural brief such as: myth treatment (a script/treatment that addresses the "brand´s proposed role in culture" and "opportune cultural contradictions") [4, pp. 64–65]. This last topic has a practical nature. Within the construction of the cultural formula and to advance the brands myth, there are four principles to consider [4]: develop plots and characters (create storytelling and a narrative in a serial or short mode); sample new popular culture (consider "unexpected artifacts from emerging popular culture and then reframing"); speak from new populist worlds (find a good fit in new populist worlds); push the myth's boundaries (use the audience´s familiarity as a foundation to allow for more inventive explorations of plot and characters.) [4, pp.198–207]. "In sum, brand myths succeed when the brand performs the right story, which is authentically grounded in the brand's populist world, and us executed with a charismatic esthetic" [4, p. 65]. When crafting a brand strategy [4], brands are known for telling certain kinds of stories pertinent to the moment generating identity value and cultural and political authority [4, pp. 95, 111].

16.4 Conclusions

There are many contributions from different disciplines and fields, from Culture Studies to marketing and design, that address cultural analysis in terms of a strategic exercise to solve a problem or develop a project. We highlighted some of these works and research, but in terms of limitations, we believe there are more. One of the main things was to underline that there is a body of research robust enough to begin a new understanding of the potential of cultural analysis for business. The identified and proposed articulations create bridges in different approaches. Not only there are many similarities, but the different approaches can add value to each other. Branding and strategic communication are relevant receptors of these benefits, but many strategic exercises and different sectors can benefit from this knowledge.

Based on the highlighted contributions and approaches, we propose the need for future works to consolidate the emergence of a possible new subdiscipline within

Culture Studies, the "strategic management of culture." In this sense, the meta-discipline of Culture Studies (from the perspective of the British Cultural Studies or other conceptions) would grow with this new subdiscipline, that articulates general common objectives and protocols from different approaches like Trend Studies; cultural branding/strategy; strategic/marketing semiotics; tribal marketing; among others. The objective is to train new researchers and professionals as, like McCracken [9] underlines, Chief Culture Officers. In future studies, we plan to create a model that can overlap these different processes to create a diagnosis of brands, their positioning, equity, and actions, to generate better strategic business insights.

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Chapter 17
Understand Fashion Consumer Profile Sustainable Textile in Portugal—Sustainable Makers Marketplace Case Study

Ana Rita Silva, Ricardo Mena, and Francisco Coelho

Abstract The current paradigm that involves the fashion industry leads us to several topics considered relevant. Thus, the central theme of this article is to understand the profile of sustainable textile fashion consumers in Portugal. This investigation used the Sustainable Makers marketplace as a case study, in order to understand what strategies this project can implement considering the needs and values of consumers. The literature reveals, among other aspects, that more informed consumers have more trust in brands, especially these reveal their principles in relation to social and environmental sustainability. Some of the topics addressed are the consumer's purchase intention and behavior, social responsibility values, the purchase process, namely through e- commerce and through which media obtain information about the socially responsible practices of brands. It addresses the relationship between consumer and brand and the impact that the COVID-19 pandemic may have had on consumer choices in textile fashion. The recommendations presented serve to make Sustainable Makers an innovative and useful project for the final consumer.

Keywords Consumer · Marketing · Sustainability · Sustainable Makers · E-commerce · Social networks · Technology

17.1 Introduction

The textile fashion industry is one of the sectors that most needs to rethink strategies and assume a conscious position in practices related to the selection of raw materials, production, consumption and post-purchase treatment of garments. Consumers are

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easily influenced by low prices and fast fashion, that is, the fact that fashion is getting faster and faster and this triggers mass production. This leads to the purchase of more clothes, which are used less frequently, which leads to waste.

In the European Union, in the last decades, the purchase of clothes has increased by 40%, due to affordable prices and the speed with which fashion reaches consumers. It is concluded that garments account for between 2 and 10% of the environmental impact of consumption in the European Union [29].

Thus, it appears that the textile industry is the second most polluting industry in the world [2]. However, the consumer also leaves his environmental footprint: in the washing of garments, through the consumption of water and chemical products inserted in detergents, in the energy consumed by ironing and in the plastic discarded in the environment [29].

The year 2020 was considered the year of conscious fashion. Despite this being an increasingly recurring concern, brands and retailers had to respond to consumer demand and have more environmentally friendly options [26].

Due to the pandemic caused by COVID-19, the business system was destroyed globally, so there had to be an adaptation. The closure of stores and various commercial spaces and the consequent drop in sales led to the transition of many business to online platforms, something that was already happening, but which has increased exponentially.

Online purchases grew by 12.5% in 2017; in 2018, they increased by 17%, and in 2019, this number exceeded 20%, hence the prospect of high prospects, due to the need for social isolation resulting from the COVID-19 pandemic. It is also concluded that marketplaces will play an increasingly important role in this business segment [6].

In this sense and in association with the idea of online shopping, it appears that sustainable textile fashion brands are being increasingly sought after on these platforms and have ensured their niche capacity. One of the factors is the increase in digital purchases, which also adds to the curiosity about brands and products and the ability to compare sustainable characteristics, price, among other factors [11].

One of the main drivers of the focus on the environment and social issues is the "responsible consumer" concept. Consumers, particularly millennials, show a strong interest in sustainability and expect the same from the companies they interact with [5].

Therefore, the central theme of this study is to understand the consumer profile of sustainable textile fashion in Portugal—a case study of the marketplace Sustainable Makers.

In this context, the information collected will serve to perceive part of the market and provide recommendations to the Sustainable Makers marketplace, a recently launched platform on which there is still not enough data on its consumers, brands, and sales volume. Therefore, it is intended to help the project to enhance guidelines to become a reference for the consumer.

Thus, the present study is divided into seven more chapters, and the case study will be framed, followed by the contextualization theory of the mentioned themes, through literature review. Then there is a chapter with some market trends that involve the

consumer, technology, and innovation in the sector. Subsequently, the methodological approach is presented, as well as the data collection techniques and the respective justifications. The analysis of the collected data follows which is divided according to the research instruments used. Finally, the recommendations and conclusions of the study are presented.

17.2 The Case Study: Marketplace Sustainable Makers

Absolutarget is a group that includes the companies Portugal Textile and Portugal Shoes, production agencies that are divided into two fashion categories: textile and footwear. The B2B business is aimed at brands belonging to the European and North American markets in the mid-high segment. The activity focuses on providing these brands with all the necessary support in the planning of collections and the production process, as well as in contact with Portuguese factories to ensure the quality control service in the confection and verify the certification of the materials used.

The company deals with several challenges of the fashion industry and it was concluded that, currently, the concern of most fashion brands is to find sustainable material solutions for the manufacture of their products. The reduction of waste inherent in this production, the use of surplus materials, and the final packaging of the product are other problems that the brands want to see resolved.

The Absolutarget group is in a phase of launching businesses in the B2C area, more specifically marketplaces, one of which will focus on the sale of textile fashion products that value environmental and social sustainability—Sustainable Makers.

In this way, to verify the strategies and achieve notoriety in the market, it is essential to understand the consumer profile of sustainable textile fashion in Portugal.

17.3 Literature Review

17.3.1 The Socially Responsible Consumer

For Webster [33], one of the pioneers of the concept of socially responsible consumer, this is a consumer who is aware of the public influence of their consumption choices. In the author's perspective, the socially responsible consumer uses their shopping habits to bring about social change.

In general, consumers expect companies to develop socially responsible behaviors in communion with society. It is easier for consumers to boycott irresponsible brands than to support brands that comply with certain socially responsible behaviors [22].

17.3.2 Purchase Intention and Consumer Behavior

Mohr et al. [22] concluded that consumers cannot free themselves from the traditional purchase pattern, based on price, quality, and convenience, when making a purchase decision. For this reason, it is difficult to use brands' social responsibility as a criterion, as it requires learning in relation to the practices of each company [1].

Consumers feel a positive connection to companies that have a good reputation for social responsibility, so they are more likely to buy their products [19].

The perspectives of Bhattacharya and Sen [1] and Rizkallah [27] establish that people with knowledge in social responsibility were more willing to support and5 pay more for an environmentally or socially responsible brand, being able to choose one brand over another if the company's practices do not correspond to socially responsible behavior. Companies can manage their strategic marketing actions and benefit from creating a positive image of social responsibility and use it to increase competitiveness [19].

However, Lee and Yoon [19] establish that the image of social responsibility does not have a significant impact on the consumer's purchase intention in relation to companies involved in social responsibility activities. However, the authors note that further studies are needed to determine whether trust inspired by social responsibility initiatives can in fact affect the consumer's purchase intention process.

17.3.3 Consumer Trust in Brands

Gurviez [10] established three dimensions that are at the origin of consumer trust in brands—credibility, integrity, and benevolence.

Credibility is based on what the brand produces in order to meet consumer expectations. Integrity is about how honest brands are about what they promise consumers. On the other hand, benevolence is related to the actions of the brand of the future, that is, in the long term and that are focused on the interests of consumers and allow them to satisfy their needs.

In general, when consumers have information that they consider reliable regarding the social responsibility actions of brands, they acquire positive attitudes toward a brand [21].

17.3.4 The Consumer and Social Responsibility in the Textile Fashion Industry

The conclusions of the study by Manchiraju and Sadachar [15] suggest that the consumption of fashion products with an "organic" connotation is considered socially

responsible. On the other hand, consumption of fashion products based on fair trade policies is not.

In the fashion industry, there is a growing number of green collections that boost the image of the brands in which they are inserted. This situation also happens in the context of companies that introduce ecological attributes in existing products where consumers must process new information through the strategies outlined for the brand. However, strategies can be different or adapted, depending on the consumer's profile, that is, their environmental sustainability values and their perception of brands [12].

The main changes in the fashion paradigm are intrinsically related to consumption and production. In this way, there are specific characteristics studied and defined based on production lines and consumer behavior. On the one hand, we have the component focused on raw materials, design, and manufacture of a particular product. On the other hand, the supply chain is what makes a product sustainable or not [24].

The purchase of second-hand products can be associated with several personal reasons for consumers, such as environmental and economic concerns. Being able to buy high quality fashion products can reinforce this option (second-hand), as well as consumer research to find products with originality. It is assumed that consumers play a key role in extending the life cycle of products [7].

Mukendi et al. [24] consider that most consumers are at an early stage to try to avoid buying fast fashion, for some specific reasons: low product quality and desire to support local brands, and also because they lack products irreverent than what other consumers use. In addition, the consumer has been more aware of the problems of the fashion industry and some ethical perspectives that have influenced consumption. Consumer attitudes toward environmental concerns have been most influential in the purchase intention of sustainable fashion products.

A study by Kim [14] addressed issues related to consumer engagement in conscious fashion and loyalty to fast fashion. The results allowed us to understand that the impact of customer engagement on their emotional connection and satisfaction with the fast fashion brand may be more prevalent than their impetus and sustainable practices.

Consumers with a strong socially responsible attitude are more predisposed to draw a natural connection between social responsibility, brands, and products [12].

According to Kim and Hall [12], the social responsibility value of consumers directly influences the motivation they give in the definition of green attributes in fashion brands. For Sun et al. [32], consumers are increasingly aware of the importance of environmental sustainability as a key factor. Consumers reveal that they believe that companies involved in social responsibility activities, which address issues related to the environment, improve their economic volume.

Sample data related to a study by Mukendi et al. [24] indicates that consumers do not internalize the dimensions of sustainable marketing to the detriment of fast fashion and industries with heavier production. Therefore, environmental concerns are crucial for the fashion industry. However, brands use social media and other digital

channels to provide coherence and transparency in social responsibility communication, fundamental for consumers involved with sustainability and to educate the most skeptical.

17.4 Data on Market Trends

In this chapter, some market trends that are considered relevant to complement the information provided in the literature review will be addressed. The topics covered will be information regarding online commerce, the consumer, their perspective on the sustainability of textile fashion brands, and the effects of the COVID-19 pandemic on consumption habits.

Consumers rethought habits with the confinement of 2020–2021 due to the COVID-19 pandemic, with the objective being to protect their finances and adapt to a new form of consumption. In this way, brands that worked for years in online innovation and change ended up having to adapt in a short space of months, leading them to invest in the only sales channel available: e-commerce [17].

Consumer engagement with sustainability narrowed in 2020 during the crisis caused by the pandemic. However, in the post-pandemic period, consumers expect fashion industry agents to continue to commit to their socio-environmental responsibilities.

This is justified by a study by the consultant McKinsey [18], in which 75% of respondents consider that trust in a brand is an important purchase factor. But younger consumers have demonstrated during the pandemic, especially Gen Z and millennials, who are more likely to try out brands with lower visibility.

On concrete trends in the fashion industry, stores will have customer service offerings that help consumers make personalized choices and select the most suitable sizes. In this sense, websites and mobile applications include the customization option, in addition to showing all available styles and size combinations [4].

The report, which reveals the inside data, says that in addition, fashion brands will pay more attention to resale and repair programs, combined with a unique in-store experience. Consumers relate more to sustainability—circularity is the key concept for a more sustainable future.

However, there are other trends in the digital environment that will remain, such as chat for customer service and shopping on social networks. WhatsApp will be one of the most used shopping tools [16].

Fashion companies are investing in digital technologies that allow them to identify and add useful information about products. This tool has been called “product passport” and uses the combination of blockchain technologies, radio frequency identification (RFID), QR codes, and near-field communication (NFC). Demonstrating that there is progress on the sustainability front is important to gain the trust of younger consumers, as around 43% of Gen Z consumers say they look for companies that have a solid reputation for sustainability [16].

17.5 Methodology

In this investigation, the general objective being to understand the consumer profile of sustainable textile fashion products in Portugal, case study of the Sustainable Makers marketplace, a mixed methodology was used for data collection and analysis, bringing together quantitative and qualitative methods. Both types are attempts to indicate finite information to a wider population, with the aim of adapting the analysis to the need for understanding and verification [30].

Therefore, a closed-type questionnaire, common in quantitative approaches, and more open-ended interviews, corresponding to the qualitative component, were used [23].

In the elaboration of the questionnaire, the central objective of this investigation. After cross-referencing some relevant topics from the literature review, a questionnaire was structured with a 5-point Likert scale (1 = very frequent; 2 = often; 3 = occasionally; 4 = rarely; 5 = never). The questionnaire, which resulted in 303 valid responses, was divided into five sections: the consumer's perspective in relation to the intention to purchase textile fashion; consumer and textile fashion buying behavior based on sustainability values; the consumer's perspective in relation to the communication of textile fashion brands; the fashion industry in the context of the COVID-19 pandemic, and the last section dedicated to sociodemographic issues of respondents, to characterize the sample under study. In this way, to analyze some characteristics related to the consumer and their intention and behavior in the purchase of textile fashion products, a simple descriptive statistical analysis was carried out.

In the present case study, six semi-structured interviews were carried out, divided into three groups: the first group, composed of two specialists, one in the area of sustainability and the other in the area of textile fashion and sustainability; the second group corresponded to two professionals from textile fashion companies that deal with circular economy and sustainability; and the third group was intended for two founders of textile fashion brands, a brand that works with the upcycling technique and supports social projects, by having a group of unemployed women over 50 years old, in the production of its pieces and a brand whose focus is on transparent communication with the final consumer.

An identical script was designed for the interviews of these three groups, as one of the main objectives was to understand the perception of each of these professionals within their areas of activity in the textile fashion sector and/or sustainability.

However, it is a semi-structured script, so it made it possible to adjust some questions when the interview allowed, especially when they were carried out via the "Google Meet" platform. On the other hand, there are responses that were sent via e-mail in which the original script format was maintained. The structure of the script was based on four themes: the attitude and purchase behavior of consumers; online shopping and physical store purchases; the communication of textile fashion brands and the consumer; and what textile fashion brands and consumers will look like in the future. These themes were prepared considering the literature review and aspects

that were considered relevant to address, based, for example, on the answers to the questionnaire intended for the final consumer.

17.6 Discussion

The analysis of the data collected was relevant to build foundations that lead to the understanding of the consumer profile of sustainable textile fashion products in Portugal—the case study of the Sustainable Makers marketplace.

Through the analysis of the questionnaire it was found that, regarding their purchase intention, the consumer shows interest in verifying components related to the environmental and social sustainability of textile fashion brands, these being the main aspects verified through the analysis: working conditions and fair wages of workers; the use of child labor in production; the origin of production; the use of animal skins in the manufacture of garments. However, when they move from the intention to a certain purchase behavior based on the factors mentioned above, it is evident that most of these themes are not related in the same way in the act of purchase. When buying, the consumer thinks more about the durability of the parts and the price. This information is described in Table 17.1, where the most important factors for the consumer in relation to purchase intention and behavior are identified, with the result corresponding to the average of responses being duly indicated, based on the Likert scale presented above and which served as the basis for this investigation.

He is a consumer who proves to be demanding, as he considers that the communication of fashion brands is not yet fully clear in relation to sustainability and, as we will see later in this chapter, through the analysis of the interviews, one of the factors for consumers is not yet buy in order to cover sustainable indicators, has to do with the lack of information they acquire from brands.

Table 17.1 Purchase intention and behavior. Results from the consumer perspective in relation to sustainable textile fashion

Consumer perspective in relation to textile fashion (purchase intention)	Consumer perspective on sustainability in textile fashion (consumer behavior)
Use of child labor in production = 1.71	Purchase of domestic production = 2.50
Social and environmental impacts that the fashion industry has in the world = 2.08	Purchase based on social and environmental sustainability values = 2.64
Working conditions and fair wages for workers = 2.12	Purchase based on production impact = 2.89
Origin of production = 2.15	Purchase considering whether the garment can be recycled at the end of its life = 3.00
Use of animal skins in production = 2.21	Purchase taking into account working conditions and fair wages = 3.21

The type of consumer analyzed prefers to buy in physical stores than on online platforms, in the same way they indicate that they do not make purchases on marketplaces often. Once again, considering information as a relevant factor for the consumer, he seeks to know more about sustainable fashion on the brands' websites. This issue may be related to the fact that brands still do not have a clear communication in terms of environmental and social sustainability, as they use the brands' direct information platforms and, even so, they do not find all the information they consider essential for a purchase decision.

As for the period of isolation caused by the COVID-19 pandemic, the consumer was available to buy products from brands that are smaller and reduced the consumption of textile fashion. In the context that establishes the end of social isolation, he confirms that he will choose to buy pieces of clothing with greater durability; however, he remains reticent about a change to just buying second-hand textile fashion.

In Table 17.1, a brief comparison is made between some factors that highlight the difference between the consumer's purchase intention and behavior. Although consumers' purchase intention assumes the aforementioned aspects, their behavior is different. The average of responses in relation to factors such as working conditions and the social and environmental impacts of production also differs.

With reference to the Likert scale used to validate the answers to the questionnaire, it is no longer situated at 2 = often, when we refer to purchase intention, and goes to 3 = occasionally, when purchasing behavior.

In order to summarize the analysis carried out through the categorization and explanation of the interviews, a summary of the key ideas that are considered relevant will be made to the three groups. From the perspective of the interviewees, in general, the factors that most affect the relationship between consumers' purchase intention and behavior are price and lack of information. This question was framed in the script considering the analyzed results of the questionnaire intended for the final consumer, to try to understand with some professionals in the fashion and sustainability, which they consider needs to be changed so that consumers assume the more sustainable values of textile fashion brands and begin to change their consumption habits.

In the opinion of the interviewees, brands should stop practicing "greenwashing" and using terminology considered more sustainable as a form of marketing.

Specifically, regarding the use of the terms "eco" and "100% organic," they consider that they should only be used if their characterization correctly defines the positioning they intend to have in the market and, thus, inform the consumer in the best way, so that able to make choices with more responsibility.

Through the analysis of the interviews, four types of consumer are mentioned; however, these data are not enough to characterize the entire market. However, from the perspective of the interviewees, there are extremist consumers, who only value second-hand purchases; the consumers who buy sustainable as it is a market trend, but which are not yet rooted in their consumption habits; consumers who show concern and try to change their consumption habits; and consumers who are indifferent to these issues.

For the future of textile fashion, they expect post-purchase services to be more frequent and for brands to realize that this is also a vehicle for enhancing information

to the final consumer. Respondents want second-hand fashion to be seen as a way of acquiring products that make a difference in the consumer's style, without having to buy "new," to keep up with trends.

Respondents reveal that the ideal would be a fusion between fashion, sustainability and technology. In this way, textile fashion brands and projects must focus on proximity in customer support service, such as the creation of avatars that serve to expose information on washing and sustainable consumption, for example, the development of technology that allows the consumer to be informed about the history of the brand and all the environmental and social sustainability indicators of the garments, as is already the case with home appliances, and the presentation of the respective energy efficiency.

Finally, they hope that consumers of textile fashion in ten years will be more conscious in their choices, although they reveal the notion that this change will not be sudden and will occur gradually and that brands have responsibility in this process.

17.7 Recommendations

Although the Sustainable Makers marketplace was launched in October 2021, it is still at an embryonic stage. Therefore, it is imperative to design strategies that allow its growth based on the results and conclusions of this investigation.

From the analysis of the data presented in the previous chapter, it can be seen that Sustainable Makers can be a way of gaining notoriety in the market but also to solidify the relationship between brand and consumer.

Next, some topics that constitute the plan of recommendations for the development of Sustainable Makers and respective consolidation in the Portuguese market are left.

- Sustainable Makers mobile application: The community between brands and consumers: This application is a community for sharing information quickly and simply between brands and consumers, as if it were a social network. Basically, it will be an area of the website, also available in a mobile application, where consumers can share suggestions on sustainable textile fashion and have access to video reports, podcasts, written articles on sustainable textile fashion. Brands can disseminate information about production processes and their social and environmental sustainability values.
- Sustainable textile fashion workshops: This action consists of providing the final consumer with the possibility of participating in workshops where they can learn techniques to treat their clothes (sewing and washing), but also knowing new concepts, such as upcycling and circular economy, in order to make more conscious choices.
- Organization of an annual conference: Organization of debates on textile fashion and sustainability open to the final consumer, in order to transmit experience and knowledge. The objective is to acquire notoriety to create a conference on

fashion, sustainability, and innovation with the name of the "Sustainable Makers" marketplace, which can be held annually and with the support of partner brands.

- Podcast on textile fashion and sustainability: Development of a podcast with content on textile fashion and sustainability, available on the various platforms for this purpose and on the "Sustainable Makers" mobile application described in the first recommendation.
- Adaptation of social networks: To adapt the content of social networks to each target audience. Provide a YouTube channel, with content that can be adapted to TikTok and can be disseminated through Facebook and Insta gram. These contents can be informative videos, reports, among others, about textile fashion, sustainability, the history of brands, the process of a particular product.
- Informative QR code: Creation of a QR Code to insert on product labels and packaging, in partnership with brands, for the dissemination of information about the marketplace, but also about the products, such as the production and distribution processes, until details of the brand's history.
- Seasonal showroom: Creation of two seasonal Showrooms, each year (spring/summer and autumn/winter). In this way, the initiative is also a way for brands to reduce waste and help consumers get to know the partner brands of this project. To feel and try on the pieces, to increase their confidence when buying online, especially from brands with a smaller strategic dimension in the market.

17.8 Conclusions

The present investigation aimed to understand the consumer profile of sustainable textile fashion products in Portugal—case study of the Sustainable Makers marketplace, in order to make strategic recommendations in relation to the marketing to be implemented on that platform.

However, as Sustainable Makers was recently launched and still does not occupy a consolidated place in the market, there is no specific data on the platform's consumers, nor on the adherent brands. Therefore, a strategic logic was established to be analyzed in this study, through data collection techniques based on a mixed methodology, that is, a questionnaire corresponding to the quantitative component and semi-structured interviews corresponding to the qualitative aspect.

After this brief overview, it is important to mention the main conclusions of the study. In general, consumers show concern in the purchase intention with the social and environmental policies that brands practice. As in the perspective of Fletcher [9], who considers it important to analyze the social and environmental problems of brands. However, through the various factors analyzed, the emphasis is mainly on the working conditions and wages that brands attribute to their workers, whether child labor is used in production, what is the origin of this same production of garments and whether animal skins are used during the process.

For Roberts [28], the lack of information about socially responsible ideals of companies influences consumer choices. Consumers are more willing to buy sustainability if they trust brands [27].

Consumers assume that textile fashion brands do not have clear communication regarding their sustainable practices. It is important to note that according to the results of the questionnaire analysis, the way in which consumers research more about sustainable fashion is through the websites of textile fashion brands; that is, consumers consider that they have little information, which can lead to a lack of interest in these issues or reveal a lack of trust and credibility in the act of purchase. These factors, from the perspective of Gurviez [10], are important in the consumer's purchase decision.

The three groups subject to the semi-structured interviews are unanimous in most of the answers given. One of the most important was related to the question regarding the results of the questionnaire intended for the final consumer, regarding their purchase intention/behavior. Respondents refer that factors such as lack of information, followed by price and market supply, may contribute to the lack of sustainable purchasing behavior in the context of textile fashion products. Kim and Ferguson [13] consider that consumers can only make more conscious choices if they are equipped with information about social and environmental issues involving brands.

Through the interviews, it is perceived that in the future, the consumer will be faithful to the options and convictions that he currently has, but more conscious and sensitive to the themes about environmental and social sustainability, and thus follow Webster's [33] thinking who developed the concept of "socially responsible consumer"?

In the perspective of Niinimaki [25], companies need to have more creative thinking in business, industry and technology. Thus, in an attempt to address some perceived weaknesses in the sector through the analysis of the data collected and to take advantage of opportunities from a market perspective, some recommendations were made for the Sustainable Makers marketplace.

The main recommendation is to make this project a platform of reference and trust in the informative core of sustainable textile fashion, to break the barrier of lack of information. The concept of the mobile application is intended to be a social network for consumers and brands, where they can share experiences, doubts, disseminate news, and make the consumer feel part of the process, while acquiring more information on the subject. surrounding.

For Shukla and Gupta [31], the lack of information in stores and textile fashion brands about their social and environmental impacts makes companies adjust and have to look for alternatives.

In short, it is intended that the target marketplace of this case study acquires notoriety in the market and realizes that the creation of a mobile application can contribute to aggregating all these contents, which allows the development of a community of consumers of sustainable textile fashion, reinventing processes currently used.

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Chapter 18
The Transformation of the Ecuadorian Private Television RTU: Marketing Strategies and COVID-19



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Abstract TV consumption has increased due to COVID-19 crisis. The demand of local and valuable news has been crucial for this rise. Under the premise that the pandemic crisis could have acted as a trigger for the adoption of new forms of content production and advertising formulas for many broadcaster, this paper analyzes the transformation of the Ecuadorian national private television channel RTU. The research carried out the RTU's financial analysis of 2018, 2019 and 2020 to understand its economic situation and the consequences of the decisions and initiatives implemented in the last years. The research also carried out semi-structured interviews with the aforementioned broadcaster managers and experts in order to understand the changes fostered given the new economic, social and technical scenario. The research allows us to evidence that the linear TV is on crisis, in special among younger audiences. RTU has drastically reduced its team due to the decrease of revenue in advertising ad the unattractive content to young audiences. Having in mind this situation, RTU is encouraging innovation on human resources management, revenue streams (digital advertising formats), distribution platforms (social network) and products/content adapted to society demands such as short videos, influencers, interaction and feedback.

Keywords RTU · Ecuador · Television · Marketing · Content · Advertising · COVID-19 · Social media · Communication · E-commerce

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18.1 Introduction

COVID-19 has changed, although presumable for a short time, people's media consumption worldwide. People have switch their preferences regarding the consumption of news, even among individuals who usually remain far from the information [1].

TV became of the one main sources to get information during COVID-19 confinement. During the crisis, traditional broadcasters have increased the demand for news, also on broadcaster's online platforms [2]. This context forced mass media to implement new formula to improve their relationship with audiences. This phenomenon raised the question about how mass media could implement new communication platforms and new media offering into their digital platforms.

In a very competitive context, worldwide broadcasters had no other choice but transform and adapt their contents and distribution formula to people's demand. This case of study will reflect about the linear TV crisis and its transformation into a digital TV and the strategies to implement by limited budget broadcasters. In the pages to come, a first theoretical approach about the post-COVID TV scenario will be given, followed by the methodology, the results regarding the strategies implemented by RTU and the conclusion.

18.1.1 The Content and Advertising on Private Television: The Post-COVID Scenario

Over the top platforms have changed the audiovisual industry [3, 4]. Because of attractive alternatives such as Netflix or Amazon Prime, audiences, especially younger ones, are disconnecting from direct and linear television. Threats must be transformed into opportunities.

For years now, broadcasters have transformed content into "transmedia" narratives screened in different platforms and exploded the collaborative environments the digital sphere offers [5]. Crises are not a new phenomenon.

The pandemic made it evident that the mass media have incorporated the possibilities that digitization offers; television has not been the exception to this change. Television adapted to the new digital reality.

The societal value of broadcasters becomes clear in the pandemic by providing a citizen service. In this regard, the focus was on the updated information and more importantly the self-care and self-responsibility when managing timely and reliable content for citizens [6]. In this scenario, mass media [7]:

1. Worked based on real testimonials
2. Created social awareness about political, economic and social events
3. Produced spaces for reflection and debate.

Additionally, citizenship demand for information and entertainment through alternative screens, televisions faced various challenges such as:

- Creating new unconventional events whether face-to-face or virtual
- Generating authenticity to foster engagement
- Carrying out joint actions at a global level
- Producing assertive and effective communication for consumers.

The pandemic emerged as an opportunity to establish new viable content strategies for connection and feedback between the media and society, in special among the so-called social audiences eager to express opinions and debate in real time [8].

COVID-19 may have accentuated the challenges of TV: Internet proliferation, growing competition and audience fragmentation. Traditional mass media must invest on valuable and interesting content to audiences. However, it comes at a cost.

Advertising is the most employed formula by commercial broadcasters for generating revenue and maintaining the production of content. Since traditional advertising has lost its credibility and audiences, new advertising formulas are necessary in the current context. Advertising need alternatives in which recommendations among consumers have a space. Online media consumption in the pandemic evidences the strength of digital advertising in combination with social networks and citizen interactivity and participation [5].

18.2 Materials and Methods

COVID-19 crisis has affected all sectors and impact consumer behavior [9]. Broadcasters must implement huge changes to create content of interest that attract audiences and to allow e-commerce advertisers to foster sales. This paper goes in the line of previous work regarding the situation of Ecuadorian TV [10] by offering a descriptive and explanatory research about the transformation of the marketing and business model of RTU, the private Ecuadorian television. To sum up, content, distribution (new platforms) and revenue stream (advertising) is analyzed in the context of COVID-19.

In order to understand the situation of Ecuadorian TV is facing nowadays, and in particular the RTU, the research carries out a financial analysis of 2018, 2019 and 2020 by using the Ecuadorian Superintendence of Companies, Securities and Insurance data. In addition, qualitative methodology was applied to determine the strategies implemented by the broadcaster in light of its challenging situation. In-depth interviews with RTU's Managing Director, Financial Director, Human Resources Director and experts allowed the understanding of the process the channel has adopted to innovate information, advertising and human capital. The topics discussed in the interviews were the following: revenue streams, advertising, TV content, social media and human resources. The results only refer to the information provided by the respondents.

18.3 Data Analysis

RTU was created in Quito in 1993. Known as the news channel, RTU committed to support journalism and information to the community and provide continuous support for micro-entrepreneurs and entrepreneurs in the country.

In 2018, the channel proposed new strategies in the digital media to maintain its level of acceptance by its audience. In 2019, the television channel expanded its information borders and consolidated the agreement with cable TV companies. This factor was transcendental for the channel to achieve greater reach at the national level and expand its alliances with companies from different labor sectors. In this context, financial changes are observed in the economic reports submitted to the Superintendence of Companies, Securities and Insurance of Ecuador (Table 18.1).

An increase in current assets is observed in each year of analysis as well as the benefit of the decrease in current liabilities and the increase in long-term liabilities that go parallel with equity. In addition, the management of the company under study has led to a decrease in operational costs in the recent years. COVID-19 stimulated the definitive transformation of the channel. We can observe a difference in the percentage of high loss for the accounting year 2018 and 2020 accounting year.

Table 18.1 RTU's accounting results in 2018, 2019 and 2020 [11–13] in dollars

Accounting	2018	2019	2020
Current assets	1,059,686.17	1,172,587.61	1,160,324.17
Property and equipment,	744,636.80	680,161.83	163,382.80
Other assets	25,504.80	–	62,250.79
Total assets	1,829,827.02	1,852,749.44	1,386,257.76
Current liabilities	321,031.12	1,229,754.44	252,618.50
Long-term liabilities	1,194,707.53	323,244.44	700,000.00
Total liabilities	1,515,738.65	1,552,998.88	952,618.50
Total owners equity	314,088.37	299,750.56	439,628.39
Total net income	879,849.43	1,343,101.94	701,766.20
Operational cost	1,163,573.01	1,364,846.20	701,755.33
Losses	283,723.58	21,744.26	10.87

18.3.1 RTU's Contents

RTU is a generalist broadcaster that promotes informative themes rooted in the current situation that Ecuador and the rest of the world are experiencing since the pandemic. Currently, RTU continues to produce live news of the most representative events that take place at a national and international level. In addition, it generates entertainment and cultural and sports content.

News coverage is highly accepted in the Sierra region. Currently, audiences have been extended to other regions of the country with which there is a direct connection due to the alliance with TV Cable.

Thanks to its long history in the market, RTU establishes itself as a broadcaster that generates confidence in the audience. The Director of Human Resources adds that it is important for the channel to continue promoting its own content for television and that digital platforms become a complement to all this work carried out over 16 years. Although RTU targets adults (+30 years old), digital strategies on social networks provided greater acceptance and consumption among youngers between 18 and 25 years old. This audience generates feedback and suggestions on the contents of relevance [12].

RTU currently produces short audiovisual content broadcasted on different social networks. First-hand on live information has priority. In this context, the channel manages its digital marketing through the website, apps (Fig. 18.2), social networks and the help of hosts that become influencers and create brand image (Fig. 18.3).

There is a constant marketing research. The company maintains the consumer under study. Social networks align its new business strategy, covering a wide age range of audiences in special its young followers. In 2020, a new process of production of rapid and real-time content begins on digital platforms such as Facebook. RTU began to promote the transmission of its most representative programs through Facebook Live, which allowed greater acceptance, rating and followers on different social networks.

Nowadays, the channel broadcasts its content through different social networks. This allows consumers to watch what they want. There is room for individual preference. In addition, RTU already has apps for Android and Apple and can be found as "Canal RTU" where real-time TV programming is screened. To date, this initiative has positive comments. Other tools that have been promoted during this time involve multimedia, interactivity, feedback and transmedia content that make the digital media of the RTU channel a space with greater innovation and greater acceptance by the public.

The last social network that is included in this new digital world is TikTok, on which informative content is being promoted by communication professionals. RTU's TikTok account creates video content with the use of music, special filters, and visual effects that attract young people attention. The @canalrtuec account, which has 52.1 K followers nowadays, offers a multiple type of short video news coverage from news to reportages and news analysis (Fig. 18.1).

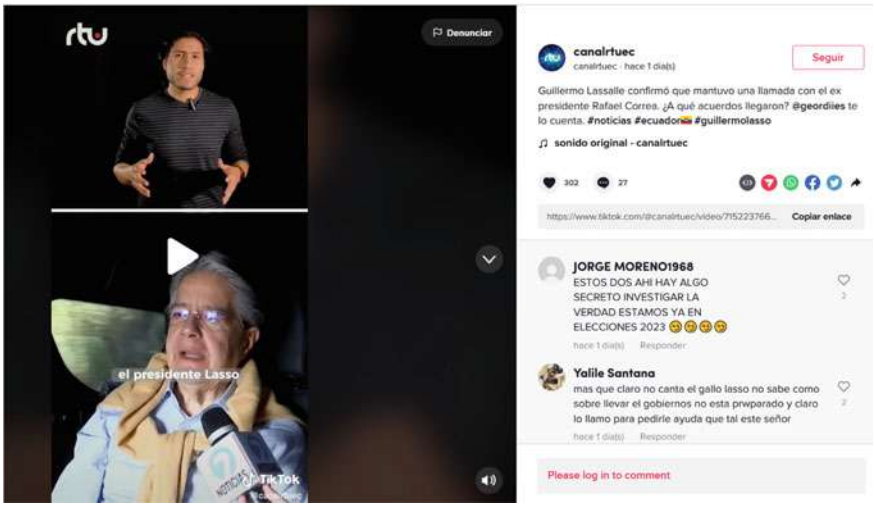


Fig. 18.1 RTU's TikTok account. *Source* Canalrtuec



Fig. 18.2 RTU's website. *Source* https://canalrtu.tv/envivo/

Currently, the company works with community managers that try to generate interaction with people of with similar interests and to create an experience and generate engagement [11]. With digital media, the channel aligns the offering to the demands of society. This way, it disseminates the most representative and important news.



Fig. 18.3 RTU's TikTok account. *Source* Canalrtuec

18.3.2 RTU's Advertising

In the XXI century, digital platforms become a strategical ally for the expansion of businesses and enterprises. Individuals access on live social networks to express their different opinions and interests about the information they consume. This enhances advertising strategies. All the content is produced in the country; this measure allows RTU to invest advertising benefits on their own production. Revenue stream comes from traditional and digital advertising.

Since its inception, RTU promotes Ecuadorian entrepreneurs at the national level. The company works with different types of clients. Small and medium-sized companies that invest on advertising and large companies depend on TV to become popular among the population. However, COVID-19 changed the way advertising was offered. Due to entrepreneur economic losses, RTU maintained their support through alliances with companies at more accessible costs and affordable advertising agreements. Since the digital media offers ad formats that are more attractive to advertisers, an effort to make new clients was also made since 2020.

Traditional advertising formats such as teleshopping were affected by the pandemic. Therefore, the last two years there was a decrease in advertising revenue. In this context, social media is key. Content on social networks fosters digital advertising formats. Live programs, such as live on the website (Fig. 18.2), are meant to promote products and sales by the use of live calls, contests, promotions and real-time publications on social networks.

The percentage of sales is measured through traditional advertising 50%; digital advertising 30%; sponsored advertising 20%; product placement during live program broadcasts 10%; live broadcasts and promotion of products or services 20%; and TV hosts as the image of national companies 25%.

As advertising investment increases, a new growth opportunity arises for the television company that now not only presents content nationally but also can connect globally and exchange information immediately with different places. Likewise, in this new digital market, there is a commitment to create innovative content that contributes significantly to its clients and to the community.

RTU achieved new strategic alliances with product and service companies for the generation of the e-commerce business model, which consists of online commerce. For this purpose, the community manager is in charge of generating stories, posting and interviews on social networks and offering advertisers' links of so that consumers can purchase products in real time.

RTU wants TV hosts to become influencers (Fig. 18.3). The activity in their personal social networks allows them to acquire additional profits if they promote channel's advertisers. RTU trains their hosts in order to maximize this initiative. As a result, the channel is also becoming stronger on Tik Tok.

18.3.3 RTU's Human Resources

Human capital is focused on working for the benefit of the company and fostering the committed to delivering quality information to the public. However, because of the last two years situation, the national private company RTU has restructure its human resources to guarantee the broadcaster continuity. It has reduced their employees in a 50%. In addition, employees received digital training to guarantee the channel competitiveness. All those who are part of the channel work as a team seeking to maintain and internationalize the channel. RTU continues to accept internships so that students learn about the new media strategies and take advantage of technology for the dissemination of information content.

In this new scenario, internal communication is improving. Prior to COVID-19, RTU's team gather once a week to evaluate information's level of acceptance. Nowadays, meetings are more often in order to promote new content strategies that adapt to audiences on social media and linear TV. Direct feedback between managers and employees is being encouraged. This way, the broadcaster fosters employees' contact with the different departments of the organization and benefits from synergies that align with new strategies in favor of business objectives. After two years of challenges, the channel committed to new value proposition to manage employees, the adoption of a much closer and family culture.

18.4 Conclusions

The pandemic emerges as an opportunity to establish new content strategies for connection and feedback between the media and society. RTU focuses on providing informative content of interest on digital platforms. This initiative allows the channel

to connect to new and young audiences. This is also beneficial for incorporating new advertising formulas. Traditional advertising has lost its credibility. Adopting alternatives that explode digital context and participation among consumers is necessary.

RTU advertising formats aim to promote products or services live. In this regard, social networks complement linear TV as advertising platform. Calls, contests, promotions and real-time publications on social networks make possible for small of big advertisers to increase their sales. Live programs foster purchases from the audience who can make orders in various ways.

COVID-19 forced RTU to rethink the objectives and strategies that connect human capital with the new digital platforms and thereby connect directly to the needs of consumers. The adoption of new organizational culture seeks to improve the company. Teamwork is key. Also training of all human capital regarding news and entertainment content trends and new platforms to distribute. For this reason, RTU promotes spaces for learning and feedback among all members.

RTU's current objectives are to strengthen social networks. Community managers are in charge of generating information for the different platforms in which news, advertising and entertainment are broadcast. The initiative also ensures TV hosts to become influencers that attract potential audiences and retain the existing ones.

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Chapter 19
Netflix: Comparison of the Impact of Social Media Content on Social Media Engagement Behaviour Between Followers of the Series and the Platform

Camila Rumaldo-Calderón, Yerko Tupayachi-Torres, and Manuel Luis Lodeiros-Zubiria

Abstract Brands have identified an opportunity to develop Social Media Engagement Behaviour (SMEB) in their users through Social Media Content (SMC) tools within social networks, such as Facebook. However, they fail to understand whether users are really engaged with them or with their products, especially if both scenarios have their own identities in social networks and different followers. The present research compares the SMEB generated in both scenarios, contrasting the followers of Netflix on Facebook and the official pages of its series. Data were collected by applying two online surveys to 284 users. Subsequently, they were analysed through the PLS-SEM multivariate analysis method based on a second-order construct. The study concludes that the SMEB found in users who follow Netflix's fan page as a brand is higher than that of its series on Facebook, thus revealing a predominance of preference, in terms of content on social networks, for the brand over the product.

Keywords Social Media Content · Social Media Engagement Behaviour · Netflix · Series · Content marketing

19.1 Introduction

Investment in streaming or over-the-top (OTT) services has grown exponentially in recent years [1] with the USA being the industry leader with more than 200 companies offering these services [2], although the industry is actually led by companies such as Netflix, Amazon Prime Video, Hulu and Disney+ [3].

An important part of the success of these platforms has been the way they communicate and relate to their users by achieving the integration of online and offline experiences with brands [4] and creating relevant content [5], being the most demanded,

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series, films and TV programs [6]. In this sense, one of the keys has been the implementation of promotion and positioning strategies [7], which allow digital platforms to change the forms of relationship and interaction of consumers towards brands [8] enabling their target audience to go from being mere observers to active participants [9] which allows engagement [10].

Social networks have become the main platform for brands to interact [11] and generate engagement with their consumers [12–14] by providing relevant content [15] on social networks [8] that get customers to interact with them and contribute in their dissemination and advocacy [16].

Regarding engagement, this can be understood as those behaviours that the customer has with the brand, which go beyond the purchase of the product [17], where brands should also predefine what type of Customer Engagement Behaviour they want to obtain from their customers through the generated content [18], since as it is known, this can vary [19].

Its research aims to contribute to an academic research priority in marketing and the social sciences in general [20]. In the particular case of the present research, the study of engagement is focused on its generation through social networks called Social Media Engagement Behaviour (SMEB) [21] under the view that brands create content that motivates users to be engaged [22] since as is known, there is a relationship between the types and variables of content generated on social networks with the type of response or engagement behaviour of users [21]. Specifically, this research goes beyond previous studies, as it aims to compare whether the Social Media Content (SMC) created by Netflix on its corporate page and the SMC created, also by Netflix, on the Facebook pages of its own series, generate different SMEB in their followers [23]. This article is structured as follows. First of all, it contains an introduction. Then a literature review and hypothesises are based. The third section includes the methodology. Then the results and the discussion are developed.

19.2 Materials

19.2.1 Social Media Content (SMC)

Companies create different contents to attract or retain users [24], SMC being the main element to achieve a successful digital marketing [25]. These contents, which are expressed in different forms such as photos, videos, and texts [26] can be classified into informative content, entertaining content and relational content [27] being rational or emotional in nature [22].

Posts with informative content are characterised by being rational in nature [28], as they aim to communicate functional characters about a brand, product, or service relevant to users [29], such as general product information, product mentions, events, or information about product availability [22], motivating users to interact with the

brand and facilitating engagement [30], which generates one of the highest possible benefits for a brand's online communities [31].

Regarding entertaining posts, these seek to be fun for users [21] and to be perceived as expressive in their communication [32], appealing to their emotional side [22] to generate greater interaction, attention and a better digital experience [33] to achieve greater engagement [34]. It should be noted that these contents often influence brands' online communities [35] through memes, colloquial jargon, images with celebrities or post descriptions with emoticons and/or interesting images linked to the brand that generate fun facts [22].

While relational posts may be similar to entertaining posts [29], since both appeal to emotions by using posts that encourage activities among users [22], it is worth highlighting that relational content focuses on attracting users to brands [36] by fostering users' social and psychological integration satisfaction through content generated by brands in social, by filling the need to gain a place of belonging in communities related to them [34].

19.2.2 Social Media Engagement Behaviour (SMEB)

The SMEB is behavioural manifestations that users externalise in social networks, generated by motivations commonly represented through participations and interactions [8] that can be seen not only by brands, but by other users within the same online space [19] and generate a link between brands and consumers [34] and finally increase the purchase behaviour [37].

Within the SMEB typology, co-creation is the highest and most beneficial level for a brand [22] as users increasingly seek to exert their influence on every aspect of the brands they follow [38] through the creation of content related to the brand and other members to the brand [21] such as creating stories, comments or content that reflect interactive behaviours that facilitate people's learning about brands [39] with the aim of manifesting their creativity and expressing their opinion or ideas about a brand [49].

On the other hand, contribution, another SMEB typology, is defined as sets of moderate, positive and active behaviours, characterised by contributing to the diffusion of a brand in social networks [22], which can be generated between user and brand as user-user about the brand [31], due to users leaving their role as "observers" and becoming "collaborators" [41].

Meanwhile, the consumption typology corresponds to the minimum positive and passive level, since users consume the content generated by brands [21], limiting themselves to using social networks with the sole intention of obtaining some benefit from the information provided, without any form of participation and interaction with it [42]. This type of behaviour is evidenced by actions such as reading posts and viewing images or videos about a brand [43].

Also, recent literature demonstrates the existence of a significant influence on outcome analysis when contrasting different contexts in social networks [44],

including other countries [45] and cultures [46]. Moreover, some research confirmed how the SMC is directly related to engagement behaviour [47], impacting brand health [35, 48], using different social media platforms such as LinkedIn [49], Facebook [50] or Instagram [51]. Moreover, previous findings conclude that the source of the Social Media Content influences users' behaviour to a variety of engagements [52], willingness to share recommendations [53], purchase intention, and eWOM [23]. Furthermore, the relationship between social media engagement and firm content was supported in the media industry [54]. Based on the above, two hypotheses are formulated.

Hypothesis 1—H1. The Social Media Content generated by Netflix's official Facebook page has a positive influence on the Social Media Engagement Behaviour.

Hypothesis 2—H2. The Social Media Content generated by the official pages of the Netflix series on Facebook has a positive influence on the Social Media Engagement Behaviour.

19.3 Methodology

To validate the research hypotheses, data collection was carried out through two online surveys, using two self-administered online questionnaires for one month in the second half of 2021. The study population was composed of Netflix subscribers in Peru who follow Netflix's official Facebook or any of the different official Facebook of the Netflix series. Facebook was chosen because it is the social network where people usually search, share, and recommend content about series and streaming platforms [55]. Data was collected through rigorous ethical protocols to guarantee the respondents' anonymity and the answers' reliability. Furthermore, a filter question in each questionnaire was used to ensure that only followers of the official Netflix Facebook page or the official Facebook pages of the Netflix series answered the surveys. The convenience sample (non-probabilistic sampling procedure) for the present study was 284 people in total. 122 users in the sample indicated that they followed the official Netflix Facebook—Sample 1, while 162 people said they followed the official Facebook of Netflix series—Sample 2. The results of an independent t-test confirmed that the sample characteristics of both samples were similar. The questionnaires were divided into two sections. In the first section, demographic data from the followers as gender and age was collected. In sample 1, 45% of the respondents were male, 55% were female, and 92% were under 35 years old. In sample 2, 99.4% of the respondents were under 35 years old, 56% were female, and 44% were males.

Surveys were conducted online because many people can be accessed at a low investment, response time is shorter, survey length is more accurately addressed, and there is great flexibility and efficiency in management [56].

In the second part, two scales were constructed based on previous research. The first was used to assess the constructs in Netflix's official Facebook followers (Sample 1). In contrast, the second instrument was used to collect responses from official

Facebook followers of the Netflix series (Sample 2). The scales used to measure the variables came from previous literature, adapting scales other authors had already tested in previous studies. These scales were written in English, so they were translated into Spanish so that they could be applied to the study population. All the items in the questionnaire were questions based on a Likert scale from 1 to 5 (1 being totally disagree and 5 totally agree). The scales were pretexted to confirm that the items were correct and only minor corrections were made. The pre-test sample was 15 respondents.

The multidimensional scale of Vale and Fernandes [34] and Schivinski et al. [43] was adapted to measure Social Media Engagement Behaviour (SMEB), based on the dimensions of consumption (four items), contribution (four items), co-creation (four items) validated by Schivinski et al. [41]. Also, the dimensions of entertaining (one item) and informative (one item) content types, originally designed by McQuail [34], were adapted from Vale and Fernandes [57]. One item was taken from Azar et al. [36] on entertaining content, which was adapted from Shu and Chuang [58]. The Fernandes and Castro [42] scale was used to measure the dimensions of informative content (two items) and entertaining content (one item); these were previously adopted by Baldus et al. [59] and Gummerus et al. [51]. Similarly, the approach in De Vries et al. [61] was used with the dimensions of informative content (one item) and entertaining content (one item) based on Muntinga et al. [31]. Relational content was measured employing the three-item multidimensional scale proposed by Helme-Guizon and Magnoni [62], which was adapted from Allen and Meyer [63].

For the present investigation, a PLS-SEM analysis was performed using the SmartPLS 3 tool [64]. Due to the ability to analyse highly complex, multivariate models with many indicators, in addition to its great statistical scope, PLS-SEM is positioned as the appropriate method for the analysis of social networks [65].

Considering that the two study constructs are multidimensional, since the independent variable (SMC) is formed by the dimensions of informational content (IC), entertaining content (EC) and relational content (RC) and the dependent variable (SMEB) by the dimensions of co-creation (CC), consumption (CS) and contribution (CTR), a second-order analysis was carried out, where the indicators of the first-order latent variables were used to construct the variables SMC and SMEB [66], both of second order. SMC and SMBE being multidimensional variables of reflective character, the model validation was done in three steps, the measurement model of lower-order reflective constructs, the measurement model of higher-order reflective constructs and structural model assessment [67].

19.4 Results

The PLS-SEM results were evaluated according to the embedded two-stage approach of hierarchical models with Mode A [67]. Likewise, two different samples were used on the structural model; these differ only in the approach of the independent variable. Sample 1 focused on content generated by Netflix's official Facebook page,

while Sample 2 focused on content generated by the official Facebook pages of the respondents' favourite Netflix series.

The first step followed was to check the measurement model of lower-order reflective constructs [68], for which Cronbach's Alpha (α), Rho_A, composite reliability and the convergent validity (AVE) were calculated. Analysing the results of the composite reliability assessment [69], the IC, EC, RC, CTR, CC, and CS constructs were used for Sample 1—Netflix (Table 19.1) and Sample 2—Series (Table 19.2). The results of the analysis showed that both constructs and samples satisfactorily reached the level of composite reliability, given that they are within an acceptable range between 0.70 and 0.95 [70]. Continuing with the reliability test, Cronbach's Alpha, of both samples (1 and 2), yielded values between 0.80 and 0.89, being considered acceptable, because an Alpha value between 0.7 and 0.9 is a good internal consistency [65, 67]. Regarding convergent validity, for both samples, the IC, EC, RC, CTR, CC, and CS constructs were used. The AVE values are above 0.5, which indicates a convergent validity, by exceeding 50% of the variation of its elements [67].

Finally, the discriminant validity results were analysed using the HTMT criterion, which shows that the values are below the established threshold [71, 72].

The second step was the measurement model of high-order reflective constructs. The analysis results indicate that the reflective measurement model meets the relevant criteria required for both samples. The model was built, initially, based on the analysis of the factor loadings of the indicators related to each of the dimensions in order to assess the reliability of the internal consistency of the latent variables, and subsequently, the causality between the exogenous and endogenous constructs to test the hypotheses raised [73]. Regarding the external loads, Sample 1 (Fig. 19.1) obtained external loads between 0.810 and 0.925, while Sample 2 (Fig. 19.2) obtained external loads between 0.785 and 0.897.

Both samples obtained results above the threshold of 0.7, which reveals that the indicators show a satisfactory level of reliability [67, 68]. The next step is the internal consistency reliability; first of all, following the results of the composite reliability assessment [69], the SMC and SMEB constructs were used for both samples. Sample 1 showed the values of 0.915 and 0.899, respectively, while Sample 2, the values of 0.884 and 0.875. These results represent the degree of satisfaction in the level of reliability with respect to the composite reliability, since they are in the satisfactory range of between 0.70 and 0.95 [66, 73]. Likewise, continuing with the internal consistency reliability test, both samples (1 and 2) were subjected to the Cronbach's Alpha test, whose results were found to be within the range of 0.785 and 0.861, which is considered acceptable, since an Alpha value between 0.7 and 0.9 indicates good internal consistency [74]. For the elaboration of the convergent validity, both samples used the SMC and SMEB constructs, as a result, the corresponding AVE values of Sample 1 were 0.717 and 0.700, respectively, while for Sample 2, they were 0.783 and 0.749. These results are above 0.5, which indicates that there is a convergent validity, since both constructs show more than 50% of the variation of their elements [65, 70, 73] (see Table 19.1).

Table 19.1 Reliability and validity statistics—high-order reflective constructs

	Cronbach's α	Rho_A	Composite Reliability	Average variance extracted (AVE)
$SMC_{Netflix}$	0.861	0.873	0.915	0.783
$SMEB_{Netflix}$	0.833	0.860	0.899	0.749
SMC_{Series}	0.802	0.804	0.884	0.717
$SMEB_{Series}$	0.833	0.799	0.875	0.700

Accordingly, the discriminant validity was worked through the HTMT criterion; for this, the different indicators of the research model were grouped, thus applying a second order for both samples. In this way, Sample 1 obtained a value of 0.890, while Sample 2 obtained one of 0.836. With these results, the discriminant validity reaches a suitable level of satisfaction, since it has not exceeded the threshold of 0.90 [71] (see Table 19.2).

Subsequently, the development of criteria for the structural model was preceded with. Regarding the collinearity of the model, the PLS-SEM analysis had the results by means of the quotient of the variance of this or VIF. Sample 1 obtained values within a range of 1865 and 2798, while Sample 2 obtained values between 1401 and 2369. As a result, it is concluded that the levels of collinearity of the indicators of the research model are not critical, since they are below 5 [65, 71, 73]. Continuing with the evaluation of R^2, the SMEB dependent variable of the research model was submitted in both samples (1 and 2). Sample 1 obtained an R^2 of 0.595 in its dependent variable, while Sample 2 obtained an R^2 of 0.450. According to these results, the proportion of the variation of the dependent variable SMEB, explained by its independent variable SMC, can be considered moderate [70, 71, 75] (see Figs. 19.1 and 19.2).

Afterwards, the data was subjected to a Bootstrapping of 5000 samples, without the option to change the sign, Bootstrapping confidence interval (BCa), with a significance level of 0.001. The results of each sample validate hypotheses H1 and H2,

Table 19.2 HTMT criterion—high-order reflective constructs

	$SMC_{Netflix}$	$SMEB_{Netflix}$	SMC_{Series}	$SMEB_{Series}$
$SMC_{Netflix}$	0.890		0.836	
$SMEB_{Netflix}$				
SMC_{Series}				
$SMEB_{Series}$				

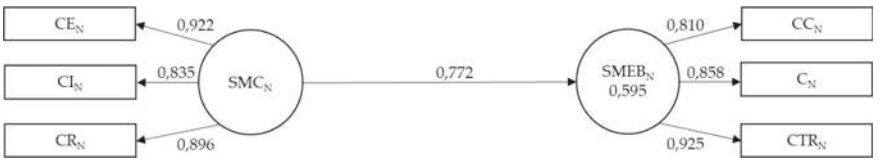


Fig. 19.1 Results of the PLS-SEM of sample 1. Followers of the official Netflix page



Fig. 19.2 Results of the PLS-SEM of sample 2. Followers of the official pages of Netflix series

Table 19.3 Standardised path coefficients, R^2 and hypothesis testing

Hypothesis	Path coefficient (β)	R^2	T-value	ρ-value	Hypothesis check
H1. $SMC_{NETFLIX} \rightarrow SMEB_{NETFLIX}$	0.772	0.595	20.035	0.000*	Yes
H2. $SMC_{SERIES} \rightarrow SMEB_{SERIES}$	0.671	0.450	15.583	0.000*	Yes

*$p < 0.001$

proving that both samples comply with a value less than 0.001 because they have a p-value (ρ-value) of 0.000 (see Table 19.3). The H1—$SMC_{NETFLIX} \rightarrow SMEB_{NETFLIX}$ had a β of 0.772. Meanwhile, the H2, that analysed the relationship of $SMC_{SERIES} \rightarrow SME_{BSERIES}$ showed a β of 0.671 (see Table 19.3).

The next step was to establish the effects of f^2 for both samples; Sample 1 obtained an f^2 of 1.472, while Sample 2 obtained an f^2 of 0.818. These values indicate that there is a higher effect of the latent exogenous variable, since the value is well above 0.35 [76]. Regarding the evaluation of Q^2, the dependent variable SMEB was subjected to this test in both samples (1 and 2). Sample 1 obtained a Q^2 of 0.427 in its dependent variable, while Sample 2 obtained a Q^2 of 0.304; these results indicate that the prediction accuracy of the model is acceptable, since the values are greater than zero [65, 67, 71].

19.5 Discussion

This research shows several contributions to the research framework on consumer behaviour in the context of social networks, as suggested by previous research from Cao et al., Creevey et al., Dolan et al., Schivinski et al., Vale and Fernandes [22, 77], but on this occasion, a reliable entertainment technology company such as Netflix has been taken as the main context within a growing industry which is highly valued by users such as video streaming. The first contribution of the study has been the comparison that the impact of the SMC on the SMEB, analysing two types of followers of the same company, is different; unlike previous research that evaluated the possible causes and consequences of the impact of the SMC on the SMEB in other industries [8, 34], this research has addressed the importance of the context in social networks

in a new way, since the comparison of the SMEB achieved through the SMC of the products, in this case, the series, was made against that obtained by the company, Netflix. The first group of followers evaluated is made up of followers of Netflix series fan pages, while the second group is made up of followers of the official Netflix page; the study was carried out on Face-book. The second contribution refers to the verification that, indeed, the SMEB is different depending on the entity that generates the content. According to the results of this research, there is a greater impact of the SMC on the SMEB in users who interact with the official Netflix page on Facebook, than in those users who follow the content of their favourite Netflix series. Taking into account that both the SMC of the series pages and the official page itself are created by Netflix, it could be deduced that users prioritise the general and diverse content created by Netflix as a brand, over the content created for one of its series in particular, probably because users value Netflix's SMC as a whole and not in a specific way when creating SMEBs.

This is an important finding because although some Netflix series are top-rated, the research results show that the content created by Netflix on its official fan page is more effective in getting followers to generate SMEB. This may be due to the fact that although some of the series become very popular, their popularity is limited to brief periods of time [78], commonly coinciding with the time that elapses from the launch of the new chapters until the followers watch the entire season, which makes it challenging to generate SMEB with the series in the long run. On the contrary, the results allow us to affirm that the constant generation of digital content on Facebook by Netflix makes its followers more predisposed to generate SMEB, sharing, cocreating, or consuming the content offered by Netflix on its official Facebook fan page. This may be because content consumption on streaming platforms, such as Netflix, is not limited to a single series; on the contrary, the subscribers of these platforms seek extensive and varied content, which is constantly renewed. This statement is especially true of users who generate SMEB since they are heavy users of Netflix in most cases.

Furthermore, the research also supposes a methodological contribution to the study of said variables [67] since the research proposal was analysed as a second order since both constructs were multidimensional, contrary to the previous researches where the dimensions of SMEB and SMC were considered constructs and studied as a first PLS-SEM.

Also, the results have straightforward practical implications for companies that offer streaming services, such as Netflix. As verified in the results, there is a clear relationship between SMC and SMEB. This implies that the strategies carried out by Netflix through social networks, specifically Facebook, are effective in getting users to be willing to create content, share information or consume it. As is known, nowadays, getting users to generate SMEBs is crucial for companies in general since achieving engagement increases the profitability of companies [79] and the purchase intention, mainly because users share their resources selflessly with the company, in the specific case of this investigation, with Netflix. At the same time, the results allow us to corroborate the importance for Netflix to frequently generate informative content while entertaining the followers and fostering relationships. This

implies that the SMEB is not generated spontaneously; on the contrary, Netflix users react to digital marketing actions on social networks through the SMC. It should be noted that these findings allow companies that offer streaming services to understand how to optimise their digital content strategies by demonstrating the close relationship between SMC and SMEB [80], which can undoubtedly be of great help in an increasingly competitive environment and with smaller marketing budgets.

It is also worth noting that this research clarifies the debate on whether it is more important to have one or two high-impact series or, on the contrary, Netflix users prefer vast and diverse content to view. The results allow us to understand that although SMEB can be achieved through SMC strategies in the official fan pages of the most popular Netflix series, it is undoubtedly more effective to implement SMC strategies on the official Netflix fan page promoting the full content of the streaming platform. In this sense, it can be affirmed that the users of a streaming platform are willing to generate SMEB and share their resources. Still, for this, platforms such as Netflix must have an immense catalogue of series and programs that allow them to create informative, entertaining content with the ability to go viral and reinforce brand equity.

The present investigation has a series of limitations, which can be corrected in future investigations. In the first place, the information gathering of the study was carried out clearly in Peru, which, although correct, limits the extrapolation of the findings to other realities; in this sense, the research could be replicated in other South American countries in order to universalise the results. Second, the research focused on the most important streaming brand, Netflix, but it is suggested that other researchers expand the number of streaming platforms, as it would serve to obtain a broader view of the impact of SMC and SMEB on the context of companies capable of producing high-value audio-visual content for users in general. In third place, it would be significant to expand the range of social networks of the study because, currently, digital platforms such as Instagram, TikTok, or the future web 3.0 [81], are becoming more popular than Facebook, and SMC and SMEB are likely to be produced differently. Furthermore, the expansion of the complexity of the model with variables related to the content generation strategy is suggested, such as the time or day the content was published, since it could generate interesting results on engagement behaviour [22]. Likewise, the expansion of the research with more current measurement instruments in the context of social networks and the digital field, in general, is suggested [41], such as Big Data or the blockchain. Finally, studying the role of influencers in the generation of Social Media Content can be considered a future research priority.

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Chapter 20
Organizational Communication: How to Engage Internal Communication in a B2B Case Study



Helena Madeira, Amélia Brandão, and Jorge Remondes

Abstract Organizations need to evaluate and improve internal communication process to keep and leverage employee engagement. This investigation aims to understand the internal communication effectiveness in a B2B context. A qualitative approach was adopted, with semi-structured interviews targeting employees from different countries of an automotive B2B multinational company. The results enhance the consensus of the importance of internal communication to create employee brand engagement. Moreover, this research highlights how does employee engagement is related with employee branding. So, a conceptual organizational communication funnel framework model was developed. The focus was on (1) employee communication needs, (2) data-driven information, (3) transparent information to employees, and (4) new channel to improve employee engagement. Thus, concrete actions were suggested for managers to improve the communication effectiveness in an integrated and blended solutions. This paper is relevant for academia since it expands the knowledge on internal communication in the complex B2B market.

Keywords Internal communication effectiveness · Employee engagement · Employ brand · B2B case study · Digital internal communication · Internal communication funnel

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20.1 Introduction

Internal communication plays a crucial role in any Company, with the aim of enhancing the alignment between the Company and the Employee [23] and increasing this relationship. This allows all to be informed and connected, aligned with Company strategy, vision, and mission using a transparent communication as an important variable which increases employees' involvement [14, 73].

Main objective of this paper is to understand the internal communication effectiveness in a automotive industry B2B considering both the online and offline channels and how the choice of channels affects the internal communication satisfaction on people engagement [70]. Then, for the proposed case study investigation, answers will be based on qualitative methodology, by observation, listen employees, semi-structured interviews, for the two questions:

Q1 How internal communication generates employee engagement?

Q2 How does employee engagement create employee brand?

To the best of authors' knowledge, there is no previous research that compares and studies in simultaneous, internal communication, implementation of online internal communication, and employee engagement. So, the topic of organization communication and communication automation remains in its infancy [19]. Exploring engagement and employees' emotions at the individual and collective level per country may vary in same country or country per country [13]. Moreover, there is lack of literature using qualitative methodology (Bohnenberger et al.) [17]. Additionally, qualitative methodology allows to obtain a richer understanding of an ongoing phenomenon. It is important to understand how to engage internal communication in a B2B case perspective. For those reasons, this study will be qualitative.

20.2 Literature Review

The role of internal communication has expanded, in the last decades, so that it now tends to be bottom-up through feedback and inputs collected from employees. The role of understanding intangible organizational asset is linked to higher levels of performance and services, generating social capital grounded on company relationship [59]. Organizational management recognized the importance of internal communication since decades. However, the employees' perspective was very scarce, instead of the management one to reach what they prefer in terms of content and channels [59].

To get close to new generations, new information categories appear, as Internal *Megaphones and Scouting*, employees' involvement, and co-creation [15, 45]. So, it is becoming critical to be aware of WHO needs to know, HOW much of WHAT, and how can we spread or facilitate knowledge sharing to became a facilitator active in a key process [26]. A flexible organizational structure that supports knowledge sharing

in one or more channels creates a better work quality and employee's satisfaction [68].

All efficient methods are based on trust to have feedback and the willing to share. The list of tools of internal communication mentioned was enlarged with instant messaging, intranet, written communication, and web conferences replaced video conferences, social media, intranet, e-mails, meetings, face to face, or virtual [1].

Social media drives engagement by improving the flow of communication, accelerating internal processes, and facilitating collaboration. Previous research grouped digital channels into six areas: instant messaging, enterprise social media, electronic media, intranet-based knowledge and performance management, streaming, and online profiles [1, 37].

Sharing information and channels are vital for accelerating internal communication effectiveness, as internal communication is a positive consequence of such more practical changes, transparency data, decision-making, higher engagement of employees, all of which lead to more productive work, reachable and precious content, and the employee informed promote less risk of failure and losses during the change processes [37]. Hence, based on the research, it seems that sharing information and channel are vital for accelerating internal communication effectiveness.

20.2.1 Communication Effectiveness

Effective internal communication is a prerequisite for organization success, aligning the content as well as channel in use for transparent process in crisis management and normal business [47]. Or change processes, ensuring correct and essential info is being shared at the right time by the proper channels. The challenge of this effectiveness depends on their ability to gain trust of internal customer or employees [73].

A good impression of transparency based on relationship quality in organization and its employees is the fact that employees reveal their physical and mental health information as a beneficial for them, e.g., medical center internally or sharing ideas to change or improve a process. A link of how internal communication practice leads to employees' perceived consequences of disclosure in the workplace through, get ideas, implement employee ideas, and feedback these ideas or promote employee ideas [44].

Effectiveness Employee Organization Relationship, emphasized due to positive effect of encouraging their active participation, transparent communication, could decrease perceived risks of disclosure, reinforce perceived benefits of disclosure, and ultimately increase health and new process disclosure intentions [44], and in crisis moment as a rapid change [34, 36].

Building dialogues and promoting mutual understanding inside the Company is the purpose of symmetrical communication aiming to achieve the interest of organizations and stakeholders [44]. Mainly for understanding the Millennial generation and

their behavior, as they desire to engage in the work that values them, and external validation is appreciated, believe that they are making a difference, and because they speak without afraid [43], compared with other generations, promoting genuine behavior.

Employees' communicative behaviors, voluntary communicative efforts to circulate management information, using scouting to share and discuss positive and negative aspects, of the Company with internal customers, by megaphoning, show internal communication effectiveness [44].

20.2.2 Online Internal Communication

Organizations must adapt fast to reach the employees and to be effective. More and more, valuable or critical communication depends upon choosing an adequate message, and sending it in convenient formats to keep employees connected [70].

As digitalization is changing business models from a linear process to a more collaborative, warning, pushing messages, and quizzes, changing the model to their use of new technologies, like the Internet of things, artificial intelligence, and virtual reality [37] which leads to communication online, digitalization in this business case, is the voluntary employee uses of employee application in the smartphone.

All are effective to reach audience, traditional face to face, printed or publications, electronic, social networks, essential that organization manages resources, speed, frequency of update align with employee's needs, in the rights channels and timing [70]. The channel decision, in modern organizations, depends on the culture, size, employee's qualifications, meaning, periodicity. The media richness theory helps to understand the best channel; for example, there is a low level of uncertainty in an email because it allows a large amount of information. Allows feedback and answering to email; nevertheless, timing may be inefficient; opposite, face to face, the rich medium is face-to-face communication which allows communication of complex information because it enables personal focus [51, 70].

Information sharing becomes essential because it is crucial to the organization's success and makes practical collaboration possible. It allows sharing of information with coworkers [61], contributes to innovation processes, builds relations, and social media encourage sharing and participation [40, 42, 46].

Internal communication is assumed to be a powerful, motivational tool in aiding employee buy-in, which leads to employee engagement [45]. Moreover, companies are currently investing in social media both to strengthen their communication with external parties and to utilize social media internally. Internal enterprise social media (ESM) platforms are multidimensional web-based communication tools that allow collaboration and information sharing both throughout organizations and in group settings [42]. Modern organizations can choose from a vast selection of different kinds of communication technologies to be used for their internal communication

[42]. The research illustrates that collaborative communication, using different channels, creates employee engagement and branding as accelerate the process of sharing within Employee community.

20.2.3 Employee Engagement

Previous literature review confirmed that internal communication satisfaction has a significant role in high employee engagement, employee attitude, and behavior [68].

Positive relations bring to extraordinary service, inimitable source of competitive advantage. Essentially, employee's attitudes and behaviors engaged are vital and impact on their outcome, and internal communications help on engaging the workforce getting themselves express physically and emotionally during performance [64].

Employees as internal customer have a relation within a Company. Either employment or partner, who develops an activity within a product or a service with capacity to nurture, maintain, and grow engagement, which requires a two-way relationship between employer employee will be showed by meaning fullness, safety, and availability of work [13, 64].

As part of internal communication, a paradigm of today's organizations exists since if the employee is engaged, it potentiates high performance till burnout [16], reduces absenteeism and turnover, and increases loyalty with Company and with the Customer, energizing himself. However, over-engagement can damage interpersonal interactions. Surveys and feedback are essential to ensure correcting feedback of initiatives and fell atmosphere, as mentioned in Table 20.1. Employees express themselves, and the communication process may help identify the signals via surveys, listening, and oral communication [48].

For some authors, engagement includes emotion and behavior or organization commitment in a long-term perspective. The employee stays in the organization because the desire to stay is an affective commitment, not necessarily an employee engagement [13].

Internal communication elements, including open channels, innovative organizational communication initiatives, constant feedback, and information sharing, have a positive relationship with work engagement. Communication plays a key role in increasing employee engagement [32, 69, 74]. Shaped by internal communication [4].

Engagement has become an essential requirement in services' context, and its effect is more prevalent, [52]. Employee engagement enhances supportive employee communication behaviors and reduces turnover intention [31, 33, 40].

Despite the importance of the relationship between internal communication and employee engagement, the association has not been widely empirically tested [6, 68], however relates to internal communication and with Employee Brand, partially foundation for this perspective case study.

Table 20.1 Employee engagement definition

Author	Definition	Observations
Susan Zeidan [64]	It is a positive attitude the employee holds towards the organization and its values It seems a passion for work, it as a positive, work-related state of mind that vigor, dedication to the job and the organization characterizes	An engaged employee is aware of the business context and works with colleagues to improve job performance for the organization's benefit at the workplace; engages and energizes employees to work overtime and put in additional effort without being asked
Kumar & Pansari, [41]	Define as a multidimensional construct that groups various aspects of employee attitudes and behaviours toward the organization	
Carter & Baghurst [11]	Hat engagement orientation has been accredited with enhancing the organization's performance	
Barnes & Collier [5]	Has been endorsed for its superior predictive power of performance and organizational behaviour	
Schaufeli & Bakker [60]	A positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption	
Fleming & Asplund [20]	The ability to capture the heads, hearts, and souls of your employees to instill an intrinsic desire and passion for excellence	
Saks (2006)	Suggested differentiation between engagement with the job and with the organization. He conceptualized EE as the summation of these two types of engagement	
Kahn [29]	'Employ and express themselves physically, cognitively, and emotionally during role performances. He identified three psychological conditions: meaningfulness, safety, and availability'	

Source Adapt from Chandni & Rahman, [13]; Lee & Li, [44]; Lemon, [45]; Rahman, [58]; Susan Zeidan [64]

20.2.3.1 Employee Brand and Meaning Creation

Branding in internal communication as a concept is still evolving [2, 3]. More and more, employees view themselves as personal brands, and it affects their performance in a positive way (e.g., Engineering, Business Administration, managers, and manufacturing operations that see themselves as artists). Employees need to know the message and feel or incorporate the company brand; creating or sponsoring employer branding is increasingly falling under the umbrella of corporate communications, as listening, giving feedback, creating engaging content and channels, and transversality of the organization helps in decision-making and reporting to CEO. Internal brand equity extends what employees believe in corporate brands and aligns with their interests [70].

Internal brand equity is the extension of what employees believe of corporate brand and align their interest. Employees need to know the message and feel or incorporate the company brand. Nowadays, as demonstrated by the online presence [9], employees view themselves as personal brands, which positively affects their individual performance [39].

Literature suggests a positive relationship between internal communication satisfaction and employee engagement and employer branding, predict satisfactory communication levels within the organization [68], and those affects how communication is perceived, as part of management process.

Active listening offers recognition, promotes dialogue, offers others' points of view, focuses attention, responds appropriately, and provides consideration, creating meaning from shared information [49].

20.3 Methodology Issues

To further our understanding of the importance of Organizational Communication on this research, data were gathered through semi-structured interviews, which is the most common method in qualitative research [66]. It allows add additional information, and there is greater freedom of response for the interviewee. This study comprised 13 individual in-depth interviews with Portuguese Management and Communication Partners, in eight countries that represents four Communication Partners (Poland, Morroco, Tunisia, Ukraine) and Portuguese Operation—Shared Services, five respondents (Portugal, Romania, Japan, France), Technical Center—two respondents, Manufacturing Operations—two respondents. After thirteen interviews, no additional data are being found whereby the research develops properties of the category. Through the interviews, the research topic was explored from the interviewees' point of view, to answer to the "how" and "why" of the perspectives brought to light [12].

20.3.1 Methodology Procedure

This investigation is a descriptive single-case study [25, 27, 78] in the automotive industry that was used to describe a phenomenon and the real-life context in which it occurred and when boundaries between phenomena and contexts are not evident [76]. Specifically, this investigation reports to a Manufacturing, Technical Center, and Shared Services. Hence, real-life instances' phenomena are crucial analysis, in large and geographical distributed organizations, at it enables members to be aware of organizational themes, as well as share and store knowledge to a cross-organizationally accessible platform, [42].

The main reason for selecting this case study was the richness of diversity, complexity, large range of Employees (2.500 in Portugal, 49.000 in Europe), and the actual transformation problematic of the automotive industry itself. Automotive industry is developing to follow the Zonal Architecture, CASE (refers to new areas of "Connected" cars, "Autonomous/Automated" driving, "Shared", and "Electric"), Mobility as a Service (MaaS) and Carbon Neutrality. This demand sharing new information and transform internal perspective as human resources required are technologically more efficient to the semiconductor crisis, Pandemic new habits; new hybrid concept, resources are anywhere and info need to be shared anyway. Portugal team is organized in a Shared service (Headquarters), Technical Service Center, and five production areas that creates a challenge to communication, due to the diversity of resources: technical and soft skills, young and old generations, as old traditional methods and offline.

In this study case, other fonts are available like reports, internal communication, meeting, individual and teams' interview, direct and participant observation, that will enrich the study. These sources require different methodological procedures, and the various sources are complementary, being the most credible study when it is based on several sources [50, 77].

Tools as daily OBEYA (Lean Management, visual meeting room, Japanese) meeting were used for information sharing, identify and ensure information sharing to scouting and megaphones. Then, one focus group was conducted [8]. Moreover, 13 interviews with management were collected to align top-down, ensure info sharing, collect and share information, define contents for News, distribution channels, understand employees' perception about internal communication, create KPI's and measure improvement, streamline and standardize in all European affiliates.

Data collection was started in October 2021 reinforcing the values and the goals, making a movie asking: What is special for you? The process respected twenty people interview, in the context of the celebration of 35 years in Portugal and 20 years of technical service division. After an observation approach started in November 2021 with participation in OBEYA and a corporative values refresh, in December 2021, this research started investigating the channels' communication preferences of different emergent tools and means to enrich the research field. This allows the understanding of the complex perceptions of organizational members [42].

Additionally, a Focus Group was conducted to collect opinions about what they would like to see in MyApp and start Megaphoning and Scouting, group with 8–12 persons. It respects employees selected from different functions' engineering from technical center, production from plant, purchasing from shared service area, and Program Manager functions. The focus group followed a respondent–moderator group identify [28]. In this typology, the moderator asks selected respondents to play the role of moderator temporarily to improve group dynamics. Focus group target was created to define the content and what they would like to see in MyApp and start Megaphoning and Scouting, for that a group of 8–12 persons selected from different functions engineering from the technical center, production from the plant, purchasing from shared service area, and Program Manager functions, and the moderator asks selected respondents to play the role of moderator temporarily to improve group dynamics, which was done in January, for one week, intensively. The focus group was only relevant for the digital application content, and the results revealed that respondents were aligning with interviewers' outcome.

20.3.2 Qualitative Research Respondents

In this research, were applied two sampling methods: the most common in qualitative research, convenience sampling, [56], and the chain sampling method, with the interviewees themselves referring other colleagues [56]. In the process, the first researcher assured the sample diversity: (1) both genders' representation, (2) respondents from all divisions; (3) located in Portugal in the Shared Services or international from other companies (Europe and Africa); (4) different geographic area; and (5) different functions.

This study was done with the Employees, in the case study in analysis, the ambition to Develop People, ensure strong culture on talent management, focus on keep the leader position in the next 10 year on electric and electrical distribution systems, of the Company in analysis focus on teamwork and reinforcing the integrity and trust.

The selection of the target population was strategic, considering their position and profile as better perspective of all subjects in all areas, availability, and potential feedbacks, from the Operations, Technical Center, and Shared Services, male and female, and generations were taken into account. Furthermore, the significant countries in the organization were selected as Portugal, France, Morocco, Tunisia, Romania, Poland, Japan, and Ukraine.

The sample participants were 13 interviews, nine in different areas of Portugal and four in other countries, very important because the change starts in Portugal and will be applied in complete Europe and North Africa.

The representative age per range: 20–31, 5 respondents, 41–40, 4 respondents, 2 with 41–50, and 2 in 51–60 range, and 54% were female, and 46% male, representing in total 192 years' business experience in Automotive.

20.3.3 Saturation Point

In qualitative theory, the concept of saturation is used, reaching this point when the collected ones construct a comprehensive and coherent theory, no longer necessary to collect more information, as from this point there is no new evidence. Sample size depends on this saturation point, "excluding these outliers, most datasets reached saturation between 9 and 17 interviews, with a mean of 12–13 interviews, despite using different approaches to assess saturation" [21, 22, 55, 67].

A recent method was developed to assess and report saturation in the context of inductive thematic analyses, applied to this study. Base size refers to what the minimum number of interviews, that we should review to calculate the amount of information already gained, which is defined in literature is to be between four and six interviews. According to this method, the new information threshold represents the proportion of new information that we should accept as evidence that saturation has been reached: ≤5% new information and no (0%) new information [24].

The saturation ratio was calculated with 2.38%, below ≤5% threshold. At this point, the proportion of new information added by the last run is below ≤5% threshold we established, meaning that the amount of new information is decreasing. Since the last interview did not add substantially to the body of information collected, we can say that saturation point was reached at interview 8, I08. Even though we know that the rate at which new information emerges decreases over time and that the most common and salient themes are generated early. We decided to continue the interviewing process to ensure that new themes emerging later in the data collection process were noticed. To achieve sampling requirements and richness and volume of data and representativeness of professionals of different divisions, used other countries to get more data.

20.3.4 Richness and Volume of Data

The richness, detailed nature, and data volume were also a request [67]. The material collected was considerable and extremely detailed. When a high degree of consensus had begun to emerge among those interviewed, the number was felt to be sufficient to satisfy the aims of this investigation.

20.3.5 Data Collection

The semi-structured interviews focused on the two main topics related to the research questions: internal communication generates employee engagement, and engagement creates employee brand. The interview guide contained several broad, open-ended questions to ascertain that respondents were free to elaborate by using their own

vocabulary [56]. The interview guide was first tested with the first interview members and then revised in terms of sequence and content, according to the feedback received. Respondents were given the choice of having the interview in English or in the respondents' native language. Respondents selection was done by the end of January 2022. The interview data collection ended on March 2022 and was collected via the Teams platform or face-to-face. The interviews lasted on average 133 min and took place in private/online so that interviewees could talk freely and without interruptions. The interviewees signed an informed consent statement after receiving information about the research scope, being guaranteed that the data collected would only be used in the context of the present research. All interviews were audio-recorded, transcribed, and main quotes are translated to English by the researcher.

20.3.6 Data Analysis

The transcripts were subjected to thematic content analysis [38] with NVivo 12. The interview material was carefully reviewed several times by the author, before the analysis was conducted. Notes on the data review process were made to support the analysis. The actual analysis was conducted in a three-step procedure to ensure data condensation, data display, and conclusion drawing/verification [53], reliable classification, and interpretation.

The first step included data preparation to ensure that all transcripts were included in the analysis; the second step comprised data coding. An initial set of hierarchical thematic categories (e.g., tree codes in NVivo) was undertaken. Then, new subordinate categories were added and refined according to findings from iterative readings. The third step involved data examination and interpretation, resulting in final recoding and minor refinements. This three-step approach minimized the bias within the inquiry and authenticated researcher interpretation [62].

20.4 Results and Discussion

Majority of respondents (100%) have a positive opinion about the internal communication, mainly in the last year. Content created is good. However, it should be even faster; offline in the Plants is still required, but decrease the number of off-boards as the increase of LCDs increases, increasing the transparency and availability for all operators. In Portugal, internal communication started in February 2022 by sending News for all payroll e-mails and displaying them in LCD's streaming. The action was done as a consequence of this research. Most refer digitalization is a must for faster process, and to increase the sense of belonging, whole support My Application project. Majority of the respondents ($n = 11$) believe that collaborative behaviors sharing the content have a high impact, and only two respondents refer that is low impact. Same for the expectation of Word of Month, a few ($n = 2$) respondents refer a

negative impact, whereas eleven refer to that as positive, and the majority consider it Ambassadors (100%) channel. In terms of performance, a bit more than a third ($n = 5$) respondents mention that communication has an equal, or no impact on performance, only one mentions low impact, and half mentions high. In terms of quality increase, only two mention low impact, one remains the same or equal, and majority refer that informed employee is high impact on their quality, improving the outcome. Regarding satisfaction, the biggest porting ($n = 12$) is what promotes satisfaction. Any refers to having a set of KPIs dedicated to the communication process. Changing the approach to full online will be easier to measure the quantitative instead of the actual qualitative one. Majority of respondents agree that communication generate employee engagement and that employee engage promotes employee brand or Ambassadors.

To answer to research questions 1—*How internal communication generates employee engagement?* Thus, it is relevant to understand internal communication effectiveness, respondents were able to recall meaning of internal communication and the goal in the Company. When asked about the 13 respondents, all consider communications critical to serve and align values, share objectives, and provide information in the organization, and thus validate Authors' opinion [18, 30, 36, 37, 66, 76].

> Internal communication (IC) is the function responsible for effective communications among participants within an organization. Cool of communication, to send, to transmit the information. This information and these data. Must complete the burps of gold checked if another objective and our goal is to retain the top talents is to develop our employees to motivate them. To see and to understand what they exactly need. Communication is one of the most powerful processes. Employees need communication. I02

Indeed, when requested to answer about effectiveness, the respondents reinforce the ability to gain trust, which is in line with Vokic [73].

> Communication leads that employee "feel" part of the discussion and decision group and he can reflect is perspective and plan in rehearsal to the company. I05

> Transparency is a crucial internal communications practice, promoting trust, accountability, and open dialogue within the organization. I08

Moreover, respondents validate Hudcova [26] on sharing information, that majority of respondents mention that internal communication is a key process:

> Internal communication means transparency, … and feedback. I11

> Transparency is a crucial internal communications practice, promoting trust, accountability, and open dialogue within the organization. Communicating is much more than transmitting data or information. I08

The respondents go even further:

> The company is like a mother to the employees. And it's imagined that the mother does not communicate with its children so. We can achieve nothing without communication. If we eradicate or neglect this aspect which is more natural in the essence than nurture; thus, automatically the employees will feel that the corporate or whatever is the institution is not his/her place". One of the difficulties of our job is to control what others understand from what we want to say and then how they use this information. I03

Efficient internal communication can achieve superior results, influence corporate reputation, create a sense of belonging, and lead to employment engagement, and the respondents are in line with Verghese [71]. All mention absolutely agree with the Author.

> Fully agree, as mentioned before internal communication should illustrate the teamwork and spirit and this is the base for success. I05
>
> The strategy of related to communication. Meant to create belonging …it opted in the denser get the meaning of the it's; or listen to them you are. You like, absorb this, this anger. be a kind of belonging to the team, to the company, to the spirit of this family that we are. I03
>
> Someone that feels that their opinion matters and that they are informed feel that they matter more than just some employee. I09

Identifying valuable and relevant content requires a company to be aware of the informational needs of internal customers (employees), and this clarity is realized through active listening. In practice, listening is performed by collecting Employees' feedback and by social media monitoring in line with Bohnenberger [7]. In addition to listening to employees' interests, a company must also identify and disseminate organizational knowledge to fulfill information to cover their needs, promote dialogue, validate Macnamara [49], and all respondents are in accordance with Author, adding inputs not found yet on literature.

> We should reinforce. Our communication with people develops open people motivation and people improvement, open dialogue, and feedback. This is the goal and that we should aligned with other colleagues and to make the same object. Because if we listen our people and inform them, what they need to know, they will help, they will be supportive, they give ideas how to improve, they will stay with us. …like what information they want. I02

In terms of internal communication being effectively applied in the organization, the answers differ, due to the transformation process, in the case study, which has been improving in the last years; this is new data any Author refers to. However, it is essential to understand how internal communication perception is now. In 13 respondents, only one refers, yes.

> I believe that there is still some fear and lack of understanding on the usefulness of a active communication. I09
>
> One of the executive management's target is to improve communication within all entities and to connect people from different locations or functions all together, around same goal. Internally or externally, company is now very present on people's life, either on social media (for recruitment reasons, marketing their products) or internally (to align everyone around same targets). I06

To continue answer to this question, tried to understand if interactive internal communication and the importance of the channels, all respondents agreed with active and interactive communication process enrich the communication and generate engagement, as voluntary collaboration like informing or forwarding information, mainly in social media in line with Lee, Lee and Li, Kim and Soga [36, 43, 44, 61]. Information obtained via employees' voluntary collaboration is strategic and helps Company's attitude to show innovation and flexibility and enhances organizational

effectiveness; respondents validate this author and add the importance of listening, Employees, reinforcing a sense of belonging, and generating employee engagement.

> Yes, using megaphones and Scouting makes communication easier and does not take time to reach out employees, both take creative post. I02

When asked about sharing information, the case company has tried to overcome this challenge by treating content creation as a joint process and combining expertise from different parts of the organization to find out what is needed, how much, and when in line with Hudcova [26], a clear example of communication creating employee engagement.

> There are no silos, no islands All belong to the "whole"; "Partially, in some instances, internal departments act as silos, leading to a miss opening of communication. I05

> Organization was poorly managed few years ago, no one knew what executive management was doing, or what was company's strategy for future, but in the last 7 months, everyone feels part of company, we know what are the goals and what's the company results. I06

The relation is more clear, when asked about content deployed, timing, quality of the information shared in one or more channels, to promote interaction, respondents' consent as Ana Vercic, that creates a better work quality and productivity increase validating Author Mishra [54], information that is useful for daily life that is disclose, and the challenges that are created to engage all via internal communication providing transparent data, useful and trustable information.

> Now, all employees are aware of our company status quo: Organizational KPI's status, organization updates, Job and Career development news, relevant Environment, Health and Safety news, dedicated events, etc. I11

> "Case studies of colleagues' story in the company, or good lessons, job vacancies, release of new products, Activities towards local community, New Colleagues, promotions, Initiatives to improve operation." (I6) "colleague's parents passed away. refresh company vision and mission statement, policies, magazine, email, meetings, our values challenges." I02

When asked about the channels and methods of information sharing, majority of correspondents refer the list that normally use, in line with Andriole, like email, teams, sharepoint, face to face, LCD's as internal and social media externally. Viber was mentioned in Ukraine; Morroco, Tunisia, Romania, and Ukraine offer a monthly newsletter in paper, and employees are proud to receive and show to family and friends.

> Direct Meetings and e-mails are the most frequently use, social media, boards and offline information, we are trying to digitalize as much as we can to make the information easier and faster to the people. I share on all screens. In reception and Cantine and all screens and production that we have a visit. By email this case not on the microphone. WhatsApp, in the Pandemia to connect with the managers. We can do surveys. Through our surface, listen the people, we can discover or find out the result. We can find out. Weakness. I02

> General conversation can be done by WhatsApp l, for example absent, delay to meeting. I10

Respondents refer two NEW parameters that were not validated on literature review:

– Microphone "is extremely useful, direct and fast, additional channel that was not fount on literature review, consider new or potential research impact." I02

– GEMBA walks, direct interface of a multidisciplinary team, encourage Cross-Departmental Communication and Collaboration, "it's one of the most, powerful ways to encourage employees and to motivate them at production in Gemba. Mornings, when I was passing through the lines, thanks to the communication." I02

When questioned about process of exchange and infrastructure to support knowledge and information sharing, twelve respondents referred that communication is becoming efficiently shared and promotes interaction and communication, in the last year, in accordance with Ana Vercic, Hudcova, Andriole, and Kovaite [1, 26, 68, 74]. However, rapidness is a must. *However, one respondent has a different opinion:*

we have access to a lot of data and information, but that alone is not enough. For an effective communication there must be a transfer of knowledge. This requires an organizational framework based on trust. No silos, no islands. In fact, we have never had so many channels (phone, email, WhatsApp's, Facebook, Instagram, …). It is difficult to understand how we currently have so many resources and we are not satisfied. I08

The findings show that respondents confirmed communication satisfaction which has a significant role in high employee engagement, mostly aligned with Vercic [68], brings a extraordinary service toward the Customer, a competitive advantage due to employees' attitude as Susan opinion [64, 72], and reduces turnover [40].

All respondents agree that internal communication helps on engaging the workforce, reinforce a positive attitude, retain people, and engage as:

Internal Communication makes them more informed so build their engagement. I12

Internal communication means transparency, engagement and feedback. I11

Majority of the respondents are in consensus, as internal communication provides transparency, trust and alignment, feedback, when asked about the internal communications create employee engagement. Internal communication has a significant role on Employee engagement act on head, heart, and soul creating passion, trust, and commitment. Serving highest quality standards, performance and productivity increase toward customer and employer.

Regarding the research question 2, *How does employee engagement create employee brand?*

Respondent's answers validate the opinion of the following Authors: Kang and Sung [33, 32], Verčič [70], and Walden et al. [75], shaped by internal communication as Bakker opinion [4]. Two respondents confirm Carter and Kumar [5, 11, 41] opinion, as they connect the results of employee engagement toward the organization performance:

All performance indicators are linked with "employee engagement". Without this commitment it will not be possible to obtain good results. Let's say that the traditional performance indicators such as Quality, Productivity, Satisfaction, Work accidents, absenteeism … are the result/effect of the biggest factor of influence that is the employee engagement. Knowing how to communicate effectively is the guarantee of a cohesive and committed team with the organization's objectives. Internal Communication helps on this transparency. I08

One respondent inclusively added tips as potential nurture, maintenance, and actions to grow engagement [64] and therefore create an intrinsic desire and passion for the organization [20, 29].

> Investing on their facilities and promoting events for all employees, to create engagement. Football, Open Bar for Beer after 6 pm, free fruit and bread, all these initiatives from organization are changing employees mind on the moment of selecting a company to work. Internal Communication should start adapting to these new "needs" of employees, as well as involve them on daily activities at local communities, e.g. clean the sea, create flowers with products scrap, recycling waste in products to decorate offices. I06

Following Schaufeli and Bakker, a positive mindset is characterized by vigor and dedication, and one respondent mentioned:

> Good communication flow between in the company, the leaders, and employees. People will be self-motivated and will therefore be satisfied and then there will be quality that will be good performance, dedication is higher, they will make everything to show up internally and towards the Customer. I would say that key would-be engagement and in employee motivation and satisfaction. I13

Engaging the production of information, give opinions, share their ideas, determined about their preferences, internal communication helps this collaboration. Listen to what employees have to say, give employees a voice. They need to be part of the "communication system", showing satisfaction, and proud of working in the organization and perceive that communication accelerates the information sharing and collaborative behavior.

Indeed, respondents connect internal communication with Corporate Communication, in accordance with Vercic [70]. In respondents' opinion, branding is on internal communication, which disagrees with Authors Backhaus and Tikoo [2]. Employee Brand, with the capacity to create meaning under the umbrella of Corporate Communication, is essential. The majority of the respondents mentioned that last year nothing happened.

> That pride can be transmitted by talking to people outside the company and that will promote the Employee Brand. I do a free advertisement about this office because of the service word. Using just in my mouth. The word of mouth. I09

> Organization starts to invest more in employee engagement (e.g. offering breakfast, provide sports at facility to keep workers at company, listen their opinions, create workshops for understanding their concerns & find solutions). All these strategies would help to increase engagement and at same time they will use word of mouth to their friends, and more people will be looking for working at the company, and less people wants to leave. I08

Again, the consensus in the respondents is visible on their sharings, that a engaged employee is creating employee brand via WOM, sharing with friends helping on recruitment, talking with friends, with the family, in the universities, everywhere.

Respondents mention example of universities that employees are proud to present their professional career align with the products, development, or other internal information in their presentations in many universities as Ambassadors.

Circulate information by this via is more effective and transparent way, and all respondents agree, showing inclusively examples of co-creations and engagement with employer.

> Sharing good news or things that make us proud. Key achievements to our family, to our friends and then there is this word of Mouth and this positive connexon that is done throughout the society participating in. In the university fairs is all fairs. I13

Indeed, to improve this power of internal communication and engagement, case study company implemented a online process. All respondents agree that we must rapidly reach our employees, adequate the message, in convenient format, validating Vercic and Spoljaric, Men, and Men and Browen [51, 52, 70], referring today's channel of communications, as extremely important. Additionally, three respondents suggest:

> Provide free network to employee to use internet communication easily. I10

> and "Teams channel can be used more. Easy access. General conversation can be done by WhatsApp as well, for example absent, delay to meeting", suggest training on Teams applications to speed up the process, usage of WhatsApp for faster chat, with free internet inside the Affiliates. I09

> "Direct Meetings and e-mails, are the most frequently use… listen the people…doing Survey…

> Gemba (shop floor) … talk to people social media, our private group, Microphone. I02

> The channels are great sources that the employees can reach. I believe they are one of the most important toolkits and we need to have a variation of channels to keep the employees informed, I01

In addition, the process of digitalization will create more collaboration and innovate the process [37]. So, adding a mobile application as a new channel will increase the possibilities to be transparent, regular, and consistent to ensure that employees are motivated since they know relevant news inside the Company.

This study investigates the effectiveness measuring of the internal communication process.

Respondents' feedback harmoniously believes that Communication influences employee engagement—nine respondents [64], being satisfied and engaged with Company and the work—nine respondents [63, 68, 71], 7 answer that employees are more productive [54, 57], doing well at first time improves quality, reduces the rework time, improves the internal performance overall—six respondents, working more satisfied and engage, avoiding waiting time between functions—two respondents, results on satisfied employees—five respondents [26], that via Word of Mouth physically or via Social Media will be Ambassador of our case study [10], increasing sense of belonging leading to employee engagement, improving the service toward Customer [7] confirming the Authors opinions.

> The best indicator is when the company is well received on the Internet and by word of mouth. I01

> "One For All, All For One", The most important of an organization: People. I08

When asked about measuring communication effectiveness, all interviewees think that it is measured by QCD-Quality, Cost, and Delivery are accurate as all other processes or activities.

However, respondents needed more support when asking them to suggest Key Performance Indicators. The new inputs are:

> it's responsibility for the leaders to be closer to it's employees and get their feedback, that is still the most reliable and human way to measure the efficiency of internal communication. I11
>
> No of followers, comments, Likes, Shares, hashtags at Social Media (Linkedin, Instagram, Facebook). I06

Summarized the consensual approach of respondents, structured by code and theme, there was a consensus among the respondents in most of the questions. Two new themes were added like using a microphone or voice—a channel not yet considered in this study—and Gemba walking on the shop floor, "where happens," to promote direct contact with employees, confirming:

- that sharing information and channels are vital for accelerating internal communication effectiveness,
- employees behavior is a strategical channel for communication effectiveness, with a new channel issuing trust and transparent information, accessible to all for free usage in accordance with the employee needs, allows to get easy feedback, monitoring, and measurement,
- collaborative communication, using different channels creates employee engagement and branding allowing an acceleration of the process of sharing within the employee community,
- engaged employee is a harness of the organization serving the highest quality and performance toward the Customer,
- new channel employee application, MyApp and the challenges increase engagement, send and receive stories, listen and feedback, moderating and publishing new trustable and rapid information. What does not communicate, does not exist! Seeks the people where they are.

20.4.1 Theoretical Contributions and Managerial Contribution

The primary purpose of this exploratory study was to understand the best strategy for internal communication, enhancing the alignment between the Company and the Employee, increasing the relationship by increasing the transparency. First, this study advances knowledge about organizational communication processes that foster the creation and delivery of valuable and timely content based on Employee needs. The study findings support evidence proposing that content must target Employees' needs, to create a sense of belonging, leading to employee engagement and consequently the employee brand via Word of Mouth and collaborative behavior and co-creation, with a potential measuring integrated and available for all Employees voluntarily based on data-driven content. The fundamental premise of the new philosophy was to create and deliver compelling, relevant, and valuable content based on individual Employee needs, which was primarily aimed at generating high-quality transparent, trustable information available digitalized and automated, see Fig. 20.1.

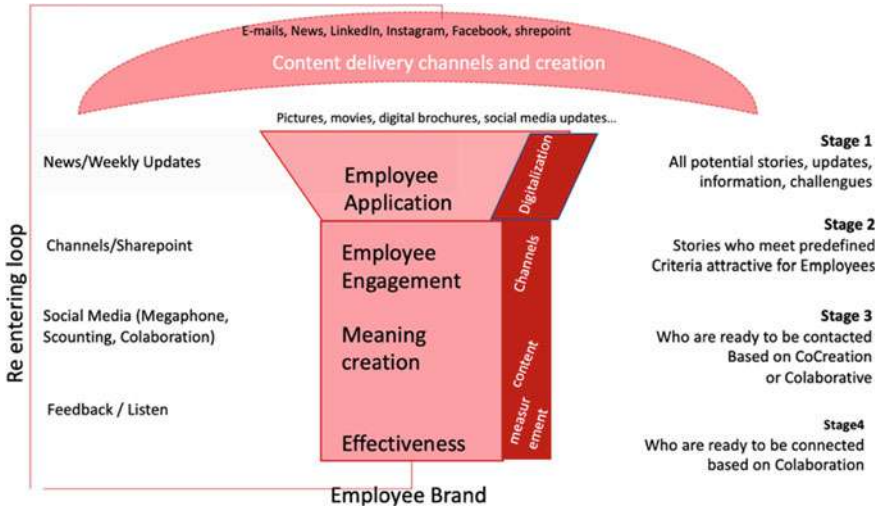


Fig. 20.1 Funnel framework employee app, new channel, own elaboration based on [27]

Personalizing content to Employee needs has proved to be a challenge that could only be overcome by combining content internal communication with an Employee Application on Smartphone, see stage1, Fig. 20.1, social media and SharePoint, a web-based collaborative platform that integrates with Microsoft Office with IT tools, see stage2, Fig. 20.1. For this target, the company acquired my employee application and corporative communication develop software to enable its Communication Partners to target employees with the right content at the right time, differentiating by scheduling one hour earlier the management, depending on type of information.

First, the efficiency of creating content—data driven, has significantly improved because of these automated processes, collecting stories, updates, challenges, information relevant for employee's needs, i.e., text message, pictures, videos (see content delivery channels and creation, Fig. 20.1). Secondly, all divisions want to delivery information to create a sense of belonging and lead engagement, showing their added value, i.e., did you know, results of the Audits, Customer Meeting, Internal Challenges, Employee of the Month. Third, internal communication input contributions to business outputs have become more transparent and trustable, and the internal communication function has shifted from serving as a tactical support entity to support a strategic decision-making unit function to all Businesses, e.g., webinars, white papers, newsletters, digital brochures, blog texts, social media posts, infographics, pictures, and videos, in multi-languages, see stage2, Fig. 20.1.

The case company has learned that good content focuses on helping employees to solve their problems and on offering advice on issues that employees may feel unsure about, and people are the most asset value Company has. Content produced by the case organization is corporate values and culture, which often does not mention the company or its products, but instead focuses purely on a given topic that the company

offers expertise in, e.g., Engineering driving, automotive supplier, connect to future. We value our people; we make it happen. See stage3, Fig. 20.1.

Listening is performed by collecting customer feedback and by social media monitoring, see stage4, Fig. 20.1. In addition to listening to employees and customer interests, a company must also identify and disseminate organizational knowledge to fulfill employees and customer information needs. The case company has tried to overcome this challenge by treating content creation as a joint process and combining expertise from different parts of the organization, having pleasure on the transformation, and working "One for All, All for One". Internal communication coordinates the process, and content subject is defined by top management, top engineers, and Communications specialists. Typically interview several specialists on a certain topic and then create actual content on their behalf or in collaboration.

Part of this process involves considering how interview data may be exploited to generate content of various formats and deploy to all internally. Primarily, this information goes to Employee Application, social media, and Company website SharePoint. Employee Application access is voluntarily, access via email account, same for social media, while access to SharePoint is mandatory. The acquisition of Employee Application has been a crucial prerequisite for the company's content internal communication strategy, listening all interviewed, understand the actual status, and workout new channels to display the contents to all employees.

A funnel framework, see Fig. 20.1, was created by researcher to summarize the new concept "data-drive content", in four stages, completing a cycle from start to stop, publish stories collect by feedbacks and active listen, moderation of social media monitoring for effectiveness measurement and collect stories, prepare news, weekly updates, data driven in Employee Application—digitalization, delivery via multiples channels/platforms and collaborative actions like megaphones and scouting, the content created in collaboration stories to attract our employees that rapidly connected with, spread the info, returning to the publish mode.

In Fig. 20.1, see the macro design of this theoretical framework to give more clarity to concept.

The present case study attends a perspective case of internal communication that generates engagement and how engaged employee creates employee brand for B2B that strategically assume a automation process to provide transparency, right content on the right timing to connect and energize the employee and presents a number of managerially relevant implications.

First, content must come from divisions, top management must understand that content, and communication tactics are learned over time and require cultural change within the organization. Requires high-level involvement, enthusiastic approach, and mindset of encouraging sharing content, listening, and feedback, which opens a new cycle. Consequently. Suggestions to keep stories, top management is important and keeps routine of send news, stories and updates all Thursdays.

Secondly, the funnel framework, works based on automation, employee application to download voluntarily in a employee smartphone require IT support and prioritization for the key process in analysis and Human Resources for onboard and

outboard new employees, if a conflict of interest between the business parties in terms on content, or IT support, or timing, top management must regulate.

Third, a limitation was the unavailability of the head of corporate communication, interviewing with enrich the study, however, due to pandemic and the war was impossible.

Forth, common metrics to evaluate effectiveness start to stop, for benefit of all, suggestion keeps monitoring monthly and per quarter add new indicators to improve performance.

Fifth, though respondents were a majority in consensus, including the focus group investigating the content, suggest further investigation to evaluate the sample and the funnel and improve the process.

Sixth, only one interview may be not enough, and a second interview six month later to same sample will benefit the study and enlarge the acknowledgement for scholars.

This study followed a long interview guide, which is a common limitation in qualitative interviews [56] because it can limit a more in-depth examination of some respondents' views. All lessons learn from Portugal will be evaluated to apply in the following countries in the same group; however, this concept may be applied to other organizations outside automotive.

20.4.2 Limitations for Future Research

First, because it refers to a case examined in a B2B organizational communication, based on internal communication in a Japanese traditional company, even though it was studied in nine different countries, the inclusion of new content and channels due to a transformation. Future studies may examine, how Employees application or digitalization and automation mechanisms harness and create share content for employee engagement and brand in other business. Specially, on social media using future technologies like facelift integrated with SharePoint platform and the application, or in human resources area investigating if this increases motivation and loyalty. Secondly, future investigating may also investigate the collaborative employees' voluntary actions toward effectiveness in a large scale or different categories of business, in terms of Business sharing how functions will delivery data driven to generate content, and the relations between the divisions, or how to keep motivated to share this info may generate long term multiple stories challenges or affect the process. Finally, as employee application will be the "digitalization and automation", investigate the transparence of communication role and adding functions as Ideas Management. As internal communication is essential for building a culture of transparency between management and employees, it can engage employees in the organization's priorities. It will help organizational communication effectiveness improve from start to finish. To be effective must understand employee needs.

20.5 Conclusion

In sum, this study presents evidence of how internal communication generates engagement and connects the workforce. While the existing literature has focused primarily on the types of communications and the best type or channel, the perspective taken in this study targets how engage internal communication: (1) how internal communication generates employee engagement and (2) how does employee engagement creates employee brand. The data analysis has led to the construction of a theoretical framework based on the existing literature but enhances it by rising five research propositions relating to perspective case in automotive industry and internal communication or organization communication. This model opens ways for future research in the fields of internal communication and employee engagement.

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Chapter 21
Does Your Business TikTok? Genuineness, Proximity to Customers and International Expansion with Short Video Marketing



Eliza Jennings, Fernando Pinto Santos, and Ana Paula Marques

Abstract As contemporary lifestyle evolved, social media platforms adapted to be attractive for consumers who spend increasing time in their smartphones and who are interested in content that is short and easy to consume. Short video apps thus emerged, becoming relevant in the social media landscape. TikTok, a social media application used for creating and sharing short videos, has become especially popular. The videos in TikTok usually include music, short plays, lip-synching, dancing, or light-hearted humor. So far, TikTok has been downloaded more than a billion times around the world. Given this context, it was decided to conduct research to address the following research question: Which are the outcomes of short video marketing strategies on TikTok in small business activities? The methodological approach was qualitative, based on interviews to business owners. The findings show that TikTok enables a different way of promoting a business offer, which relies on entertainment and consumer proximity to the businesses. The app TikTok offers an alternative to more traditional communication channels and enables the creation and sharing of low-cost videos that can nonetheless create awareness, traffic and sales, including in international markets. Additionally, on TikTok, business owners can build on their knowledge about their markets to engage with consumers, relying on genuineness, as this research shows.

Keywords Social media · Strategy · TikTok · Video marketing

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21.1 Introduction

In today's world, where the pace of life is becoming faster, new social media platforms, such as TikTok, are emerging and substituting traditional marketing channels. Additionally, smartphones are responsible for the increase of digital time in consumer's life, allowing users to consume content on the go [5].

Social media platforms have been evolving and adapting to be suitable for consumers with a rapid pace of life and the desire to find short and interesting content. It is in this context that short video apps emerged, becoming dominant on social media [12]. Video marketing thus became one of the biggest opportunities to attract and engage with customers' needs and emotions [10].

A key aspect that differentiates short video marketing from other communication activities is that it tends to have low production costs, especially when employed in social media [12]. Therefore, it can be adopted even by small enterprises with a limited budget for communication. In this research, small businesses are regarded as companies with relevant limitations, including financial resources, lack of marketing skills and knowledge, and low visibility and impact in the market [2].

TikTok is a social media application used for creating and sharing short videos. In the last few years, it became one of the most popular applications for people who use smartphones. The videos in TikTok usually include music, short plays, lip-synching, dancing, or light-hearted humor. So far, TikTok has been downloaded more than a billion times around the world. The platform is becoming a community for generation Z, in which they can express their ideas and make a social statement in politics and other kinds of issues [13]. More and more brands are entering the world of TikTok, which improved the status of the platform in the new media era.

TikTok has more than 680 million daily users, surpassing the number of active users of Twitter, Pinterest, and Snapchat [4]. It was originally launched as a short-form video-sharing platform for lip-synching and dancing, in China, in September 2016. Despite its original purpose, TikTok has grown into a full-fledged video service, with content available for all types of viewers [3].

In November 2017, TikTok acquired the company Musically. After the fusion, the app snowballed into the most popular app in 2019 and 2020. With 850 million downloads in 2020, it began to be a true competitor against Facebook's ecosystem of social networking. TikTok is the first non-Facebook app to reach 3 billion downloads, which it achieves in the second quarter of 2021. The app is especially popular among Millennials and Gen Z. According to [3], TikTok is mainly used by those under thirty years old, who represent 63% of the users.

The low-cost production of rich and specific content on TikTok enabled its use by a growing number of small businesses [12]. While on Instagram people need a strong follower base to see results, with TikTok, a business does not need to have many followers to reach a wide audience.

This research addresses the following research question: Which are the outcomes of short video marketing strategies on TikTok in small business activities? The

methodological approach was qualitative, based on interviews to business owners who use video marketing strategies on social media.

21.2 Related Literature

Compared to other social media platforms, short video applications have become the top platform since 2019 [7]. The number of daily active users is around 800 million, twice the average of other online video platforms. Therefore, more companies and content creators are starting to get involved in the short video marketing trend [7].

According to [12], there are three common characteristics of short video marketing (Table 21.1).

TikTok has managed to grow exponentially, within a context where short videos started occupying more leisure time of users [12]. The app allows users to create short videos, set to an audio clip, a song, or a pre-recorded video sequence with effects, stickers, filters, augmented reality, and green screens.

The unique characteristics of TikTok make it different from other short video platforms. The extensive use of algorithms helps to understand users' preferences,

Table 21.1 Table captions should be placed above the tables

Short video marketing characteristics	Description
Form fragmentation	Consumers of short video content usually play them on mobile devices, whether they are resting or on the go. Short videos are suitable for people with a rapid pace of life because of their simplicity and short but explosive content. Short video apps generally consist of scrolling down to watch the next video and double-clicking to like; therefore, more and more short videos are coming up. Due to their lack of complexity, consumers started consuming short video applications during leisure time
Distribution personalization	Short videos are constantly collecting data from their users, allowing the platform to select the specific content users are interested in to later create a personalized and accurate distribution. Personalized content turns marketing practices more effective and precise. As a result of personalization, the short video environment is more immersive, and users' curiosity is creating stickiness to the apps. Back ends allow this to happen, and they labeled each user according to their most frequent visited video types, providing merchants with the information about who to target through the app
Content decentralization	Short video platforms normally adopt the decentralized mechanism of content production. The formula is simple, and it does not set any privilege: Whoever can produce the hottest video will win the most views. The combination of Professional Generated Content and User Generated Content encouraged users to create while watching. Short videos do not need a million dollars production sets, if the idea is good, everyone can make beneficial content for themselves

showing them more of their favorite content and making users addicted to TikTok feed [13]. Furthermore, TikTok integrates information, music, and e-commerce [13].

TikTok is essentially an algorithm-driven app.The app uses artificial intelligence in two ways. First, on the consumer side, the system learns quickly about the individuals' preferences because they capture not only user comments, but also how long a user watches each video. Second, on the producer side, artificial intelligence helps creators make videos. It simplifies the trouble of video editing and suggests popular music, tags, filters, and other improvements by categories [13].

The short video distribution mechanism of TikTok is based on the selective exposure theory. On TikTok, the mechanism can not only label different users according to their interests, but after it learns what the users like, it can continuously show similar videos to the users. It´s important to know that the tags applied by the users are not necessarily matched with the users' needs, for that reason, the mechanism pushes videos in a batch-by-batch way. First, the back end measures the amount of interaction, that is, the video playback completion rate, the number of likes the number of comments, and the sharing and forwarding; being the number of likes the most critical indicator. Second, the system pushes the content to a small group of users. If 10% of the interactions are completed, the push can be determined to be accurate. From there on if more than 10% of the interactions are completed, the system will continue to expand the range. This means that the more videos the viewers watch, the more accurately relevant content they will get [12].

In 2018, TikTok established an ecosystem providing opportunities for brand support on integrated marketing, life cycle marketing, and performance marketing. The ecosystem support brands to reach their target users in a fast and precise manner.

In a study of TikTok, Moe [7] identifies three levels of interaction in the hierarchical structure of the user's experience, the audio library, and the platform's music (Table 21.2).

The TikTok challenges recreate a venue for brainstorming, creativity, and memetic entertainment [14]. Despite looking like a trivial and competitive game, challenges' interaction models spread beyond musical concepts and processes [11].

Table 21.2 Type of interaction in TikTok

Interaction level	Type of interaction
Level 1	Emotions that is audio dubbing with funny stories
Level 2	Interactivity that includes imitations, mind relaxing, and liking (Ask & Adibin, 2017)
Level 3	Usability reflects the easiness to switch between content, effects, and so on

21.3 Methodology

A qualitative approach was employed in this research since it was considered as the most appropriate given the goal of understanding business owner's experiences, perspectives, and reflections on the strategic use of TikTok. The selection of the informants was based on the performance of their small businesses in TikTok: number of views and likes of their most popular video, as well as the number of followers, with a minimum number of followers of 7 K.

To reach business owners, a contact was made through direct messages in Instagram. For reaching the business owners, another platform was needed because TikTok doesn't allow you to send a direct message to people that don't follow you back. In Table 21.3, the small businesses addressed in this research are detailed.

The businesses operate in different industries, as detailed above. The data were collected From February 28 to March 15, 2022, by interviewing small business owners. The objective of the interviews was to understand the experiences of each business owner. Fifteen business owners were interviewed: They were chosen by a

Table 21.3 Informants and characterization of businesses and TikTok activities

Business owner	Number of likes in the most popular video	Number of views in the most popular video	Number of Followers	Industry
I1	95.2 K	736.6 K	33.4 K	Beauty products
I2	43.4 K	365.4 K	66.5 K	Hand-painted hoodies
I3	21.3 K	196.3 K	21.3 K	Clothing/ fashion
I4	6806	102.5 K	11.1 K	Tattoo studio
I5	12.1 K	105.8 K	12.5 K	Nails studio
I6	66.6 K	820.8 K	64 K	Jewelry
I7	58.5 K	735.6 K	13.4 K	Jewelry
I8	48.8 K	347.1 K	31.5 K	Bakery
I9	8700	112.2 K	14.4 K	Skincare
I10	42 K	415 K	44.9 K	Handmade accessories
I11	7929	115 K	19.8 K	Beauty products
I12	38.9 K	426.9 K	42.3 K	Bakery
I13	5519	63 K	12.1 K	Hair accessories
I14	205.5 K	9644	7771	Design services
I15	18.2 K	280.1 K	8282	Intelligent house

list of hashtags that helped the authors to understand where the most experienced and popular small businesses on TikTok were.

The interviews were semi-structured, with questions that were previously prepared in a script. The interviews consisted of a set of seventeen questions regarding the knowledge and experiences of the business owners with the app.

The interaction with the business owners during the interview helped to understand more deeply their experiences, opinions, and feeling regarding the platform. The interviews were done online through google meetings and on average the interviews lasted around 17 min each. During the interviews it was possible to connect in a more personal way with the interviewees, allowing the acquisition of more relevant insights for the study.

For the analysis of the interviews, Miles et al. [6] first and second cycle of coding approach were used. For the first cycle, it was used the descriptive coding that allows to highlight the most important and useful data of each interview, resulting in a summarized version of the data collected during the interviews. In the second cycle, after collecting and summarizing the information, the data were put into categories.

21.4 Findings and Discussion

Table 21.4 presents the main findings of this research, providing perspectives on the outcomes of short video marketing strategies on TikTok in small business activities.

As addressed above, the creation of traffic that enables to make sales through Instagram or a website is a key outcome of the use of TikTok. This goes in hand with the awareness created by communicating with videos on TikTok. Very importantly, TikTok offers the ability for small businesses to reach people that don't follow them.

After using the platform for some time, the business owners interviewed were able to figure out the underlying general logic of algorithm of TikTok, allowing them to take advantage of the way the app delivers the content. Some of the interviewees expressed their frustration with other platforms because, while on other social media platforms more followers mean more reach, on TikTok this is not necessarily the case.

According to the business owners, if a brand-new business wants to join TikTok, they should worry first about the content they are creating and not about building a strong fan base. By combining the right content, the duration of the videos, and the hashtags, business owners can maximize the performance of their videos, reaching a broad audience.

One of the biggest issues of small businesses on other platforms is that they need to pay for advertisements to get their content to be seen by others other than their followers. Business owners that were interviewed mentioned that, with the expansion of TikTok, they can find their target on this platform and reach them more effectively without having to spend money on ads. Many of the interviewees, described TikTok as a platform for free marketing and advertisement because of the organic reach the app has.

Table 21.4 Short video marketing strategies outcomes

Outcomes	Quotes of interviews
Traffic is generated to Instagram, or to their website, to finalize their purchase	"I feel that a lot of people come from TikTok to Instagram to order… after, after seen videos on TikTok about some products" (I1) "In terms of results, I felt that in terms of sales … sales increase a lot in fact … I can say that, more or less, I don't want to say 50% but 45% of my sales are from TikTok" (I4)
Increased visibility and number of customers	"Probably if it wasn't for TikTok, I wouldn't grow so fast or would probably never … reach the level I'm at today" (I1) "70% of the new customers that we have, or of the people who access our site, come from TikTok … in September when I started to focus, I had 130 followers and since then we have grown a lot … Now we are 13 k" (I13)
Proximity with customers and increased trust	"They connect with you, with your space, your story, so it's much easier, they have that closeness, they come to you" (I.9) "I think that's where it comes from, people see that I've always been publishing constantly, and they see that I love what I do, that I have a disposition, that I have evolution and I think it's from there that people want to make an appointment with me" (I14)
Reaching international markets	"I managed to reach many more countries and after creating TikTok for my store, I was able to make more international sales" (I6) "They videos manage to reach a much larger audience, outside Portugal and everything else" (I11)

In particular, this reach enables to create a proximity to customers. And to this end, being genuine and transparent on TikTok is essential. Based on the experience of the business owners and the segment in which they operate, the community of TikTok seems to appreciate the more human side of the business. Whenever they produce a more personal video, where they are being honest and real, the videos will have a better performance, according to this research' respondents. They mentioned that TikTok gives space for the business owners to adapt their content to be more fun, relaxed, and personal, changing their corporative identity for a more informal one.

This identity allows them to create and strengthen the relationship with their clients and at the same time build trust in their businesses. Genuineness [8] seems thus to be essential to how the dynamics of interaction between audiences and business occur, and a sense of legitimacy can be envisaged as being articulated through the visual dimension of communication. This visual dimension in TikTok might be all that some of these audiences have as tangible evidence from an organization. Hence, videos with products and their uses materialize the business and the brand before different audiences [9].

Interestingly in this regard, TikTok launched the feature of live sessions and since then the small businesses interviewed started to take advantage of it as well. The business owners expressed how live sessions allow them to interact with their audience in real time, answer their doubts, addressing their inquiries, and in sum, being authentic. With this feature, the business owners can connect with the audience beyond their products or services, which is essential to be close to them.

TikTok, in overall terms, allows creating deeper relationships between customers and the small businesses [7], identified different levels of interaction, the first one being emotions, and from the interviews it became noticeable like emotional connections seemed to be important for the engagement and closeness of audiences to the small businesses addressed in this research.

During their time on TikTok, business owners were able to identify that TikTok users don't appreciate pushy marketing. According to them, the community sees the platform as a channel to support other businesses rather than a massive consumption app. This has led to other ways of selling and promoting a product without the audience knowing that purpose is making sales. They claimed that small businesses should be able to raise a desire from the unconscious part of the consumer's mind and the best way of getting there is by producing the right content for the audience on TikTok.

According to [1], TikTok videos can be analyzed for their time-variant or invariant features. These features are later correlated to understand their impact on the performance of the videos. However, the small businesses that were addressed in this research don't consider these correlation indicators in the evaluation of performance. The way they analyze the indicators is very simple and is based on the insights the platform gives them. As it is stated in the literature [1], the business owners interviewed and recognized that the followers don't have a strong correlation with the performance of the videos, so they don't consider them as important as the number of shares, comments, views, and average watch time. On another hand, for most of the small businesses in the research settings of this study, these indicators don't mean anything if they don't bring them sales or followers to other platforms.

Finally, another outcome is the reach to international markets. With the aforementioned characteristics, TikTok is especially well-suited to reach—and engage—audiences that are geographically disperse, enabling a sense of authenticity and closeness that seems especially relevant to take into account.

21.5 Conclusions

Small business owners regard TikTok as a different way of promoting their offer. In this platform, business owners can be themselves, and this genuineness allows them to become closer to their consumers. TikTok thus offers an alternative to more traditional communication channels and enables the creation of low-cost videos that can nonetheless create awareness, traffic, and sales. In addition, an increased international reach was found also to be a common outcome of the use of TikTok by small businesses. While on other social media channels there is need for specific competences and often a relevant financial investment, on TikTok business owners can build on their knowledge and expertise in their markets to engage with consumers through short videos, relying on their genuineness, which this research suggests is a quality to be considered with increasing interest, given the landscape of contemporary markets.

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Chapter 22
Digital Storytelling Impact on Consumer Engagement



Joana Lima, Sandrina Teixeira, and José Moreira

Abstract We live in an era where we witness constant changes and advances, especially at a technological level. Both consumers and organizations are becoming increasingly digital. This new consumer requires the use of digital to be managed in a much more interesting and challenging way, seeking to engage him/her as a basic condition to preserve the attractiveness of a brand. The use of storytelling as a consumer engagement strategy is increasing in several domains, but there is still scarce research relating consumer engagement to advertising in a digital storytelling format. This investigation is thus a contribution, aiming to understand the impact of the various components of digital storytelling on the different dimensions of consumer engagement. Adopting a qualitative and exploratory methodology, four focus groups directed at the Z generation were conducted to understand digital storytelling's impact on consumer engagement. A content analysis was then performed using a qualitative analysis support software, and the results were supportive of the existence of a relationship between the components that make up the stories and the engagement they provide to the brands. The components most valued by consumers are, respectively, the message, the plot, the verisimilitude, the music and the characters. However, the message is the storytelling component that most impacts consumer engagement.

Keywords Content marketing · Digital storytelling · Storytelling components · Consumer engagement · Advertisement

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22.1 Introduction

This investigation aims to study the impact of digital storytelling on consumer engagement. The COVID-19 pandemic accelerated the digital transformation and, consequently, increased the use of the majority of brands' digital communication tools. The confinement generated by the pandemic triggered consumption from home [1]. Besides, because of the advancement of digital transformation, together with the complex and unstable economic time caused by the pandemic, companies were forced to increase operational efficiency and improve the customer experience in order to survive [2].

As a consequence, both people and organizations have become more digital [1]. This new digital-first consumer demanded from organizations a much more interesting and challenging way to use digital [3]. Because of this, it became increasingly relevant to study storytelling on digital platforms, not only for being considered the future of digital marketing [3] but also for being considered a crucial tool for understanding consumer behaviour and attitudes towards brands [4].

According to Digital Marketing Institute, 92% of consumers prefer storytelling ads [5]. Given this, storytelling has become extremely important in the business-to-consumer (B2C) market in order to sustain a successful brand management [4]. In addition to storytelling, video content has also been shown to be of great importance to consumers. According to Animoto, 93% of consumers said the video is helpful when purchasing a product [6]. When the two are combined, showing storytelling through a video, the result can only be good. It is much easier and more attractive for customers to understand a product, a service or even a brand when using video content. Consequently, an effective way to create engaging, attractive and informative content for consumers is through the use of video marketing [7].

"The use of storytelling as a customer engagement strategy is on the rise in a range of domains" [8]. For these reasons and because scarce literature on the topic exists, we defend that is extremely important to answer the following question: how do storytelling components influence the different dimensions of consumer engagement?

The empirical component of this investigation is carried out through a qualitative and exploratory methodology, based on focus groups directed at the Z generation and a content analysis of the corpus of the study. Unlike most studies on consumer engagement, ours analyses how the audience that sees ads with storytelling content reacts in terms of engagement. The results highlight that the message is the storytelling component that most impacts consumer engagement.

22.2 Content Marketing

Content marketing is the idea that all brands should behave and think like media companies, that is, they should tell stories in all their forms, to consequently enhance customer attraction and retention [9]. Digital content marketing is understood as a strategic marketing approach that aims to create and communicate valuable and relevant brand content on digital platforms to current or potential customers in order to enhance their engagement, trust and relationships with the brand [10].

Subsequent increasing sales, saving costs, improving customers and their loyalty and focusing on content as a profit centre are the four main reasons and benefits that drive enterprises to use content marketing [11]. Besides, other incentives such as generating organic traffic to websites, generating organic leads, increasing brand awareness and reducing customers' acquisition costs suggest the use of a content marketing strategy by organizations [12].

22.3 Storytelling

22.3.1 Storytelling Context

Stories are the most common communication format among humans [13]. In marketing, storytelling is used as a communication tool between brands and consumers and aims to transmit messages by creating a story or imposing a story-like structure on branded content [13].

Storytelling ads are currently at the centre of marketing and emerged with the aim of organizations to ensure attention, understanding and retention of content, seeking to capture the public's interest and be accepted by it [9]. Storytelling is also about creating an intimate relationship with the public, in which values, goals, emotions and expectations are constantly shared, creating long-term relationships, far beyond the presentation of a product or a motivation to buy [14].

Nowadays, due to digital information overload and ad-blocking technologies, marketers face significant challenges in creating relevant and engaging ads instead of ads that people find annoying interruptions [15]. As an alternative to other advertising formats, storytelling emerges in order to overcome barriers when it comes to capturing attention and creating digital engagement with video advertising [16]. When the public creates a more emotional connection with the brand through the story it tells, greater proximity with the values and emotions of consumers is established, which will consequently result in a higher competitive advantage over the brand's competitors [12].

Narrative transportation, or in other words, absorption in the story, is the main process that differentiates stories from other communication formats. Through this phenomenon, consumers' senses are enveloped by stories and end up mentally producing experiences identical to those in the real world. These mental experiences

are, in fact, vivid mental imagery that can result in affective and cognitive responses that can consequently lead to changes in consumers' beliefs, attitudes, intentions and behaviour. Thus, by identifying with the story or its characters, consumers end up attributing meaning to the brands and the products used by them [17]. Through storytelling, a brand has the ability to communicate in a more human, cohesive and impactful way, which consequently results in a more genuine connection between the brand and its customers [12].

In digital marketing, applying all the storytelling concepts in the different communication formats can truly make a difference in the public's perspective regarding a particular brand. Framing storytelling in digital marketing involves telling appealing stories that use the various resources available on the internet, namely text, image, video and sound, as a way of promoting a brand [12]. Departing from the requirements of the digital age one currently lives, the decisions of marketers when intending to tell digital stories must take into account three important issues: the way a story should be made, by whom the narrative should be delivered and what are the target audiences to which the story should be oriented [8].

22.3.2 Storytelling Components

The storytelling content includes several components such as plot, characters, verisimilitude [18, 19], message [20] and music [21, 22].

Plot. The plot is characterized by the temporal sequence of events that directly or indirectly affect a character, resulting, therefore, from the interplay between the two components of the narrative structure, chronology and causality [13]. In fact, the plot in a story is the equivalent of a premise in an argument: it is what defines the kind of story that will be told [23].

The audience's involvement in the plot of the stories is revealed by the fact that consumers feel touched by the meaning of the stories, which inevitably ends up triggering certain emotions, especially when the stories reach their climax. Furthermore, audiences tend to show a solid and enduring cognitive focus on the content of stories when they get a certain level of attention [13].

Characters. Characters are created in the plot of a story [24] and are the element that allows the story's audience to experience beliefs, purposes and emotions. Together with the plot, they facilitate the approximation of the stories to real-life experiences, which is why they are the main drivers in generating empathy between the audience and the events in the stories [19]. The characters' behaviour and mindset are, therefore, vital elements of cognition and understanding of the story's plot [25].

In summary, stories composed of characters with particular goals and motivations make people feel empathy for them and indirectly experience the story through them. Thus, the presence of characters in a narrative proves to be a relevant condition not only for consumers' involvement in a narrative but also for the consequent success of the narrative [15].

Verisimilitude. Verisimilitude is another essential element in storytelling as it represents the probability that the events in the stories actually happened [18]. By making the stories as close to reality as possible, the audience tends to intensify their level of reflection, consideration and understanding of the message's power conveyed [13]. Besides, the more authentic the story, the more willing people are to act, either by sharing the content of the story or by supporting the message conveyed in the stories [19].

Message. Stories are told, heard, and responded to convey and absorb messages or ideas [26]. The message functions as a central theme throughout the story in the form of an ideological or moral statement [20].

Through storytelling, it is possible to create a position in which the receivers of the stories are interested and with their attention entirely focused on the message [27]. For most companies, storytelling as a branding tool consists of using stories to communicate messages that reflect positively on the company's brand. The message of a story is inseparable from all other storytelling components, as without them, no message could have been generated and transmitted effectively [27].

Music. Digital storytelling consists of a short video narrative, told in the first person and created by combining still and moving images and music or other sounds [26].

Music can serve many purposes in the context of a digital story. There are various capacities where music can contribute to more effective storytelling [28]. When it comes to entertainment, choosing good music can contribute to the effectiveness of an ad simply by making it more attractive and less intrusive. Music can also be used in various structural roles, for example, to tie together a sequence of images, a series of episodes, or a list of product appeals, or to enhance or emphasize more dramatic moments or episodes. The use of music can also contribute to more significant memorization, whether of the product, the ad or the brand. Music can also help to engage or captivate viewers who make up the target audience [28].

22.4 Consumer Engagement

22.4.1 Consumer Engagement Context

Nowadays, it becomes increasingly challenging to maintain a lasting relationship with consumers, as they are more and more impatient and demanding, with greater expectations and less and less tolerant of errors, making it harder to reach loyalty. Consumers end up switching quickly from one brand to another if an offer that they think is better comes along. Bearing this in mind, engagement with consumers is key to preserving a brand's attractiveness. Customers with a higher level of engagement end up buying more, promoting and recommending the brand more and consequently being more loyal [29].

According to Claffey and Brady [30], consumer engagement is the psychological process that delineates the underlying mechanisms in the construction of consumer relationships. Currently, competing for the public's attention is a great challenge for brands. For this reason, brands must apply diverse content communication processes in the various existing digital spaces to attract as many users as possible and achieve a sustainable level of engagement with them. By generating positive engagement with their consumers and audience, brands can consequently benefit from increased loyalty and reputation [25]. By evaluating brands' performance and predicting its relational outcomes, consumer engagement is recognized by many theorists as superior to consumer satisfaction and consumer repurchase behaviour [30].

22.4.2 Consumer Engagement Dimensions

Previous studies reveal that consumer engagement is a multidimensional, dynamic and highly contextual concept [30]. Regarding the multidimensional perspective, consumer engagement highlights the relative importance of different cognitive, emotional and behavioural combinations.

The *cognitive* dimension focuses on consumers' thoughts and mental elaboration [31]. It reflects the concentration and interest in a specific object: company, brand or social network [32]. According to Dessart and Pitardi [13], mental elaboration is represented by a set of lasting and active mental states that a consumer experiences, such as attention and absorption. Attention represents the cognitive availability and the amount of time the consumer spends thinking and paying attention to the object of engagement [33], which, in this case, are the storytelling ads. Absorption represents the level of concentration and immersion in which the consumer finds himself with the object of engagement [34].

The *emotional* dimension focuses on consumers' feelings and reflects their state of emotional activity related to the brand or company [32]. This state of emotional activity is represented by the summative and lasting level of emotions of a consumer in relation to the object of engagement, for example, enthusiasm and enjoyment [32]. The former is the intrinsic level of excitement and interest concerning the object of engagement [13] and represents an enduring and effective state in relation to that object [35]. The latter reflects the consumer's sense of pleasure and happiness derived from the interaction with the object of engagement [36].

The *behavioural* dimension focuses on consumers' actions. It reflects the state of consumer behaviour in relation to the brand or company: a consumer's energy, effort and time spent on an engagement object [32]. This behaviour can be materialized in learning, sharing and endorsing [37]. Sharing represents the act of providing information, content, ideas, experience or other resources [29]. Learning, instead, represents the active or passive search for those resources [29]. Finally, endorsing represents the act of sanctioning, showing support or referring to resources shared by the object of engagement [29].

22.5 Methodology

The main objective of this research is to understand the impact of digital storytelling components on the different consumer engagement dimensions.

In order to achieve this general objective, the following specific objectives are pursued: identify (1) the most relevant components of storytelling and (2) the different dimensions of consumer engagement; understand (3) how the plot of a story influences consumer engagement; (4) how characters in a story influence consumer engagement; (5) how the verisimilitude of a story influences consumer engagement; (6) how the message of a story influences consumer engagement; and (7) how the music of a story influences consumer engagement.

Considering not only the flexibility required in this study but also the complexity of data to be collected (and the relationships to be understood), it was recognized that a qualitative methodology was the most adequate for the study. In order to respond to the previously defined objectives, the focus group was selected to be used as a technique for the collection of primary data on the relationship between storytelling and consumer engagement.

The research was carried out through four focus groups with male and female residing in the north of Portugal and belonging to generation Z, representing individuals born between 1995 and 2009 [38]. The groups selected included six participants, and each one lasted approximately 1 h and 40 min. The questions presented in the focus groups focused on the three dimensions of consumer engagement, and stimulus material was used to encourage participants' responses, more precisely the visualization of three illustrative advertisements.

To achieve the research objectives, a content analysis of the different participants' opinions of the focus groups was carried out, which were later transcribed into a digital document and then analysed using the webQDA software. As in any investigation, this focus group considered the fulfilment of ethical issues inherent to scientific studies. Participants consented to the audio and video recording of the discussion [39].

22.6 Findings and Discussion

After concluding the coding of the analysis corpus and in order to respond to the study's specific objectives, several matrices were created in order to cross each component of storytelling—the plot, the characters, the verisimilitude, the message and the music—with the three dimensions of consumer engagement—the cognitive, the emotional and the behavioural. These matrices aim to mirror the impact of storytelling components on consumer engagement. The numbers present in the matrices represent the number of times the focus group participants mentioned the different components of storytelling while commenting on the three dimensions of consumer engagement.

Table 22.1 Impact of plot of a story on consumer engagement

Storytelling component	Cognitive dimension		Emotional dimension		Behavioural dimension		
Plot	Attention	Absorption	Enthusiasm	Enjoyment	Sharing	Learning	Endorsing
	17	25	16	10	4	5	4
Total	42		26		13		

22.6.1 Understand How the Plot of a Story Influences Consumer Engagement

As given in Table 22.1, the plot significantly impacts consumer engagement's cognitive and emotional dimensions. It is, in fact, the component with the most significant impact on the cognitive dimension, both in terms of attention and absorption. In other words, when participants explain why a particular ad calls them more attention and provokes more concentration (absorption), they mainly refer to the plot. It is also the component with the most significant impact on the emotional dimension, both in terms of enthusiasm and enjoyment. When participants explain why a particular ad causes them greater enthusiasm (interest) and enjoyment (happiness), they also primarily refer to the plot. On the contrary, it has a reduced impact on the behavioural dimension of consumer engagement.

These results suggest that the plot is powerfully relevant to create cognitive and emotional engagement and less relevant to create behavioural engagement. These results regarding the impact of the plot on consumer engagement are in line with the ideas defended by Dessart and Pitardi [13]. They argue that the story's plot generates more consumer engagement in the cognitive base due to the continuous attention and absorption with the object of engagement. The high emotional engagement in the plot is mainly encouraged by the story's climax, which triggers various emotions in consumers regarding the story's content. Stern [40] also says that consumers' positive feelings and emotions stimulate empathy with the plot. Although the plot has a reduced impact on the behavioural dimension of consumer engagement, this impact can be explained by the desire to learn, support and share the content transmitted by the story [13].

22.6.2 Understand How Characters of a Story Influence Consumer Engagement

As displayed in Table 22.2, characters have a moderate impact on the emotional dimension of consumer engagement. Although the impact on enthusiasm is small, the impact on enjoyment is relatively high compared to the other components. When participants explain why a particular ad causes them more enjoyment (happiness),

Table 22.2 Impact of characters of a story on consumer engagement

Storytelling component	Cognitive dimension		Emotional dimension		Behavioural dimension		
Characters	Attention	Absorption	Enthusiasm	Enjoyment	Sharing	Learning	Endorsing
	3	2	4	7	0	1	4
Total	5		11		5		

they sometimes refer to the characters. In consumer engagement's cognitive and behavioural dimensions, characters have a shallow impact.

This evidence suggests that characters are moderately relevant to create emotional engagement and less relevant to create cognitive and behavioural engagement. The results are in line with the ideas defended by Pera and Vigilia [19]. They argue that the emotional dimension of consumer engagement is, in fact, where the characters have the most significant impact, as they are the component that allows the audience of the story to experience beliefs, purposes and emotions and play a fundamental role in creating empathy between consumers and the story, as they facilitate the approximation of stories to real-life experiences [19]. Although the characters have a minimal impact on the cognitive dimension of consumer engagement, this impact can be explained by the fact that the characters' behaviour and mentality are essential elements of cognition and understanding of the story's plot [25]. The characters have a shallow impact on the behavioural dimension of consumer engagement; however, as small as this impact is, it exists, contrasting with Dessart and Pitardi [13] results that show no impact on this dimension.

22.6.3 Understand How the Verisimilitude of a Story Influences Consumer Engagement

As given in Table 22.3, verisimilitude moderately impacts consumer engagement's cognitive and emotional dimensions. Although the impact at the absorption level is small, the impact at the attention level is relatively high compared to the other components. The same can be said when we analyse the impact on the level of enjoyment and enthusiasm. This means that participants moderately refer to verisimilitude when explaining why a particular ad causes them more attention and enthusiasm. Concerning the behavioural dimension of consumer engagement, verisimilitude has a very high impact. It is, in fact, the second component with the most significant impact on the behavioural dimension, both in terms of sharing, learning and endorsing. When participants explain why a particular ad encourages them to share, learn and endorse (support), they mainly refer to verisimilitude.

These results suggest that verisimilitude is powerfully relevant to create behavioural engagement and moderately relevant to create cognitive and emotional engagement. They are partially in line with the evidence proposed by Pera and Vigilia

Table 22.3 Impact of verisimilitude of a story on consumer engagement

Storytelling component	Cognitive dimension		Emotional dimension		Behavioural dimension		
Verisimilitude	Attention	Absorption	Enthusiasm	Enjoyment	Sharing	Learning	Endorsing
	9	3	6	4	18	25	13
Total	12		10		56		

[19] and Van Laer et al. [18]. They argue that the behavioural dimension of consumer engagement is, in fact, where verisimilitude has the most significant impact, since the closer the story is to reality the more people are willing to act, whether out of a desire to share or support the content of the story [19]. The positive impact of verisimilitude on the cognitive dimension of consumer engagement can be explained by the fact that stories similar to real-life trigger reflections and considerations through the transmission of valuable messages [18]. Verisimilitude has a moderate impact on the emotional dimension of consumer engagement, contrasting with Dessart and Pitardi [13] results. These authors propose that verisimilitude has no impact at all on this dimension.

22.6.4 Understand How the Message of a Story Influences Consumer Engagement

As given in Table 22.4, the message has a moderate impact on the emotional dimension of consumer engagement. Although the impact on enjoyment is small, the impact on enthusiasm is relatively high compared to the other components, meaning that participants moderately refer to the message to explain why a particular ad causes them more enthusiasm. Besides, this component has a high impact on the cognitive dimension of consumer engagement. Although the impact on absorption is small, the impact on attention is high compared to the other components. Also, the message has a very high impact on the behavioural dimension of consumer engagement. It is, in fact, the component with the most significant impact on the behavioural dimension, both in terms of sharing, learning and endorsing. When participants explain why a particular ad encourages them to share, learn and endorse, they mainly refer to the message.

Table 22.4 Impact of the message of a story on consumer engagement

Storytelling component	Cognitive dimension		Emotional dimension		Behavioural dimension		
Message	Attention	Absorption	Enthusiasm	Enjoyment	Sharing	Learning	Endorsing
	12	4	7	4	21	29	18
Total	16		11		68		

Thus, based on this evidence, we conclude that the message is powerfully relevant to create behavioural and cognitive engagement and moderately relevant to create emotional engagement. These results are consistent with Dessart and Pitardi [13] proposed evidence. They argue that consumers show a strong sign of individual commitment to the story's message by showing willingness to learn, share and consequently support the message of the story, thus reflecting the substantial impact it has on the behavioural dimension of consumer engagement. Regarding the impact of the message on the cognitive dimension of consumer engagement, the authors explain that consumers show a particular cognitive process as soon as they get involved in the story when they reflect on the story's message and what it means to them. The emotional engagement of consumers in the story, albeit moderate, is explained by the fact that consumers feel somehow touched by the message and its meaning [13].

22.6.5 Understand How the Music of a Story Influences Consumer Engagement

The evidence displayed in Table 22.5 shows that music has a reduced impact on the emotional dimension of consumer engagement and no meaningful impact on the cognitive and behavioural dimensions. Although the impact on enthusiasm is small, it is the component with the most insignificant impact. Music has no impact at all on the behavioural dimension of consumer engagement.

Therefore, it is possible to conclude that music is rarely relevant to create cognitive and emotional engagement and not at all relevant to create behavioural engagement. These results contrast with those of Huron [28], who argues that music can help to engage or captivate viewers, and contrast also with most of the literature on the topic. It appears thus as a novelty that deserves future research.

Table 22.5 Impact of music of a story on consumer engagement

Storytelling component	Cognitive dimension		Emotional dimension		Behavioural dimension		
Music	Attention	Absorption	Enthusiasm	Enjoyment	Sharing	Learning	Endorsing
	1	0	4	1	0	0	0
Total	1		5		0		

22.7 Conclusions

22.7.1 General Conclusions

With the support of focus group outcomes, we concluded that the message, followed by the verisimilitude, is the most relevant component of a story at the behavioural dimension. This may be because, for most of the people, a story without a message is meaningless and not at all memorable. Moreover, for many people, messages are implied in stories as if they were intrinsic to a story. The plot, mainly at the cognitive dimension, turns out to be also quite relevant since it represents the way in which that message will be transmitted. Contrasting with most of the literature on the topic, the music does not seem to have a minimum of relevance. Given the music's role in people's lives, this result was unexpected. Although some people genuinely enjoy music, and others do not care as much, a no effect of music on the way consumers interact with stories came as a surprise indeed.

The study's results reveal that the dimension where the plot has the most impact is the cognitive one, due to the continuous attention and absorption with the object of engagement, as defended by Dessart and Pitardi [13]. The dimension where the characters have a more significant impact is the emotional one, as Pera and Vigilia [19] mention, since characters allow the audience to experience emotions and create empathy with the story, facilitating the approximation of the stories to real-life experiences. The dimension where verisimilitude has the most impact is the behavioural one, also consistent with Pera and Vigilia [19] results, since the closer the story is to reality, the more people are willing to act, whether out of a desire to learn, share or support the content of the story. The dimension where the message has the most significant impact is the behavioural one, as in Dessart and Pitardi [13], given that consumers show a strong sign of individual commitment to the message of the story by showing willingness to understand, share and consequently support the message of the story.

In summary, the message, followed by the verisimilitude, has the main influence on consumers. These two components have the greatest impact on the behavioural dimension. The plot has a similar importance but at the cognitive and emotional dimensions.

22.7.2 Theoretical and Practical Contributions of the Study

From a management point of view, the results showed how specific elements of the brand story, adequately orchestrated, can stimulate cognitive, emotional and behavioural engagement. Thus, in terms of practical contributions, the results obtained in this study will allow any brand that intends to communicate through videos a better understanding how to produce narrative content according to the intended objectives. Different from other studies in the field, adding to the literature,

this research focuses on the dimensions and sub-dimensions of consumer engagement as a consequence of stories, allowing companies to obtain answers about the type of story that generates more engagement and which components are most valued by consumers. For example, a brand that wants to do this type of communication but has limited resources and consequently cannot focus on everything this format requires should focus more on the plot and the message. This is because these two components are not only the ones that most affect consumer engagement but also the ones that consumers value the most.

22.7.3 Limitations and Suggestions for Future Research

Regardless of the findings and conclusions, the present study faced some limitations throughout the process. Considering the study's exploratory nature and the sample size, which focuses only on the opinions of generation Z, the findings cannot be fully generalized. In future, carrying out a similar study may be helpful to involve a more comprehensive, significant and representative sample of consumers. This would provide the opportunity to develop more knowledge about the impact of storytelling components on consumer engagement.

Regarding the methods and techniques chosen to carry out the study, it was decided to use a qualitative methodology using focus groups. For future studies, it could be interesting to complement the study with other techniques, such as semi-structured interviews with experts on the subject. It could be interesting to use a mixed methodology operating a more quantitative analysis based, for example, on questionnaires, to verify the causal relationships between the story elements and the dimensions of engagement.

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Chapter 23
Environmental Sustainability and Sports Management: A Review of Marketing Contributions and Discussion of Future Research Opportunities

Ricardo Roseira Cayolla and Marco Escadas

Abstract In this research, we provide an overview of the increasing area of environmental sustainability in the sports management field and discuss future research opportunities. Through a division of topics that we consider most impactful, a selection of the research that has been implemented is presented, as well as their results and possible future directions. We conclude with a final reflection to extend and deepen sustainability studies in sport management.

Keywords Environmental sustainability · Sport management · Marketing

23.1 Introduction

The sports industry is among the most important in the world. It generates billions of euros annually and is of enormous importance in society: financially, socially, emotionally, from a sustainable perspective [22]. Marketing and communication can function as essential vehicles in conveying the intended message [29]. The development of modern technology allows new ways to reach a vast audience [28]. In consumers, the perception of initiatives carried out by sports organizations is a sphere where marketing can assist the sports industry [33]. Recently, we have witnessed an enormous effort by sport management in terms of sustainability initiatives, namely from the perspective of environmental perspective [4, 7, 31]. However,

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further research is needed to examine the influential impact of such sustainability initiatives on the various stakeholders, as well as its subsequent results in observable and measurable decisions and behaviors.

The general society is increasingly involved with climate changes, and sports stakeholders are no exception. The sustainability practiced by sports organizations can be a way to strengthen ties between communities, increase the fan base, make operations less financially burdensome, and benefit society globally [32]. The excitement derived from watching sporting events makes them more memorable. Combined with a high level of consumer identification with the brand, it can facilitate consumer behavior change toward greater sustainability.

This article begins by addressing the environmental impacts of sports, an undeniable reality resulting from a considerable mass of followers of the sports phenomenon. It then presents studies on how to manage sustainability in sports. It addresses several sports and theories to try to explain how sports activity should be managed from an environmental sustainability perspective. The sustainability facility is the next topic, particularly concerning stadiums and countries that harvest mega-events. The sports consumer is unique because of the strong emotions that characterize the activity. Fan engagement is also an object of study from a theoretical logic and applicability. Attitudes and consumer behaviors close the presentation of works achieved, highlighting the lack of models that control and monitor consumer behaviors. Finally, we present a conclusion.

23.2 Environmental Impacts of Sport

Except for some deniers, climate change is a reality that today affects the quality of life of many citizens. Diagnosing the existence of the sports industry requires more profound knowledge, both at the micro-level (e.g., individual as family planning) and macro-level (e.g., in the definition of policies and their subsequent implementation).

Through questionnaires and interviews with directors of sporting events as well as volunteers, among the first to conduct studies to evaluate the environmental performance of an international multi-sport event were Mallen et al. [18, 21]. The authors conclude that once a plateau of results has been reached regarding environmental performance, structural, systemic, and cultural measures are necessary to define policies and subsequent implementation of the respective programs. The success of sporting events from an ecological perspective, whether strategic or operational, is a consequence of the measures to be defined.

The practice of sports, particularly for the youngest, has a considerable impact on the environment due to the trips made by parents to enable them to practice their favorite sport. For example, 75% of families with a school-age child in the USA alone engage in an organized sporting activity. The steps taken to reduce this type of negative impact are essential. Bunds et al. [2] studied 172 guardians of a sports swimming team with a jam-packed competitive calendar consisting of 47 weeks of competitive activity. The study's objective was to measure the environmental impact

of the trips carried out. The use of the car, mainly for the trips made, is a reality. The authors suggest using carpooling and including other objectives in addition to going to the sports facility (e.g., grocery shopping) as measures to reduce the environmental impact.

The carbon footprint caused by spectators in transport to access university sporting events was studied by [35]. One of the essential factors to consider is the stadium's location and the spectator's area of residence. The authors chose on- and off-campus locations, defining them as high density and low density, respectively. They concluded that, depending on the sites in question, the type of transport chosen by the participants differs. The metro is more used in the more densely populated area, with car pooling and buses more used in the less densely populated place. The analysis of these two different stadium locations gives accurate insight into how spectator mode of transport has influenced CO_2 emissions and whether stadium location changes CO_2 emissions per spectator.

The need for quantitative studies on the environmental impact of events is a fact. In small-scale university sporting events held at a university, the carbon footprint of spectators and teams' travel by analyzing travel patterns was analyzed [9]. They concluded that university spectators had a smaller footprint than teams per person, but a wider overall carbon footprint. The authors advise measures to diminish the footprint of spectators and teams, namely through a shorter number of long-distance air travel and rising the vehicle occupancy rate.

As the sports industry, by its very genesis, pollutes, sports organizations have accomplished, in the last decade, a set of more environmentally friendly practices. CO_2 emissions produced in the sports industry were also studied [34]. The report shows that only measures with a management approach and the development of sustainable policies can "attack" this problem. After a review of the literature, the author concludes that it is necessary for sports organizations to have specific practices, namely in the mobility of spectators, thus promoting more sustainable displacement.

The reality is that sports organizations have been evaluating, in addition to the economic impact, the environmental impact. While it is important to underline this fact, further progress is needed [22]. Monitoring and measuring sustainable practices in all aspects, including negative ones, becomes imperative. In this study, the authors first reviewed the literature that analyzes and reports on sports' environmental impact. Then, they propose a model, thus expanding more understandably, the evaluation to be carried out and the identification of specific aspects of sporting events to reduce their environmental impacts.

Mobility is a "sine-qua-non" condition for the success of the sports industry, whether on an amateur or more professional basis. It is necessary to have sustainability reports about the events carried out, namely the environmental impact caused. Possible future research directions may focus on the policies to be defined, the strategy of sports organizations and subsequent implementation, and the family organization itself.

23.3 Managing Sustainability in Sports

Since the beginning of the millennium, sport organizations have had a genuine concern regarding their performance in sustainability areas (REF BIBLIOG). The social importance of sport has been constant over time. In this way, sport can serve as a facilitator of social change.

The sports industry has been making efforts to be more sustainable. Organizational learning is a reality, and the sports industry may better understand and combine efforts made in environmental sustainability initiatives. Employing two theoretical models (i.e., institutional theory and diffusion of innovation) [23] uses examples from different sports organizations and competitive leagues to classify the efforts made. They call these examples "waves" and reflect on the possible implications arising from these efforts.

What has been done and the actual results of the initiatives carried out are essential to consider in the sustainability field [14]. They recognize the effort sports organizations and event organizers have made to be more sustainable. They begin their study with concrete, structuring questions about sustainability. "What is the true meaning of sustainability?" "How do consumers perceive it?" "How are sustainable goals implemented, and what is their true effectiveness and efficiency?" From these questions, the authors present examples of greenwashing in the history of the Olympic Games, as well as two examples from professional sports: NASCAR and the National Hockey League (NHL). They finish with two recommendations: Firstly, sports organizations should define, measure, and evaluate sustainability; secondly, there must be a closer link between government actions and the sports industry to sustainability improves.

Websites, academic journals and magazines, and the dissemination of environmental sustainability (ES) activities in different modalities (football, basketball, baseball, and rugby) were investigated [36]. The results indicate low communication of ES practices by professional sport teams in the Asia-Pacific region compared to North America. They propose future studies on relationships, where the wealth of data can be complemented by analyzing factors such as attitudes, cognition, or behavior. Studies must be conducted outside North America, confirming or extending data from investigations already carried out. The use of interviews to understand the reasons and expected results or to obtain data to understand the public's perceptions and expectations in these markets is also suggested.

In the four major North American leagues (NBA, NFL, MLB, and NHL), were interviewed executives in their consulting, advisory, non-profit, and corporate partner firms who were responsible or assisting with the design, implementation, and management of the environmental initiatives [32]. Ecological practices have strategic importance for clubs with organizational and social benefits. This study reinforces the importance of the environment as an essential pillar of sustainability strategies.

During the pandemic, three months after the suspension of public attendance at sporting events, Cayolla et al. [7, 6] completed an online survey with a total of 5917 stakeholders (partners, employees, and sponsors) of a professional sports team

(PST). This research aims to deepen the importance of environmentally sustainable initiatives in sport (ESIS). Three topics were considered (i.e., climate change and energy consumption, environmental impact of sporting events, health and well-being) and analyzed under three forms of sustainability: organizational, community, and individual. Through a descriptive analysis of the results, the theme most valued by partners and employees is health and well-being in a sustainable individual form. At the same time, sponsors prefer more collective structures (i.e., organizational and community).

Based on the United Nations definition of higher education and supported by Küskü [17] environmental citizenship model, Busch and Hoffmanns's [3] environmental dimensions model, as well as a vision of the future [1], [19] present questions that are intended to be the beginning of a vigorous debate on the fate of environmental sustainability at the sport academy. The model presented is nothing more than the beginning of a discussion, and the extent and depth of it depend on the will and interest of those involved in the sport academy.

Sports organizations can be ecological examples for other institutions [27]. By incorporating eco-centric management principles into their organizational practices, organizations that make up the sports industry can be more environmentally friendly. In their work, firstly, they present a paradigm composed of four levels of thought and respective values that identify and guide the practices of sports organizations. Then they offer a set of propositions to adopt behaviors that reflect the values of sports organizations.

The study of sustainability management in sport is still at a very seminal stage. Collecting qualitative and quantitative studies is essential for a deeper understanding of the subject, and studies on geographic contexts other than North America are something to consider. Finally, knowing the opinion of the sport's primary stakeholders (i.e., the fans) is very important. However, researchers should go further and also listen to the idea of sponsors, managers, and politicians who manage the public cause.

23.4 Facilities and Sustainable Initiatives

The places where the mega-events take place are the object of pilgrimages and are made up of enormous symbolism. The stadiums where the mega-events are held are much more than a symbolic issue as they represent a source of economic growth and a new way of being due to consumers' behavior when using the facilities. Careful study and analysis are required in the planning and execution of these modern cathedrals.

Making sport mega-events more environmentally friendly has been a concern of sport organizers, particularly in the last two decades. With the analysis and study of interviews carried out with various stakeholders participating in the Beijing (2008), Singapore (2010), and London (2012) Olympic Games, Samuel and Stubbs [26] concluded there are transversal measures (e.g., assuming publicly sustainable commitments, having sustainability as a basis in the vision, mission, and branding

of the commission and organization). For the authors, these measures allow for more excellent and better practices of sustainability policies and initiatives that make these mega-events more sustainable at all levels. Finally, reinforcing the institutionalized sustainability characteristics in the sports organization is necessary.

Currently, all organizations are faced with a degradation of the environmental condition, and the sports industry is no exception. A case study of a specific country, Canada, presents a proposal for a guided vision adapted from several reports unanimously recognized worldwide and from several academic studies [20]. To better understand the phenomenon of sustainability and its impacts, they end with questions that open new avenues for research.

The possible social change is always inherent to the activity of the sports industry. The most visible symbol of the environmental flag for sports organizations is the stadium where the events occur. Sport has enormous popularity and importance in society. Kellison et al. [16] interviewed 13 stadium architects wanting to learn more about the link between social change and sustainable design and concluded that, in North America, only 40% of the stadiums are new. That is, they follow directives in favor of more sustainable construction and future behavior that is more environmentally friendly. The environmental movement and concerns for a more sustainable world were significant in the conception and design of the stadium.

The sustainability initiatives executed in 16 North American stadiums were analyzed by Mallen et al. [18, 21]. Through questionnaires to three dozen experts, the authors made a "state of the art" regarding the environmental sustainability of the stadiums in question, including several domains (e.g., reported value, financial support, best practices, challenges). They reveal future trends and advocate that the results in question can be an educational guide that promotes discussions and debates that allow the development of environmental sustainability.

It is well known that mega sporting events generate vast amounts of pollution. Regarding environmental sustainability efficiency, it is crucial to have a criterion for choosing the cities or countries that will host these events. Pereira et al. [25] propose the facility location problem (FLP) model as a tool to be applied in the sports sector. With this study, using a tool with proven evidence in other economic sectors and from a sustainability management and planning perspective, it would be easier to choose cities and countries that are candidates for mega sporting events. For this, it is necessary to change the current selection criteria.

The topic related to the facilities and sustainable initiatives has not been the subject of extensive research. From an environmental sustainability perspective, it is necessary to broaden the scope (e.g., other countries, other sports, events of a more local nature but which involve a greater frequency of action) and to create a volume of research. That allows greater certainty about where we are and which way to go.

23.5 Fan Engagement

The importance of sport in today's society is an undeniable reality. The colossal stage enjoyed in the most diverse media, combined with a strong sense of identity, can help make consumers more aware of climate change, and make society more environmentally friendly through their behavior. From the various studies published in recent years, we present authors who cover the topic of fan engagement from different perspectives.

Based on Kelman's perspective, Inoue and Kent [11] investigated how a sports team can induce consumers to behave in favor of the environment. In this study, carried out through an online questionnaire composed of 197 students, the authors prove that positive environmental practices increase the level of internalization of the team's values by the consumer. The acknowledgment of this fact leads, on the part of the fan, to a greater intention to support the team's environmental initiatives and include behaviors in favor of the environment in their daily life. The authors conclude by reinforcing the role of the social impact of sports organizations and highlighting the role of internalization in the entire process.

Sustainability practices were analyzed and examined from a triple perspective (social, environmental, and economic) in the websites of 126 teams from four North American leagues (NFL, MLB, NBA, NHL) [8]. Although the type of communication varies according to the league in question, there is a common denominator. On websites, social items are valued more than economic items. The authors conclude that, as far as sustainability initiatives are concerned, close attention should be paid not only to the communication efforts of sports organizations but also to consider the various stakeholders' perceptions. They warn that these two factors have consequences concerning consumer behavior and attitude toward professional sports.

Through corporate social marketing (CSM), Inoue and Kent [10] investigated the extent to which professional sports organizations can voluntarily influence fan behavior. An online survey of supporters of two sports teams collected 620 valid responses. After studying them, the authors conclude that corporate credibility influences organizations and the characteristics of the programs developed. Concerning sustainability actions, the behavior of the adept is a reflection of this corporate credibility. Interestingly, the authors find that supporters with less involvement in environmental issues are more susceptible to the greater importance of corporate credibility. Professional sports organizations' importance as a vehicle for social improvement is thus proven due to their credibility in the CSM.

The design and construction of sports infrastructures emphasizing sustainability is an excellent example of the importance of pro-environmental strategies in professional sports organizations. It may result in positive results in three areas: environmental, social, and economic. Kellison and Kim [15] interviewed ten directors from four North American sports leagues (MLB, NBA, NFL, NHL). The authors found that sports organizations emphasize the social component of sustainability. However, this does not mean that the other domains (environmental and economic) are not closely

linked. Still, there is a more significant concern with the social component. With a focus on social, they hope to achieve two goals: raising awareness among fans in the field of sustainability and attracting new fans, thus increasing the business base.

Sports organizations have been implementing measures to reduce this impact because the sports industry affects the natural environment [24]. Such actions range from energy improvements, to waste management programs, and a strong connection with supporters (i.e., fan engagement). However, the results of the efforts of initiatives related to fan engagement are contradictory. In this way, the authors propose, through fan identification, the leverage of Sense of Place (SOP). The objective would be to achieve greater fan participation in this initiative. Consequently, there will be a decrease in the environmental impact of the actions of sports organizations and at the individual level through the behavior of fans. Through the explanation of practical examples, the authors present a model that encompasses sports management and sustainability.

Sustainable behavior is vital in events played at the stadium or opponents' facilities. In college men's basketball, Casper et al. [4] studied how the engagement initiatives carried out by sports organizations for fans, associated with values and norms related to the environment, influence their behavior in home games. Two hundred sixty-seven fans with annual tickets were studied in two moments: before the season started and at the end of the season. The assessment was based on memory and three environmental initiatives (recycling, water conservation, and composting). The results indicate that personal values and norms are not significantly related to changes in a particular behavior (i.e., at home). The rules for sporting events enabled a more excellent perception of the benefits of recycling, thus supporting that sustainability campaigns to achieve greater engagement of supporters are effectively a communication and promotion lever for more sustainable behavior.

Due to the vast audiences, sustainability initiatives carried out in sport can reach a vast and heterogeneous audience. Although it is known that this type of initiative can help to increase consumer awareness, there are few certainties about the actual effectiveness of campaigns carried out with this objective. To try to find out more about what fans think about the sustainability initiatives of a professional sports organization, Cayolla et al. [7, 6] collected data at two different times (2020 and 2021). The authors studied the 1687 suggestions provided by members through an open question registry. Applying content analysis, recommendations were summarized in five main themes: sustainable venue design, eco-friendly matchday operations; green sponsorship activation; pro-environmental communication; and improving matchday experience in general. They conclude that the perception of the partners concerning the main themes suggested a greater awareness of the themes related to sustainability.

From the studies presented, in general, more research is needed to understand how fans receive the initiatives performed by sports organizations. More studies are required to understand, for example, to what extent the current behaviors of fans are changed due to the initiatives executed. Carrying out comparative studies between North American leagues and leagues from other parts of the world is also a way forward. Knowing that it is difficult to get the supporters' commitment to sustainable

behaviors, realizing the degree to which consumers are truly aware of the initiatives is another possible area of investigation.

23.6 Attitudes and Consumer Behaviors

In a way, consumer behavior is unpredictable. For sports organizations to begin understanding the impact that the sustainability initiatives carried out have on the consumer is very important. Communication comes into this equation, which is central to making known what is being done. Then we describe the chosen studies on this topic.

The sports industry has been thoughtfully committed to the issue of climate change. There is lack of uniform models that allow the evaluation of environmental sustainability initiatives [30]. The authors created and tested a model for evaluating sustainability initiatives among participants in an endurance race, obtaining 531 responses. To test for non-response bias, two response times (participants who completed the survey before the last day and those who completed the previous day) and various factors (gender, education level, family income, and distance traveled to the race) were taken into account. The needs and values of the participants are aspects to consider in the initiatives to be developed by sports managers and managers.

Most studies on the carbon footprint focus on sporting events and, to a lesser extent, on sporting teams. In Germany, sport-active participants' perspective was scrutinized in a study on the heterogeneity of individual consumer behavior [37]. Through online questionnaires, 6537 adults who practice twenty sports reported their behavior related to sports trips, whether for regular training or competitions. The author concludes that a more significant relationship exists between environmental awareness and a smaller carbon footprint in favor of individual sports to the detriment of team sports. Interestingly, nature sports participants had the highest emission levels.

A longitudinal study was elaborated to investigate the use of sunscreen during snow vacations by 418 Dutch adults [13]. Before the trip, two moments of evaluation were designed. First, psychosocial factors were measured in a questionnaire (e.g., knowledge, risk, social influence, among others). After the trip, the authors measured sunscreens and sunburn frequency. The results show that, regardless of the intention to use sunscreen, about 40% did not use it. Men and the youngest to respond are the highest risk group. The authors conclude that using sunscreen, among others, predicts a positive attitude and high levels of efficacy.

Inoue and Kent [12] have developed a conceptual model that explains how companies can influence consumer behavior through initiatives carried out under the aegis of corporate social marketing (CSM), whether from a social or business benefit perspective. For the authors, the company's credibility is critical in the sense that the effectiveness of CSM initiatives depends on this factor. As antecedents of credibility, there are three levels to consider: (1) the company's characteristics, (2) the characteristics of CSM initiatives, and (3) the characteristics of the cause itself. They

conclude that the credibility of the CSM influences the intention of prosocial behavior and consumer loyalty.

Reducing the environmental impact of sports organizations is an objective to which the sports industry is committed. However, it is tough to control the behavior of the fans on an environmental level. This research by Trail and Mccullough [31] seeks to follow up on the evaluation of sports sustainability campaigns in a sports organization. Over time, the authors studied movements that addressed various topics (e.g., garbage collection, transport, and energy conservation, among others). Needs and values influence attitudes toward sustainability campaigns. The authors analyzed 182 caregivers of intellectually disabled athletes and propose that sustainability intentions before the event predict sustainable behaviors during the event, adding that a higher satisfaction rate with the campaigns carried out influences a more sustainable behavior day by day.

The implementation of sustainability initiatives is a reality for many sports organizations. Cayolla et al. [5] analyzed the initiatives carried out at an unusual time—during COVID-19 and with the absence of fans at the stadiums, under two topics: diversity and inclusion (i.e., in the public domain) and attraction and retention of human capital (i.e., not the inner plane of the organization). Also, the authors added the distance from the fans' residences to the stadium. The idea is to understand if there was any relationship between the distance and the lesser or more significant knowledge of sustainability initiatives. Five thousand six hundred ninety-four members answered the online questionnaire. The results indicate the importance of knowing the initiatives with positive discrimination. Finally, distance affects positively or negatively depending on the knowledge or lack of understanding of the initiatives.

Concerning sustainability initiatives, much more is known today than a decade ago about consumer behavior, attitudes, and ways of being. However, this is one of the areas where a more significant amount of research is needed to have a more coherent and holistic view so that sports organizations can effectively carry out sustainability initiatives with concrete results. Using the models proposed in other contexts is possible, as well as carrying out studies in other sports.

23.7 Conclusion

Far more is known today than just two decades ago in environmental sustainability. In sports, progress has been made very quickly in this specific area of sustainability. However, the truth is that we are still in the first steps toward a more sustainable sports industry from an environmental perspective. For sports organizations, simple actions such as making annual reports, monitoring, controlling, and evaluating the initiatives carried out are crucial for better sustainable performance in all its perspectives: environmental, economic, and social. Further, standard vocabulary (e.g., ES, ESIS, SI) is also desirable for faster and deeper dissemination and understanding of the

research executed. We hope that the reflection provided by this research paper can encourage this scientific journey.

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Chapter 24
Green Perceived Value in the Brand-Consumer Relationship: An Empirical Study of Its Determinants in Managing Global Brands

Catarina Ferreira de Faria and José Manuel Carvalho Vieira

Abstract Consumers' concern with the industry's impact on the environment has been increasing, so they increasingly seek to adjust their buying and consumption behaviour to the need to preserve and conserve natural resources. Although the existing literature on green marketing is increasingly common, the relationships between its critical concepts still need to be more conclusive. This research focused on one of the main consumption trends: green consumption. Given consumers' growing preference for sustainable business practices, an exploratory structural path analysis was developed to understand the primary benefits consumers value the most and how they are relevant for brands to create consumer-brand relationships. For this, this research tried to clarify the relationship between a product's functional and emotional benefits (utilities and warm glow), the green transparency perceived through the information provided by companies and brands, the connection between brands and consumers, brand loyalty, and green brand equity. Results suggest that the perceived green value (GPV) increases when utilitarian environmental benefits and warm glow benefits of products and corporate green increase. The greater the green perceived value, the greater the connection created between consumers and brands and, consequently, the greater the brand loyalty. Loyalty is one of the paths leading to the generation of green brand equity. Therefore, companies must understand the importance of green perceived value to achieve high consumer involvement levels.

Keywords Green marketing · Green perceived value · Self-brand connection · Brand loyalty · Green brand equity

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24.1 Introduction

Consumers' concern with the industry's impact on the environment has been increasing, so they are increasingly seeking to adjust their purchasing and consumption behaviour to the need to preserve and conserve natural resources. Companies and brands are therefore obliged to redefine their way of acting. How they obtain the raw materials for their products and how they communicate their environmental preservation policies in order to be able to create and deliver value and, therefore, adopt green branding strategies [1].

From the green activism of the 1970s to the present, concern and awareness of the impacts of consumption on the environment have been significant trends in recent decades [2]. Although controversial because it is simultaneously consumption and attentive to the conservation of resources [3], the number of consumers who opt for environmentally friendly consumption practices is increasing [4–6].

Green consumption involves sharing, reusing, repairing, and restoring instead of exchanging. Look for precise information on the way and method of obtaining raw materials for products or even the energy levels used through the observation of labels or the reading and rigorous analysis of the brand's sustainability and social responsibility policies [6].

If previously, consumers associated green products with lower quality and higher prices and whose brands were mostly unknown or uncommon [7], green consumption and a sustainable and healthy lifestyle are currently one of the biggest trends. Assuming that the concern for preserving the planet is common to all generations, from Baby Boomers to Generation Z, previous research found four clusters with different levels of commitment, awareness, and altruism: the Lifestyles of Health and Sustainability (LOHAS), naturalists, drifters, and conventionalists [7].

The number of brands integrating this concept into their corporate identity is increasingly significant [5, 8, 9]. For example, *green marketing* is defined as "the study of all efforts to consume, produce, distribute, promote, package, and recover products in a way that is sensitive and responsive to ecological concerns". Also, Aaker [10] defines *positioning* as the part of the brand identity and its value proposition that must be actively communicated to the target.

At the base of positioning is the value proposition, which will be the main reason the consumer will choose a brand and, consequently and ideally, will become loyal. Dahlstrom [9] defined it as the emotional, functional, and self-expression benefits the brand offers that will bring value to consumers of a particular market. Therefore, the value proposition is one of the essential components of a company's positioning process [11]. This perceived value is a balance between the sacrifices and benefits associated with a series of consumption practices, and it refers to the net benefit of a product or service [12–15].

Within this framework, this research aims to identify sustainability factors that, in terms of product attributes and business processes, generate value for consumers and sustain, reinforce, and monetize their loyalty to a particular brand.

Based on exploratory structural path analysis, it intends to clarify the relationships between the functional and emotional benefits of a product (utilities and warm glow), the green transparency perceived through the information provided by the companies and brands, the connection between brands and consumers, brand loyalty, and green brand equity.

First, the literature concerning the tested concepts will be reviewed, giving rise to model research hypotheses. Next, the results of path analysis are presented and discussed, as well as the conclusions (taking into account the confirmation or disconfirmation of the hypotheses), the study's limitations, and suggestions for future lines of investigation.

24.2 Literature Review

24.2.1 Environmental Utilities Benefits

A *green brand* is defined as a brand with specific attributes and benefits to reduce environmental impact and consumer perception as an environmentally friendly brand [16].

A green positioning strategy based on functional attributes, reflecting its perceived usefulness, builds brand associations through the product's environmental attributes. It turns them into advantages—in the environmental scope—such as the production process or referring to the product's use or even the elimination of post-consumption of a product compared to the competition [17]. Consequently, it is expected that:

H1: The greater the environmental utility benefits of a product, the greater the green perceived value.

24.2.2 Benefits of Warm Glow

A green positioning strategy based exclusively on utilitarian or functional attributes may be limited. For example, reducing the environmental impact of using a product may not deliver personal benefits to its buyer, making their motivation insufficient for the product purchase [17].

A green brand must also position itself for its emotional benefits, similar to what happens with non-green brands [18]. Benefits associated with self-expression behaviours through visible consumption of green brands, direct contact with nature, and, more importantly, altruistic behaviours (warm glow) allow consumer satisfaction, especially when they feel they are contributing to an environmental improvement, a common good for all living beings [10, 17]. This investigation intends to verify if:

H2: The greater the warm glow benefits of a product, the greater the green perceived value.

24.2.3 Green Transparency

The interest in transparency is transversal [1]. Corporate transparency allows consumers to clearly and objectively establish a point of view about the company, define their expectations of the company, and reduce uncertainty in the face of sometimes very complex content [19–22]. The fact that a product can be reused or recycled does not, however, determine its degree of greenness since it may, in order to obtain the raw materials that constitute it, have severely harmed the environment [6].

Conversely, eco-innovation assumes that brands develop new products, processes, and services that consider the most efficient use of resources, processes, and the least number of adverse effects on the environment [23–25].

The transparency with which green brands deliver relevant environmental information, as well as admitting how their production process impacts the environment, will determine their differentiation based on the creation of green value [26, 27].

This research defines *corporate transparency* as a deliberate attempt to make all information available, whether positive or negative—in a precise, timely, balanced, and unambiguous manner to increase the public reasoning capacity and hold organizations accountable for their actions, policies, and practices [15]. Hence, formulate the following hypothesis:

H3: The greater the perceived green transparency, the greater the green perceived value.

24.2.4 Green Perceived Value

GPV is a balance between different types of value (economic, social, hedonic, and altruistic) and different types of cost (price, effort, evaluation costs, time, and performance risk) [16]. Consumers globally evaluate a product or service based on (1) its net benefit as a reflection of their environmental desires, (2) their sustainable expectations, and (3) their ecological needs—it is a balance between different types of value (economic, social, hedonic, and altruistic) and different costs (price, effort, evaluation costs, time, and performance risk). GPV is essential for creating and developing lasting relationships between brands and consumers, but mainly because it affects purchase intentions and consumer trust in a particular brand, that is, Brand Loyalty [13, 28]. At the base of the perception of this, green value and consequent brand loyalty are two factors: the benefits of a green brand—both emotional and functional and warm glow that are related to the feeling of altruism—and transparency [17].

Brands need to communicate their utilitarian and emotional green benefits, and their information must be transparent so that consumers evaluate positively—and above all, systematically. This assessment results from perceived green value. Thus,

higher GPV leads to a higher probability of the consumer becoming loyal to the brand. So, it is hypothesized that:

H4a: The greater the perceived utility benefits, the greater the green perceived value and the greater the brand loyalty.
H4b: The greater the perceived benefits of warm glow, the greater green the perceived value and brand loyalty.
H4c: The greater the perceived green transparency, the greater the perceived green value and brand loyalty.

24.2.5 Brand-Consumer Connection

This construct captures a brand's image's role in consumers' self-congruence, more specifically, the extent to which individuals incorporate brands into their self-concept, the degree of connection between the consumer's identity, the brand, and the symbolic consumption of the brand, as well as their role in the consumer's actual or ideal self-expression [29, 30].

At the base of a relationship, there is some connection between the consumer and the brand. The self-brand connection can be segmented into four behaviours [26]: (1) consumers invest functionally in brands when there is a high functional connection and a low emotional connection. They buy their products because of their satisfaction with the brand in terms of performance. However, since there is no emotional bond, their decisions generally consider the price and functionality of the products of a particular brand. Therefore, if there is another alternative that seems more intelligent to them, they can switch; (2) when consumers are emotionally and functionally connected to a brand, they are fully invested in it. More than loyal, they love the brand and actively contribute to positive word-of-mouth. They also tend to ignore some flaws the brand and its products may have. They are willing to pay premium prices—and refuse to buy other competing brands—as they feel that the brand is part of them; (3) when relationships are based on powerful emotional connections, with low functional connections, consumers like and choose a brand for affective reasons, even if the brand or its products underperform compared to competitors. If the emotional connection degrades for this reason and over time, the relationship may end; (4) whenever there is no relationship basis, there will be no investment, brand loyalty will be non-existent, and price sensitivity will be greater. In these situations, brands are subject to the competitive environment in which they are inserted and risk being replaced by other competing brands. To reverse the scenario, it is necessary to deepen connections with consumers.

The congruence between the consumers' self-concept and the values and attributes of a product or service of a particular brand increases the probability that they will purchase its products, positive word-of-mouth, and develop a lasting and sustainable relationship with the brand [31, 32]. Similarly, green consumers tend, according to

Lin et al. [17], to identify with brands that support them in achieving their ecological goals and objectives, the more they can perceive their green value, so:

H5: The greater the perceived green value, the greater the brand-consumer connection.

24.2.6 Brand Loyalty

Whether frequent or cumulative, satisfaction is not enough to talk about brand loyalty. Loyalty is something that transcends satisfaction [33, 34]

Creating and maintaining brand loyalty depend on five factors: treating customers well, staying close to them, measuring and managing customer satisfaction, creating switching costs, and delivering extras [18]. Despite companies' efforts to develop and implement loyalty programmes, most customers need more time, interest, or emotional energy to form relationships with various products or services [35].

In an increasingly digital economy, customers define, determine, and guide the dynamics of relationships with the brand(s). Cognition and affection are two of the pillars of the brand experience. At a cognitive level, the usability and functionality of a website are two elements that replace the "real-world" experiences obtained through physical contact, as well as fun and pleasure, at an affective level [36].

Consequently, how consumers integrate the brand determines their behaviour and the level of brand loyalty. In this sense, this investigation intends to verify if:

H6a: The greater the perceived green value, the greater the brand loyalty.
H6b: The greater the perceived green value, the greater the brand-consumer connection, and the greater the brand loyalty.

24.2.7 Green Brand Equity

Brand equity is associated with the value that a brand represents for the consumer (customer-based brand equity) and companies (corporate-based brand equity) [9]. It depends on its active and passive attributes that add or subtract value provided by a brand, product, or service as well as the consumer's attitude, attachment, and activity towards the Brand.

The concept of green brand equity extends it to the set of active and passive attributes of a brand related to ecological commitments and environmental concerns linked to a brand, its name, and its symbol, which increase or decrease the value of a green product or service [13]. In this sense, green products with a greater emotional and cognitive impact tend to guarantee a greater GBE on the part of consumers [37]. Consequently, associations and environmental perceptions related to the brand contribute to creating the green brand image as they add—or, in some cases, subtract—value to the brand [38]. In this sense, this investigation predicts that:

H7: The greater the brand-consumer connection, the greater the green brand equity.

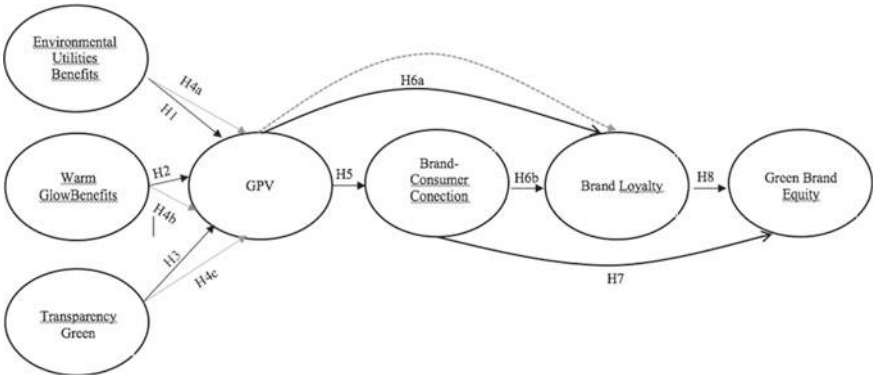


Fig. 24.1 Conceptual model. *Source* Adapted from [17, 38]

H8: The greater the brand loyalty, the greater the green brand equity.

The model in Fig. 24.1 explains the set of predicted relationships whose direction and strength are to be tested.

24.3 Methodology

Data were collected using a semi-structured questionnaire (Likert scales), multiple-choice closed-ended questions referring to sample characterization, and two short-answer open-ended questions referring to brand identification and age of respondents.

The hypothesis test was performed using the Smart PLS 4 software that allows the modelling of structural equations (SEM) through the partial least squares (PLS) path modelling model.

24.3.1 Sample

A total of 325 responses were obtained, and 253 were considered valid. This sample is considered non-probabilistic for convenience as it does not statically represent the population. With an average age of 26.9 years (SD 8.42), the sample is primarily female (81.0%), single (84.3%), with higher education (72.5%) with income between 1000 and €1500 (48.1%).

24.3.2 Measurement Model

The analysis of the measurement model of the present investigation was based on the methodology steps suggested by different previous research [36, 39, 40]. As a result, each construct obtained its convergent validity, the loadings of each indicator, the average variance extracted (AVE), Cronbach's alpha, and the composite reliability of each construct.

The loadings must have values not lower than 0.6 [36]. As can be seen in Table 24.4, the minimum value recorded is 0.779.

Finally, when the variables are positively correlated with their respective constructs, the AVE values exceed the minimum value of 0.5 (Table 24.1).

In the case of environmental utility benefits, Cronbach's alpha is 0.754; in the remaining constructs, it is higher than the minimum recommended value of 0.8.

Table 24.1 Convergent validity

Constructs	Items	Loadings	AVE	Cronbach alpha	Composite reliability
Environmental utilities benefits	Env. Ut. B	0.894	0.671	0.754	0.859
	Env. Ut. B	0.779			
	Env. Ut. B	0.779			
Warm glow benefits	WG 1	0.948	0.868	0.924	0.952
	WG 2	0.924			
	WG 3	0.921			
Green transparency	Transp. 1	0.925	0.885	0.935	0.958
	Transp. 2	0.961			
	Transp. 3	0.935			
Green perceived value	GPV 1	0.852	0.783	0.961	0.916
	GPV 2	0.916			
	GPV 3	0.886			
Brand-consumer connection	B-CC 1	0.907	0.857	0.944	0.960
	B-CC 2	0.916			
	B-CC 3	0.948			
	B-CC 4	0.932			
Brand loyalty	BL 1	0.874	0.747	0.886	0.922
	BL 2	0.895			
	BL 3	0.887			
	BL 4	0.797			
Green brand equity	CBE 1	0.980	0.960	0.979	0.986
	CEE 2	0.988			
	CBE 3	0.971			

Composite reliability—defined, according to the same authors, as an indicator of the consistency of the indicators of each construct—does not present values lower than the recommended value of 0.7.

24.3.3 Discriminant Validity

Then, the discriminant validity, which refers to the fact that a construct is unique and does not reflect the same as the others [36, 39, 40], was determined. Finally, the criterion of Fornell and Lecker analyses the square roots of the AVE of each construct with the correlations between the remaining constructs.

The results obtained in Table 24.2 conclude that the values highlighted on the diagonal are superior to the remaining correlations, demonstrating adequate discriminant validity.

Since the Fornell and Lecker criterion does not reliably determine the discriminant validity, the results obtained through the Heterotrait-Monotrait ratio (HTMT) were analysed, whose HTMT values should not exceed 0.85, which happens with the results presented in Table 24.3.

24.3.4 Structural Model

The model's predictive power was first analysed based on the adjusted R^2 and R^2 values [36]. Table 24.4 shows that the percentage of variation explained by the model is satisfactory, ranging between 32 and 58%.

24.3.5 Model Adjustment

Standardized root mean square residual (SRMR) is defined as "the difference between the observed correlation and the model's implicit correlation matrix (…), which can be used to avoid errors in model specification" [39, 40]. An SRMR value less than 0.10 or 0.08 is considered a good fit [41]. The normed fit index (NFI) uses Chi2 values as a parameter between 0 and 1, with NFI values above 0.9, as a general rule, representing an acceptable fit. The results in Table 24.5 show that the SRMR value of the estimated model slightly exceeds the recommended value of 0.08, while the value referring to the estimated model is only 0.058. The NFI values are also low, close to the recommended minimum of 0.9. The values obtained may be related to the sample size of the present investigation.

Table 24.2 Fornell and Lecker criterion

	Environmental utilities benefits	Brand-consumer connection	Green perceived value	Green brand equity	Brand loyalty	Green transparency	Warm glow benefits
Environmental utilities benefits	0.819						
Brand-consumer connection	0.535	0.926					
Green perceived value	0.665	0.643	0.885				
Green brand equity	0.293	0.438	0.398	0.980			
Brand loyalty	0.375	0.504	0.523	0.551	0.864		
Green transparency	0.509	0.438	0.531	0.262	0.425	0.940	
Warm glow benefits	0.559	0.698	0.652	0.285	0.446	0.413	0.931

Table 24.3 Heterotrait-Monotrait ratio

	Environmental utilities benefits	Brand-consumer connection	Green perceived value	Green brand equity	Brand loyalty	Green transparency	Warm glow benefits
Environmental utilities benefits							
Brand-consumer connection	0.622						
Green perceived value	0.812	0.710					
Green brand equity	0.334	0.455	0.432				
Brand loyalty	0.463	0.551	0.594	0.589			
Green transparency	0.598	0.465	0.590	0.272	0.467		
Warm glow benefits	0.661	0.746	0.729	0.298	0.516	0.443	

Table 24.4 Model predictive power

	R^2	R^2 adjusted
Brand-consumer connection	0.413	0.409
Green perceived value	0.584	0.575
Green brand equity	0.318	0.330
Brand loyalty	0.321	0.312

Table 24.5 Fitting the model to the data

	Saturated model	Estimated model
SRMR	0.058	0.088
NFI	0.840	0.827

24.3.6 Hypothesis Test

Bootstrapping results in Smart PLS 4 (*P*-values and *T*-values) suggest that the benefits of warm glow are the ones that exert the most positive and significant influence on the green perceived value ($\beta = 0.372$). Environmental utility benefits also positively and significantly affect the green perceived value ($\beta = 0.358$). However, transparency does not have such a significant impact on the green perceived value ($\beta = 0.195$). Therefore, the data suggest that H1, H2, and H3 are supported. Furthermore, environmental utility benefits, warm glow benefits, and green transparency explain 57.5% of the variance in green perceived value ($R^2 = 0.575$).

The influence of utilitarian environmental benefits on brand loyalty through green perceived value was obtained by summing the direct effects of utilitarian benefits on green perceived value and the indirect effects of green perceived value on brand loyalty.

The results suggest that the influence of environmental utility benefits on brand loyalty through the green perceived value is quite significant ($\beta = 0.479$).

The same is valid for analysing the influence of warm glow benefits on brand loyalty with the perceived green value as a mediator ($\beta = 0.484$). Based on the data obtained, green transparency positively affects brand loyalty through the green perceived value ($\beta = 0.424$). Therefore, H4a, H4b, and H4c are supported.

It is also expected that the perceived green value strongly influences the brand-consumer connection ($\beta = 0.643$), with a smaller influence on brand loyalty ($\beta = 0.339$), which suggests the confirmation of H6a and H6b. Furthermore, the green perceived value explains 40.9% of the variance in the brand-consumer connection ($R^2 = 0.409$). In comparison, 31.2% of the variance in brand loyalty is explained by the green perceived value and the brand-consumer connection consumer ($R^2 = 0.312$).

Finally, it is possible to observe that the brand-consumer connection positively influences green brand equity ($\beta = 0.214$), but the latter is more influenced by brand loyalty ($\beta = 0.444$). Therefore, confirmation of H7 and H8 is suggested. Also, 33%

of the green brand equity variance is explained by brand loyalty and brand-consumer connection ($R^2 = 0.330$).

In order to analyse effect sizes, the values indicated by Cohen (1988), cited by Ali et al. [42], were followed, considering 0.02 for minor effects, 0.15 for medium, and 0.35 for considerable effects.

Table 24.6 shows that most relationships have medium effects—relative to their size—ranging from $f^2 = 0.183$ to $f^2 = 0.222$. However, the relationship between perceived green value and the brand-consumer connection has a high impact effect ($f^2 = 0.705$). On the other hand, the relationships between green transparency and green perceived value ($f^2 = 0.065$), between green perceived value and brand loyalty ($f^2 = 0.099$), between brand-consumer connection ($f^2 = 0.071$), and between brand-consumer connection and green brand equity ($f^2 = 0.052$) are those with effects whose sizes are considered small.

Table 24.6 Structural model

Hypotheses	Beta total effects	*T* value	*P* value	Decision	f^2
H1: Environmental utilities benefits → GPV	0.358	4.966	0.000	Supported	0.183
H2: Warm glow benefits → GPV	0.372	4.416	0.000	Supported	0.221
H3: Green transparency → GPV	0.195	2.616	0.009	Supported	0.065
H4a: Environmental utilities benefits → GPV → brand loyalty	0.479	4.966	0.000	Supported	0.183
H4b: Warm glow benefits → GPV → brand loyalty	0.484	3.146	0.002	Supported	0.099
		4.416	0.000	Supported	0.221
H4c: Green transparency → GPV → brand loyalty	0.424	3.146	0.002	Supported	0.099
		2.616	0.009	Supported	0.065
H5: GPV → brand-consumer connection	0.643	3.146	0.002	Supported	0.099
		11.586	0.000	Supported	0.705
H6a: GPV → brand loyalty	0.339	3.146	0.002	Supported	0.099
H6b: GPV → brand-consumer connection → brand loyalty	0.643	11.586	0.000	Supported	0.705
H7: Brand-consumer connection → green brand equity		2.780	0.006	Supported	0.071
	0.214	2.128	0.034	Supported	0.052
H8: Brand loyalty → green brand equity	0.444	4.895	0.000	Supported	0.222

24.4 Results Discussion

Regarding the interpretation of the data obtained by the analysis carried out, similar to what happens with previous research [17, 38], the data suggest the confirmation of all hypotheses.

In this sense, both the ecological attributes at the product level (environmental and warm glow utility benefits) and the fact that companies provide corporate information from an environmental point of view (green transparency) are significant for the value that is perceived by consumers (green perceived value).

Companies and brands must invest their resources in improving their product ecological benefits related to the product, as well as in transparently communicating their actions that contribute to the conservation of nature and the environment so that the GPV increases. As can be seen in Table 24.6, the data suggest that environmental utility benefits, warm glow, and green transparency directly influence GPV and indirectly influence brand loyalty (through GPV).

GPV is a factor to consider in terms of brand loyalty since its impact is direct and indirect, through the brand-consumer connection that contributes to a brand's purchase and repurchase attitudes [29]. Consumers who feel connected to a brand (both emotionally and functionally) tend to invest in that same brand and refuse to buy products from brands other than the one with which they identify [26]. Green customer values and brand equity also impact on green eco-conscious product consumption solving the attitude-behaviour gap [43].

For a consumer to identify with a brand, its GPV must be considerable, as green consumers seek and, above all, relate to brands that meet their goals and objectives.

Green brand equity has an affective component at its base. When positive emotional responses are created in the consumer, he will likely establish a strong relationship with a particular brand, which makes him develop, in addition to trust and satisfaction, affection for the brand [38].

According to what the data presented suggest, a brand should invest in creating and maintaining long-lasting and highly involved relationships with consumers so that its value—perceived through its ecological commitments and concerns—increases.

Since brand loyalty is one of the main assets leading to brand equity, brands should bet on making consumers loyal [10]. As already mentioned, the greener the consumers identify with a brand, the more likely they are to become loyal.

So, in short, brands must meet the needs of green consumers and present extensive information to improve the brand experience. The brand experience is related, as already discussed, to the cognition and affection of consumers towards a brand.

This cognition is related to perceived quality, brand awareness, and brand associations, and affection towards a brand is linked to engagement with it. These are two main factors contributing to the generation of green brand equity. Therefore, making customers loyal can lead to improved green brand equity.

24.5 Conclusions and Future Research

Consumer trends are moving towards the implementation, albeit gradual, of green marketing.

Based on the present study, the critical point of relationships between consumers and a particular green brand is the perceived green value (GPV).

In this sense, it is up to brands to identify their sources of value and how they can take advantage of them to gain competitive advantages.

Consumers' GPV increases when they recognize the environmental benefits of products in terms of functionality and use and the moral satisfaction consumers feel when purchasing green products.

Although consumers who adopt this style of consumption seek to obtain as much information as possible regarding corporate green transparency, the data obtained suggest that there are more significant factors in the perception of this value. The results presented by the analysis suggest that consumers perceive the more the value, the more they establish a personal connection with a brand.

However, GPV is not, by itself, the main determinant of brand loyalty, and a strong connection (both functionally and emotionally) is necessary for consumers to become loyal.

Finally, it is concluded that loyalty is one of the drivers of green brand equity. Loyal consumers develop a positive brand image, are satisfied, and trust the brand in question, and these three factors are the "engines" of the GBE generation.

Future investigations should revisit the model, assuming the GPV constructs as second order, as well as considering moderating factors that represent the real difference in stage of development and rationality of consumption.

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Part IV
Machine Learning Applied to Marketing

Chapter 25
Expert Systems for Marketing Decision Support—The Case of the Portuguese Mountain Olive Oil

Teresa Paiva, Teresa Felgueira, and Catarina Alves

Abstract In the present economic and technological context, decisions must be made quickly, and some business planning processes do not comply with the needed velocity. At an entrepreneurial level, new business start-ups and in some sectors, like the agrifood industry, not only need speed decisions, but also the companies do not have the capacity and knowledge to make those decisions. Particularly in the case of marketing, it is possible to observe a greater difficulty since it is difficult to have the knowledge, technique, and tools to analyse the market and design the adequate strategy to fulfil and satisfy the market needs. The expert decision support system in marketing (ESM) presented here was built to allow the mountain olive oil producers and distributors in Portugal to speed up their decision ability, overcoming the time-consuming process embodied in rigorous business analysis. An ESM is built based on knowledge and allows diagnosis and development of marketing scenarios that boost opportunities detection and market corrections. In industries characterised by micro-business and for new business creation, this technology is important and can be the first consultation service to offer to the companies to improve their performance.

Keywords Expert decision support system in marketing · Strategic marketing · Mountain olive oil

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25.1 Introduction

The agriculture sector has been changing with the introduction of different technologies in how tasks are performed, new products are offered, and new procedures are implemented [1]. These new technologies are vital to agrifood goods' production, quality, and innovation.

Technology has also been applied in management to optimise and improve day-to-day processes, streamline companies, and increase their productivity, offering higher-quality products and services, value and benefits for its customers [2]. The success of any business depends on many factors, some of which are supported by an accurate analysis of indicators, which involves choosing the right technology to support operations and having a better vision of the future. Technological tools can provide timely responses (speed), ensure data reliability, and minimise business risk [3]. Thus, the speed and accuracy of the data are fundamental characteristics of decision-making [2]. In this sense, it is essential to develop marketing management for companies, with a small dimension, particularly in the olive oil industry and, in particular, the mountain olive oil product.

Mountain olive oil is understood as those whose production is in the sub-region Beiras and Serra da Estrela (NUT III), which is located in the interior of the central region (NUT II), next to the border with Spain, presenting limits to the North the sub-region of the Douro, Northwest Viseu and Dão Lafões, to the Southwest the Region of Coimbra and to the South the sub-region of Beira Baixa. This region consists of the municipalities of Almeida, Belmonte, Celorico da Beira, Covilhã, Figueira de Castelo Rodrigo, Fornos de Algodres, Fundão, Gouveia, Guarda, Manteigas, Mêda, Pinhel, Sabugal, Seia, and Trancoso, and it mostly hosts small companies with a family-owned structure [4].

The business companies of this sector and region generally are of very small dimension and typically have characteristics of family businesses. One of their main needs regards the way they answer the market demand. Most companies do not have marketing managers and/or knowledge or instruments to understand the market needs. Many consider marketing as communication and/or sales and do not recognise the importance of marketing's ability to allow to monitor the behaviour of its customers and consumers and the results already achieved, avoiding decision errors and increasing management efficiency [5]. The company must always follow a marketing plan both in strategic and operational terms, with the definition of integrated actions aimed at "attacking" the market effectively and efficiently. Without planning, the company cannot provide an adequate response because it cannot guide its activities together to satisfy the market's needs and desires. High customer satisfaction levels are the key to business success and cannot be achieved without a real-time customer support mechanism. For the preceding, it is essential for companies, whatever size they are, to have a management philosophy based on marketing, where the marketing plan (strategic and operational) is indispensable to reduce uncertainty, ambiguity, and difficulty of decision and control, thus managing opportunities, changes, and countering weaknesses and barriers to development [6, 7].

Aware of this relevance of marketing, an expert system of decision support in marketing was developed to facilitate the analysis and reflection of small companies, particularly the mountain olive oil business area in Portugal.

A specialised system of decision support in marketing (specialised system in marketing or expert system in marketing—ESM) was developed to facilitate the application of marketing to a specific business area with a more proactive and dynamic concept approach, whose objective is to streamline a complex analysis of a given business area and support managers in reflection and decision-making in favour of a market-oriented competitive performance improvement.

25.2 Literature Review

Specialised/expert systems (ES) are a branch of what is known as artificial intelligence and consist of computer applications that incorporate non-algorithmic knowledge to solve specific problems [8]. Specialised systems capture the understanding of a human expert and the rules he uses to reach conclusions. This knowledge is then made available to others through a computer programme [9–11].

The two main components of the ES are the knowledge base and the inference mechanism. The rules used by an expert and his knowledge and experience over a particular domain are questioned, and the captured knowledge becomes the knowledge base, which is the heart of the system [9, 10, 12].

These specialised items have several main components of the system and interface with individuals in various roles.

The main components are [8]

1. Knowledge base—a declarative representation of expertise (area of expertise);
2. Job storage—data that is specific to a problem that is being resolved;
3. Mechanism of inference—the code at the core of the system, which derives from the recommendations of the knowledge base and specific data of the problem in the storage of work;
4. User interface—The code that controls the dialogue box between the user and the system.

To understand the design of the specialised system, it is also necessary to understand the main roles of individuals who interact with the system [8]. These are

1. Specialist—the individual or individuals who are currently experts (experts) solving the problems that the system is intended to solve;
2. Knowledge engineer—the individual who encodes the expert's knowledge in a declarative manner to be used by the specialised system;
3. User—the individual who will use the system to take advantage of the knowledge and advice the specialist(s) has provided.

In an ES, the inference mechanism accesses the knowledge base, makes the necessary connections, draws conclusions, and generates responses. General reasoning strategies are separate from the knowledge base to allow the system to use knowledge in various ways, requesting additional information if necessary to solve a specific problem and, explaining the reasoning behind your questions and recommendations, reporting the rules and facts used [8–11].

According to [9], an ES relates to an area of specialisation or knowledge, being restricted to a specific theme, gathering rules and specialised expertise, using an inference mechanism to deal with uncertainty, advising the user, and explaining the reasoning.

Business management, however, does not lend itself to a very exact logic. They do not solve most problems by mathematical means but by experience, knowledge, and intuition. In marketing management, the issues are identical since most are logical and not mathematical, and the knowledge of problem-solving, while available, is incomplete. Marketing managers deal with uncertainties and often vague concepts. Decisions are invariably built on a set of "rules", or heuristics, that reflect the expert's knowledge and experience about the problem in question. These "rules" are difficult to minuet and quantify, in particular, because the presence and expertise of someone who is an expert in the field provide them with grayscale reasoning, "more or less", and "approximately". Humans often use such confusing thinking to find paths in situations that are very complex and difficult to deal with in a fully conscious, rational, and scientific way [9].

The problem to be addressed by the ES in the field of marketing then focuses on how to take into account the intuitive art presented by experts in situations of complexity and uncertainty in a way that is describable and susceptible to a kind of rigour that is outside the limits of technical rationality [9].

The basis of any ES is knowledge, which can be produced by one or more experts in a given field. This expertise is usually stored in thumb rules (heuristics), typically indications. For example, if A is "true", then B is "true"; or if X is true, do Y. Given an initial set of circumstances, the system can map a set of additional contigencies [8–11].

In marketing, a heuristic can be: "if the market is growing and if the company has adequate business strengths, then a suitable marketing objective would be to increase market share".

A system that interconnects heuristics in the form of a decision tree is a way of representing knowledge. These are sometimes "backward inference" and sometimes "forward inference". Regressive inference begins with a goal and experiences different combinations of rules and/or actions until achieved. Forward reasons for inference of initial information until reaching valuable conclusions. This can give rise to what is called a "combinatorial explosion", which can be avoided by using heuristics that are correct most of the time. This gives likely solutions to problems defined less rigorously and too complex to be treated with algorithms [8–11].

Marketing planning remains one of the main tools in marketing management and is a crucial analysis area, the use of which has greatly recognised benefits. But also,

it is notorious for its complexity, and many of the Portuguese companies of micro-dimension, particularly in the business area of mountain olive oils, can enjoy this tool, hence the importance of ESM.

25.3 Methodology

The methodology followed for the computer application development came from the specialised knowledge of a strategic marketing plan in which analytical reasoning and inference are followed based on a sequence of deductions taking into account a set of possible results, as shown in Fig. 25.1. A strategic marketing perspective is defined around the company's strategic mission, the diversity of products and markets and their positions adopted for each pair (product-market), the assets that the company holds and the way it exceeds its weaknesses, and finally, the objectives and guidance it intends to follow in terms of performance and its strategy [13]. In this sense, planning, despite all the controversy that lies for based on forecasts made in contexts of major changes, is essential to guide and allow the company a better integration of its set of activities in the value chain, continuously redirecting them to the areas of growth and profitability taking into account the resources and know-how available. The strategic plan describes both the company's value system and common vision, as well as the conditions and developments made in the context where it is included allowing informed decisions. It also coordinates the different organisational functions facilitating the follow-up of actions and increasing the flexibility of the company's reaction to changes [14].

By applying this specialised knowledge to creating an ESM, we have defined its main components, as shown in Fig. 25.2.

The experts then offer knowledge of the different items of a strategic marketing plan based on documentary research and transform the components related to business characteristics into a set of issues, which correlated with the documented external analysis allowing the generation of inferences, determinants and correlated with positioning factors, generated by business knowledge. Thus, the strategic and operational definition of marketing followed by the user manager (producer or non-producer) of ESM—mountain olive oil is identified, comparing it with the definition of strategic

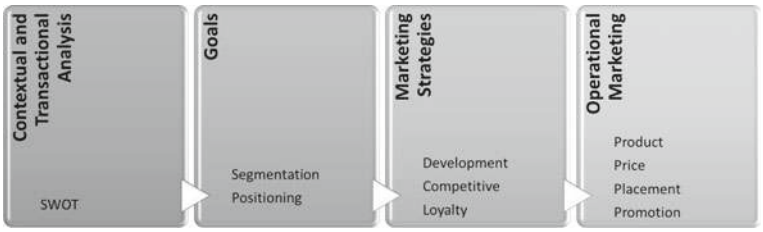


Fig. 25.1 Strategic marketing plan process

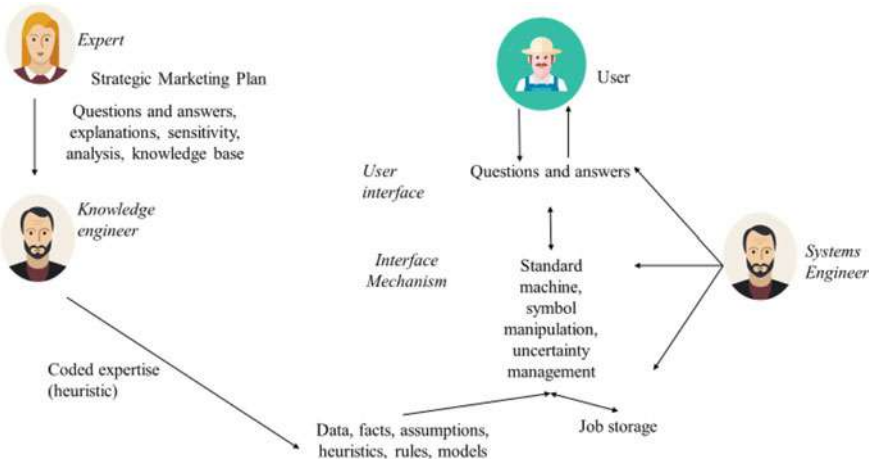


Fig. 25.2 ESM—mountain olive oil

and operational possibilities that should be followed in the specific business area. It is still possible here to analyse the performance of companies in relation to their ability to respond to the target market to which they are addressed, comparing what they do with the characteristics of various markets characterised and analysed in previous research.

The ESM was built through the software Applying Node.js®, a JavaScript runtime built on Chrome's V8 JavaScript engine, linked to database PostgreSQL.

25.4 Expert Decision Support System in Marketing for Mountain Olive Oil

ESM—mountain olive oil allows the olive farmer to test his strategic and operational marketing decisions, assessing whether they align with the context of the olive oil business area and its characteristics and conditions. The olive producer (the farmer that produces and sells olive oil) or non-producer (the business that sells and distributes olive oil) can analyse whether his marketing strategy and/or operational marketing is appropriate to the market in which he operates and whether it responds to the needs and desires of this market where it operates and whether they are consistent. In this sense, they can align and reorient their activity/strategy if you find any deviation to maximise your performance in terms of marketing.

To do this, the farmer has to register and follow a process of answering 65 questions subdivided into several components (see Fig. 25.3).

These questions were defined, by the authors, to answer and characterise the business regarding marketing management and to be contextualised with the defined sector and market context in different countries. In the end, a report is generated that



Fig. 25.3 ESM—mountain olive oil process and analysis areas

gives the marketing analysis of the farmer's business and some insights into the best path to follow next.

The answers inserted in the ESM, according to the context of the olive oil business, allow ESM to automatically analyse and develop a report that identifies the followed business strategy; if it is in line with the analysis and strategic definition of marketing for the business area; whether the activities of the company concerned allow to respond to the needs and desires of the domestic market or some other foreign demand (based on markets considered to be emerging and potential for olive oil); and verify that if the company develop a product, price, a type of distribution, and communication policies adequate to the strategy that follows and should follow.

There was a phase of tests within different workshops to help the farmers analyse the ESM—mountain olive oil reports (see the report structure in Appendix), and the results generated by this expert decision support system in marketing allow the farmer/manager to reflect on his activity and guide or reorient his performance according to what is defended as appropriate and with the company's specificities. The ESM—mountain olive oil is now available at https://azeites-de-montanha-staging.herokuapp.com/#index to any olive oil farmer or distributor access and use.

This way, you can enjoy a competitive increase and better business profitability. This future path may have the support and consultancy of the marketing management team and the creator of the "simulator" to identify and define the best strategic and tacit orientation for a given company. Thus, ESM aims to help farmers in the mountain oil business area improve their market performance.

25.5 Conclusion

The development and use of ESM—mountain olive oil were very rewarding for their acceptance, ease of use, and analysis of the results made by olive businesses. The vast majority of these managers' farmers have a size of their business too small to have the ability to have specialists guide them in their market performance. And if they have had a production-centric activity, they realise now that looking at the market is critical to the sustainability of their business.

The development of such technology makes it much easier for you to make decisions based on high-value specialised work that they have not had until now.

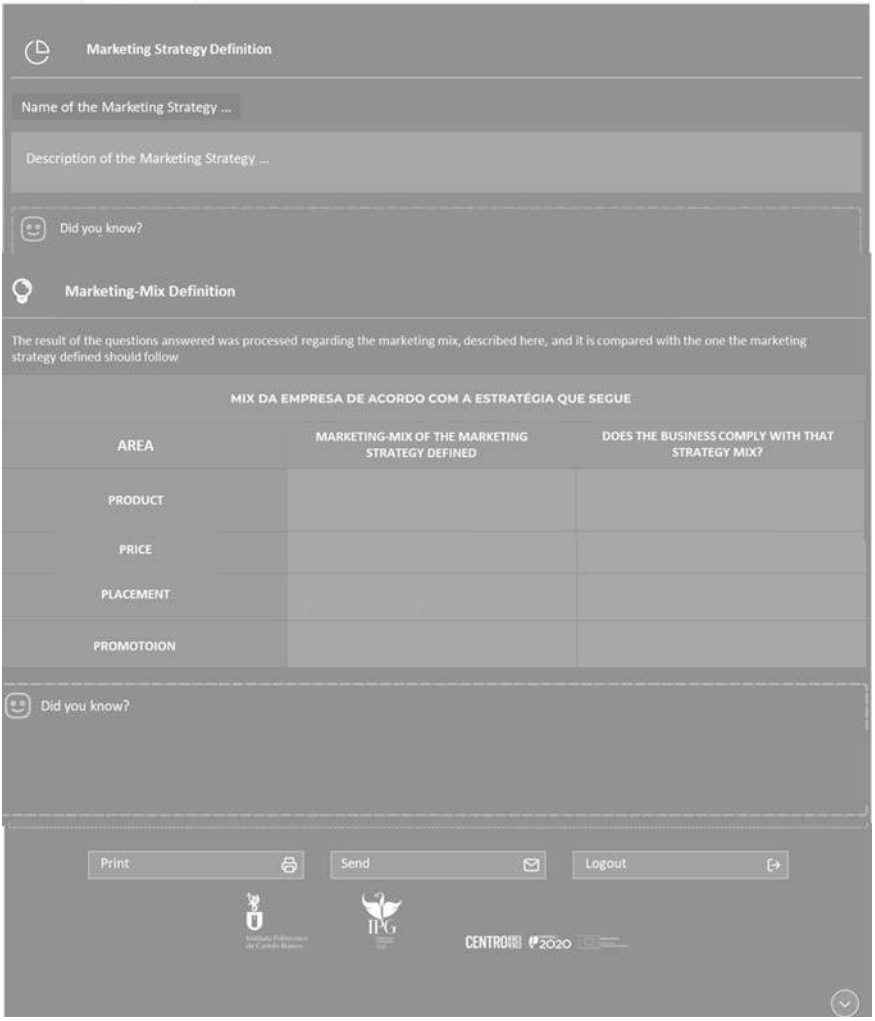
The use of this type of technology in marketing has not been a common practice due to the difficulty that this theme has in managing the uncertainty of the key elements that compose it. There have, however, been several attempts that have developed a marketing plan model in the 1990s [9, 10] for UK companies, and there have been even more specific ones to facilitate decisions related to advertising communication.

This path of technological incorporation is adapted to the times we live and in which managers need to realise that they can and should use to give more competitive and timely responses in their market orientation.

In this way, it was developed a mechanism that allows companies to benefit from the advantages of a well-defined and grounded marketing plan, ensuring their decision-making process and at the same time having quick and pragmatic marketing in decision-making. Therefore, olive oil producers and farmers or distributors can have a reduction in the decision time, can be more effective decisions oriented to the market needs and overcome the cost of the initial marketing consultancy, that they do not have financial capacity for, to diagnose and test the market impact of their business activity.

Appendix


Result of the Marketing Strategy Simulation within the Mountain Olive Oil Context
Market
Use and Signalling Criteria that you believe your products have and the markets they are good for:
Country A
Country B
Country C
Country D
Use
Attributes
Benefits
Packaging
Store
Did you know?
Swot Analysis
Swot is the acronym for Strengths, Weakness, Opportunities and Threats analysis of the context the business is working in.
It is going to be presented here:
Strengths
Weakness
Opportunities
Threats
Suggestions
Here are presented the results of the strategic reflection to enhance the positive aspects, minimising the negative ones, and relate them with the SWOT components
How the business strengths can help to improve the business, taking advantage of the identified opportunities persecution?
How can the business strengths help to minimise the threat impact?
Which actions are necessary to develop to minimise the weaknesses through the identified opportunities?
Which actions are necessary to develop to minimise or eliminate the weaknesses and minimise the threat impact?



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Part V
Marketing, Geo-marketing and IoT

Chapter 26
Development of a Conceptual Framework for Hybrid Car Adoption in Bangladesh



Md. Aslam Uddin, Mohammad Zahedul Alam, and Md. Nokir Uddin

Abstract The major goal of green technology is to lessen the greenhouse effect and control global warming. Hence, the main idea is to come up with new inventions that do not deplete natural resources. The research, here, is attempted to examine the factors influencing consumers to purchase hybrid cars like environmentally friendlier automobiles that are gaining more popularity. Hybrid car is a vehicle that uses at least two or more power supply as to make the vehicle move. The combination of an internal combustion engine and electric motors is one of the uniqueness owned by hybrid cars. This study discusses various theoretical models and proposes a conceptual model based on those theories, especially on UTAUT2 (Extended Unified Theory of Acceptance and Use of Technology) which adapted and identified seven independent variables (performance expectancy, social influence, environmental concern, price value, hedonic motivation, facilitating conditions, and health benefit) and one dependent variable (behavioral intention to purchase) from the related literatures. Though there is huge importance or advantages of hybrid cars, there have been many people in Bangladesh till now who are not currently buying/using hybrid cars. This study is significant and rationale in environmental, marketers, and economic perspective. The expected outcome of this study will enhance new understanding on the profile of Bangladeshi consumers in purchasing hybrid cars as well as marketers, and policymakers can take opportunity to take decisions by utilizing the findings of this study.

Keywords Hybrid car · UTAUT2 · Conceptual model · Bangladesh

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26.1 Introduction

26.1.1 Background of the Study

Growing environmental issues, such as global warming, energy security, and resource scarcity, have resulted in increased pressure to reduce the human ecological footprint by shifting to more sustainable production and consumption [1].

Green products got popularity since 1970s particularly in 1990s because of the anxieties about atmosphere and humanity. At this time, the regions that are performing better are so much concerned for making their marketplaces greener building up a sustainable livelihood position [2]. One of the papers pointed out that 92% of Multinational Corporations from Europe countries changed their offers to deal with the upward trepidation of ecological contamination [3, 4]. It is also found that consumers of some developed countries like USA and Western Europe were so much aware about the pollution of their atmosphere [4, 5]. However, factors to purchase green products have become a momentous topic in the last decade. Sustainable development is a system of resource exploitation that aims to meet human needs by preserving the environment so that these needs can be met not only in present but also in the near future.

The research is here interested to concentrate on green product, like environmentally friendlier automobiles, specifically, petrol-electric hybrids that are gaining popularity. It is also found that transportation is the subsequent behind electric influence as the prime cause of carbon discharges in the world [6]. Consumers are buying increasing numbers of environmentally friendly cars. Increasingly, many of these environmentally conscious consumers choose to purchase petrol-electric hybrid vehicles [7]. This information may potentially be valuable to increase adoption rates for other environmentally friendly products and ideas.

Green cars such as hybrid cars are a solution to be much more ecologically friendly production as they have fewer contaminant emissions [8]. Hybrid car is a vehicle that uses at least two or more power supplies as to make the vehicle move. The combination of an internal combustion engine and electric motors is one of the uniqueness owned by hybrid cars. These cars are usually recognized as hybrid electric vehicles (HEVs), and they are well-thought-out as a pioneering product in automotive field [9].

The demand for environmentally friendly means of transport is continually increasing all over the world, especially in big cities and metropolises [10, 11].

26.1.2 Problem Statement

There has been numerous research done in this area in the USA, Japan, Canada, Australia, China, Malaysia, Sri Lanka, Netherlands, etc. Emerging economies such as Bangladesh is not expected to see significant EV sales until late in the next decade,

despite that country's pledge that all new cars sold there will be electric by 2030. As an environmental aspect, a hybrid car produces 25–35% less in CO_2 emissions than regular cars. Those who are living in cities in Asian countries including Dhaka have already realized how seriously air pollution has been poisoning life and degrading the environment [12]. In Bangladesh, perhaps no worth mentioning study was conducted especially on examining environmentally friendlier automobiles, specifically, petrol-electric hybrids which can ensure the sustainable development through hybrid cars in Bangladesh. Seven independent variables (performance expectancy, social influence, environmental concern, price value, hedonic motivation, facilitating conditions, and health benefit) and one dependent variable (behavioral intention to purchase) from the related literatures have been taken into consideration.

The study variables of performance expectancy, social influence, environmental concern, price value, hedonic motivation, facilitating conditions, and health benefit are still lacking and experience from the qualm's conclusion in the perspective of hybrid cars and Bangladesh. Thus, the study instrument selected for this research is really justified.

Hence, most studies have focused on the marketing mix elements or general environmental behavior of green products instead of specifically on factors influencing to purchase hybrid cars in the Bangladeshi context. Result of this study will enhance new understanding on the profile of Bangladeshi consumers in purchasing hybrid cars.

From the discussion, it is relevant to ask the following research question (RQ): *What are the factors influencing consumers to the purchase intention of hybrid cars?* The broad objective of this research is to investigate the factors influencing to purchase hybrid cars. The specific objectives are *(i) to explore the factors influencing consumers to the purchase intention of hybrid cars and (ii) to examine the relationship between the dimensions of hybrid cars with the behavioral intention to purchase.*

Though there is huge importance or advantages of hybrid cars, there have been many people in Bangladesh till now who are not currently buying/using hybrid cars. This study is really significant and rationale in environmental, marketers, and economic perspective as hybrid cars have huge influences on the socioeconomic development of Bangladesh, these are very beneficial for marketers [13], and fuel-efficient hybrid technology contributes an excellent economic worth in persons' motivation to own hybrid automobiles [14]. Hence, it is important to understand factors that can influence to the behavioral intention to purchase hybrid cars.

26.2 Literature Review

Environmental awareness among consumers worldwide is gaining positive attention; consequently, promotion of green consumption for confirming healthy living and guard of the environment is acquiring acceptance [15, 16]. As it is the part of the Sustainable Development Goals (SDGs), countries seek to preserve the Earth from

quick degradation to approve wealthy living standards by 2030 [17, 18]. Hereafter, as sustainable environment is remaining vital to human existence and happiness on Earth, Goal 12 of the 2030 global agenda pursues to achieve bearable utilization and manufacture that can save the surroundings.

The result of Rio + 20 demands all particularly corporate organizations, to produce unanimously tolerable sustainable brands [19]. Thus, business organizations are now interested to compete with finding pioneering ways to encourage sustainable healthy consumption that concurrently protects the environment, whereas promoting green marketing strategies to their customers.

Nowadays, the world perceives huge environmental problems globally, like ecological dilapidation, worldwide temperate, ozone exhaustion, and typical weather alteration. All these ecological issues have momentous penalties on individual well-being and worth of life [20]. The sky-scraping fossil energy convention and expenditure in transport sector amplify the emanation of toxins producing the discharge of the greenhouse consequence that can ground worldwide temperature [21, 22].

Transport sector is recognized as the vital source of greenhouse gasses and atmosphere contamination. Therefore, for the replacement of conventional cars, supporting cars by means of high effectiveness in energy expenditure and reduction of emission is essential [22].

The possibilities of environmental degradation will be heightened due to the dependency on energy-intense transportation systems. Shifting the modes of carrying from conventional means of transportation to energy-efficient vehicles is a workable process of extenuating the rate of carbon emanation; nevertheless, the adoption rate of environment-friendly vehicles is still low globally and essential to explore [23].

According to [24], the Canadian Medical Association (CMA) has recently released data that predicts the annual death toll caused by air pollution to reach 21,000 in 2008. CMA warns that 710,000 more people will lose their lives by 2031 due to long-term exposure to air pollution, and the count for acute short-term effects will reach 90,000 deaths. One study indicates that the most significant issue for all car makers and designers is that they are worried about the formalistic characteristic or stylistic feature of a car. For this reason, the paper aims at to comprehend if there is any relation between the car's sustainability levels and their formalized features [25].

Purchase intention of green products is the consideration of consumers to acquire a product that has eco features [26]. However, according to Chen and Chang, purchase intention of green products is a consumer willingness to purchase particular products that satisfy the environmental requirements [27]. Green purchase intention can be intellectualized as a consumer's inclination to obtain a green item over other non-green items in their buying consideration [28].

The report prepared by International Energy Agency (IEA) found that the emanation of carbon dioxide is regarded as one of the major providers to weather alteration; of which two-thirds is subjugated by the transport division (IEA, CO_2 Emissions from Fuel Combustion 2019). From this statistic, cars are found as the most significant amount of power utilization. Hence, some organizations recommended that oil nation could recover the competency of power utilization for vehicles and ultimately decrease the statistics of fuel ignition discharge of the world. The vision

of energy efficiency requires satisfying, specifically in the transport sector, should induce the concern of each country to grasp fuel-efficient automobiles. It is also stated by the International Organization of Motor Vehicle Manufacturers (OICA), the cars production is mounting worldwide eventually, which replicates that the demand for this mode of transport has never emaciated.

As a result, car producers require adopting cleaner power train systems as a practicable reaction to the confrontation of extenuating oil ignition emanation. In this regard, the placement of hybrid cars is regarded as a hopeful way of dealing with the aforementioned circumstances to achieve an energy-efficient transport arrangement [29]. As hybrid cars promise minor carbon emissions, mostly in perspective of carbon secretion, so in this way, hybrid cars are different from conventional cars [30]. Henceforth, hybrid cars appear to be one of the viable substitutes for plummeting dependency on energy intensive transportation and enlightening the efficiency of transport energy. However, the purpose of increasing the effectiveness of transport energy is promptly believed to be genuine, it still yet to be accomplished, as the figure of hybrid cars' acceptance is still far behind the adoption of traditional cars internationally.

The statistic found from IEA confirmed that by comparing with traditional cars, the market share of ecological cars is still moderately diminutive. Although there are still various nations with a small level of acceptance of hybrid vehicles, the market share of those hybrid cars is gradually exhibiting an optimistic development. The world's maximum market share of hybrid cars is owned by the European countries, while in Asia, China is the only country representing with a substantial market share of hybrid cars and is one of the imperative players in hybrid automobile acceptance internationally. From Bangladesh perspective, the automotive marketplace and the taking up of energy-efficient automobile are still at a comparatively lower price, like the trend of eco-friendly cars in Bangladesh, which is still in an initial stage.

Upper stages of ecological contamination for instance, air pollution, traffic noise, deterioration of water quality, increasing of garbage disposal and hastily losing ground landfill space, etc., are also negatively affecting Bangladesh, like several Asian cities. Result of the paper will increase new consideration on the shape of Bangladeshi purchasers in buying green products. Since in Bangladeshi context, there is no research carried out in this area, the outcome of this research might be valuable to local sellers, mainly those involved in green items' businesses by considering the attitudes of green consumers. Overseas retailers who aim to initiate green products into Bangladesh may also uncover this effort very significant.

The major literature reviews are summarized and given in Table 26.1.

After above discussion of literature, it can be said that hybrid vehicles appear to be the vital viable substitutes for plummeting dependency on power exhaustive transportation as well as enlightening the competency of transporting power. From Bangladesh perspective, the automotive market and the adoption of eco-friendly cars are still at a comparatively small rate, like the energy-efficient vehicles in Bangladesh, which is still in an initial stage.

Therefore, the present study addresses this gap in the literature by examining various factors that influence to the behavioral intention to purchase hybrid cars.

Table 26.1 Literature review

S. No.	Authors and dates	Country	Research findings
1	[15, 16]	China, Italy	Environmental awareness among consumers worldwide is gaining positive attention; consequently, promotion of green consumption for confirming healthy living and guard of the environment is acquiring acceptance
2	[17, 18]	USA, UN,	As it is the part of the Sustainable Development Goals (SDGs), countries seek to preserve the earth from quick degradation to approve wealthy living standards by 2030
3	[31]	Malaysia	Transportation is recognized as one of the vital sources of greenhouse gasses and air contamination. Therefore, for the replacement of conventional cars, promoting cars with high effectiveness in fuel consumption and reduction of emission is essential
4	[23]	Malaysia	Shifting the modes of carrying from traditional automobile to energy-efficient automobile is a workable process to mitigate the rate of carbon discharge; nevertheless, the acceptance rate of eco-friendly automobile is still small worldwide as well as essential to discover
5	[25]	Iran	The paper aimed at to comprehend if there is any relation between the car's sustainability levels and formalistic characteristic or stylistic feature of a car
6	[28]	Malaysia	Green purchase intention can be intellectualized as a consumer's inclination to obtain a green item over other non-green items in their buying consideration
7	[29]	Saudi Arabia	The placement of hybrid cars is regarded as a talented way to deal with the aforesaid situations to accomplish an energy-efficient vehicle movement procedure
8	[30]	Malaysia	Hybrid cars are different from conventional cars
9	[8]	Malaysia	The study conducted in Malaysia shows that selected independent variables (cost, environmental concern, and brand) have positive impact on the customers' intention to buy hybrid cars

Based on the discussion on the prior studies, *research gaps of this paper* can be stated in the following way: Inadequate research is found in Bangladesh in the context of hybrid cars, and factor analysis of constructs influencing the consumers to purchase green cars has not been done rigorously.

Structural equation modeling (SEM) in the existing field of literature of our country is not of superior quality. Insufficient evaluation of theories is also considered regarding hybrid cars adoptions in Bangladesh. As there is a huge marketing opportunity for green products in Bangladesh, the stakeholders of hybrid cars will be influenced to conduct business in this sector by fulfilling these research gaps.

Therefore, the present study addresses these gaps in the literature by examining various factors that influence to the behavioral intention to purchase hybrid car.

To support the widespread adoption of hybrid cars, there is a need to examine the factors influencing to purchase hybrid car. It is so much noteworthy for the marketers, practitioners, and decision-makers who are involved in producing and marketing green products.

26.3 Theoretical Models and Conceptual Framework

Corbin and Strauss [32] discovered that research literature may serve different purposes, such as discovering gaps in understanding, to derive theoretical and conceptual frameworks. The emphasis of the qualitative and exploratory methods of research is the discovery of relevant categories, the relationships between them, and relating them in new ways [32].

During last couple of decades, a good quantity of theories or models have been prepared and employed to examine information system or technology acceptance and/or usage behavior [33].

In this paper, researcher is interested here to discuss and criticize some theories like (i) health belief model (HBM) [34], (ii) theory of reasoned action [35], (iii) theory of planned behavior (TPB) [36], (iv) technology acceptance model (TAM) [37], (v) innovation diffusion theory [38], (vi) combined TAM and TPB [39], (vii) TAM-2 [40], (viii) unified theory of acceptance and use of technology (UTAUT) [41], (ix) TAM-3 [42], and (x) extended unified theory of acceptance and use of technology (UTAUT2) [43].

This paper proposes a conceptual model based on those theories, especially on UTAUT2 (Extended UTAUT) which adapted and identified seven independent variables (performance expectancy, social influence, environmental concern, price value, hedonic motivation, facilitating conditions, and health benefit) and one dependent variable (behavioral intention to purchase) from the related literatures.

The theoretical framework as well as hypotheses development is grounded on related literatures. Based on theoretical framework, seven independent variables are hypothesized to affect the dependent variables—see Fig. 26.1.

Based on theoretical framework and conceptual model, the following hypotheses have been developed:

H1: *Performance expectancy is positively associated with behavioral intention to purchase.*
H2: *Social influence is positively associated with behavioral intention to purchase.*
H3: *Environmental concern is positively associated with behavioral intention to purchase.*
H4: *Price value is positively associated with behavioral intention to purchase.*
H5: *Hedonic motivation is positively associated with behavioral intention to purchase.*
H6: *Facilitating conditions is positively associated with behavioral intention to purchase.*
H7: *Health benefit is positively associated with behavioral intention to purchase.*

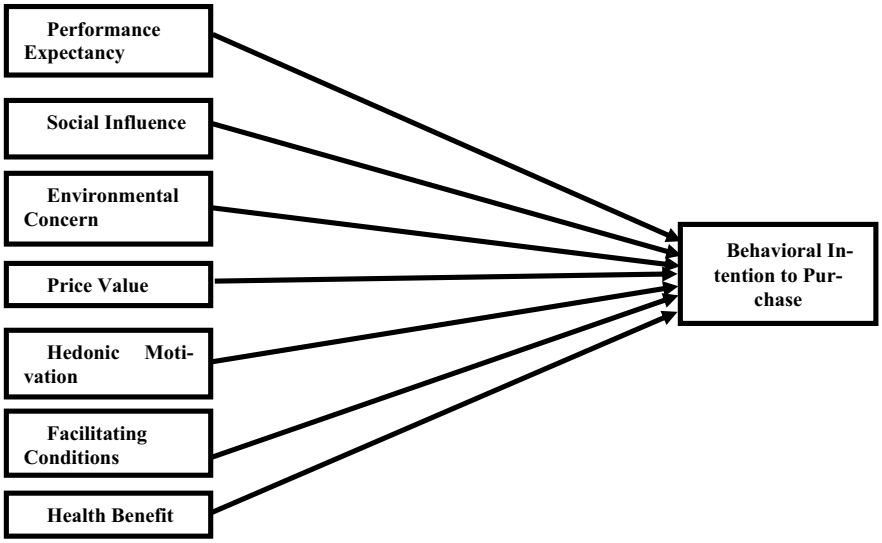


Fig. 26.1 Proposed research model

26.4 Research Methodology

In this research, these variables will be analyzed in the study to determine their importance and significance in consumers' decisions to purchase hybrid cars. The intention of consumers to purchase hybrid cars may be affected by these variables either positively or negatively based on their hypothesized argument and prior research. Moreover, it is noted that in this research, extended unified theory of acceptance and use of technology (UTAUT2) model is utilized as the base model and some constructs have been added on the perspective of the current context.

The research, here, is intended to investigate the factors influencing consumers to purchase hybrid cars by examining the multi-characteristics of consumer of Bangladesh. The target population of this study will be actual users of hybrid car in Bangladesh. Three hundred respondents will be selected conveniently for data collection located in Dhaka City. The research instrument applied for this study is stated in Table 26.2.

Table 26.2 Summary of constructs of hybrid car with measurement items

Construct	Statement	References
Performance expectancy (PE)	PE1. I find hybrid car useful in my daily life	ADDIN EN.CITE ADDIN EN.CITE.DATA [43–45]
	PE2. Using hybrid car increases my chances of achieving things that are important to me	
	PE3. Using hybrid car helps me accomplish things more quickly	
	PE4. With the use of hybrid car, the maintenance cost would drop	
	PE5. Hybrid car can significantly increase my standard of living	
	RS5. I think salespersons play vital role to buy hybrid car	
Facilitating conditions (FC)	FC1. I have the resources necessary to drive hybrid car	[43, 44]
	FC2. I have the knowledge necessary to drive hybrid car	
	FC3. Hybrid car is compatible with other technologies I use	
	FC4. I can get help from others when I have difficulties using hybrid car	
	FC5. I believe that hybrid car is adequately compatible with my preferences for searching for energy-efficient knowledge	
Social influence (SI)	SI1. People who are important to me think that I should use hybrid car	[43, 44]
	SI2. People who influence my behavior think that I should use hybrid car	
	SI3. People whose opinions that I value prefer that I use hybrid car	
	SI4. My family members and friends support my decision to use the hybrid car	
	SI5. If hybrid car becomes a trend among people around me, I would consider using it	
Hedonic motivation (HM)	HM1. Driving hybrid car is pleasing	[43]
	HM2. Using hybrid car is enjoyable	
	HM3. Using hybrid car is very entertaining	
Price value (PV)	PV1. Hybrid cars are reasonably priced	[43, 45]
	PV2. Hybrid cars are reasonably priced comparing with other types of private cars	
	PV3. Hybrid cars are good value for money	
	PV4. At the current price, hybrid cars provide good value	

(continued)

Table 26.2 (continued)

Construct	Statement	References
Health benefit (HB)	HV1. It means a lot to me to have a good health	[46]
	HV2. Good health is important to me	
	HV3. I often think about my health	
	HV4. I think of myself as a person who is concerned about healthy car	
	HV5. I am very much concerned about the health-related consequences of what I use	
Environmental concern (EC)	EC1. I purchase hybrid car because it is environment friendly	[47, 48]
	EC2. I prefer to purchase hybrid car because I am concerned about environmental problems	
	EC3. I purchase hybrid car because I care about energy conservation	
	EC4. Environmental attitude influences me to buy hybrid car	
Behavioral intention to purchase (BIP)	BIP1. I intend to continue using hybrid car in the future	[43]
	BIP2. I will always try to use hybrid car in my daily life	
	BIP3. I plan to continue to use hybrid car frequently	

26.5 Conclusion

To protect the environment, there will be high demand for hybrid car in future. But it is necessary to conduct more research on the acceptance of hybrid car in Bangladesh. There exit many factors behind the acceptance of hybrid car in developing countries. This study will propose a model to be used for exploring the factors affecting the adoption of hybrid car in Bangladesh. The expected results of this research will be valuable to local and foreign retailers, importers, especially those producing, buying, and selling hybrid cars by understanding green consumers' buying patterns. The possible outcome of this study will offer significant contributions to the green consumers, the policymakers, and the green marketers who are directly and indirectly involved in manufacturing, exporting, importing, and using hybrid cars in Bangladesh. Overseas retailers who aim to initiate exporting hybrid cars into Bangladesh may also uncover this effort very significant.

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Chapter 27
Marketing Strategies and Sales: Key Factors for Positioning and Growth in the Market



Emanuel Bohórquez, Maritza Pérez, Roxana Alvarez, and Sabina Villón

Abstract Today organizations face new challenges that have caused marketing to place greater emphasis on the strategic communication of companies, so marketing strategies have fostered a change in the organizational structure, because it must be adjusted to the preferences, tastes, and needs of today's world. The present investigation has as its main problem the commercial ignorance of the product toward potential clients, this leads to the little application of marketing strategies that negatively affect the level of sales of the company, thus inferring in the low positioning in comparison with its competition, being the main objective to diagnose the current situation regarding the marketing and sales strategies of the bottling and packaging company "DSC WATER". The methodology applied was with a quantitative approach and descriptive scope, supported by the deductive and bibliographic method, with a non-experimental and transversal design; using a survey aimed at recurring customers and whose results indicate that more than 60% of customers show distrust in the quality of the water offered and do not receive promotions from the company, in addition 85% of customers agree I agree that the application of marketing strategies is necessary for the development of sales. Finally, the development and implementation of marketing strategies are established as a recommendation, which allows the business to position its brand, capture the attention of potential customers, and have adequate growth in the market.

Keywords Marketing · Sales · Strategies

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27.1 Introduction

Currently, marketing has placed greater emphasis on the strategic communication of companies, because it has focused on distributing information about customers, their characteristics, needs, and preferences. That is why by having this new paradigm, the future of companies manages to make good decisions within it.

Consequently, to this marketing strategies have fostered a change in the organizational structure, because it adjusts to the preferences, tastes, and needs of today's world, leading them to carry out the implementation of tools that allow them to stay in the market, in addition, to increase creativity in some of them for the positioning of the product or good offered.

Given that SMEs in Mexico occupy an important position in the country's economy and are the engines of its development and growth, this infers so that they can be competitive in the national and international market (…), companies need to take some actions and join the field of innovation because they are linked to their marketing area, and this is because these actions will help SMEs to present themselves, position themselves, improve their vision, and stay in the market [1].

According to a study carried out in Peru, it was shown that the application of marketing mix strategies has a positive or negative effect on a company's sales, depending on how it is managed. So, at the end of the study it turns out that the dimensions of the marketing mix such as product, price, place, and promotion are factors that affect sales growth [2].

In the scientific article by [3], it was revealed that the sales strategies applied in shopping centers indicated that these are important tools used by companies to improve customer service.

In Ecuador, around the market for the production and distribution of bottled water, there are several competitors, most of which are companies with extensive experience.

Therefore, it is important to note that, at the level of the province of Santa Elena, there is great competition, and so for the current investigation, the bottling and packaging company "DSC WATER" has been considered, which is located in the Santa Elena Canton. Elena, province of Santa Elena, is the same one that was legally created in 2019, whose main activity is the production of natural mineral waters and other bottled waters. The study problem lies in the commercial ignorance of the product toward potential customers; this leads to the little application of marketing strategies that negatively affect the level of sales of the company, thus inferring in the low positioning in comparison with its competition, probably because it currently has only a few years of creation in the market, constituting the possible cause of why it has not been able to expand completely throughout the province of Santa Elena. The main objective of the research is to diagnose the current situation regarding the marketing and sales strategies of the bottling and packaging company "DSC WATER".

This research is structured as follows: The second section presents the principles and theories regarding marketing and sales strategies; the third section describes the

methodology used; the fourth section presents the results; finally, the fifth section shows the conclusions and recommendations.

27.2 Marketing and Sales Strategies

27.2.1 Marketing Strategies

Regarding the description of [4], the use of marketing strategies, as described by [5] (see Table 27.1), is an essential element in the context of business existence, given that having market-oriented expectations certifies the ability to dominate environmental changes in terms of competitors. The tastes and preferences of consumers are a factor in the competitiveness of companies.

For [6], it describes that a marketing strategy can consist of one or more marketing programs. Each program consists of a marketing mix or the so-called four elements: product, price, place, and promotion.

The concepts of marketing strategy are understood as a plan that is applied in companies using available resources to efficiently attract future customers and keep current ones, creating links not only with external ones but also with internal ones, because the capture and maintenance is a way to have a balance point before the needs and requirements of the market. Therefore, for the implementation of a marketing strategy, the target to which it is directed must be clear, to create a competitive advantage over its rivals.

Table 27.1 Types of marketing strategies

Strategies	Description
Portfolio strategy	It is in charge of setting the course to be followed for the establishment of each business strategic unit, detailing for them the different product-market combinations that the company must develop
Segmentation strategy	The segmentation strategy supposes a decision-making by the marketing management regarding which of the segments in which we have classified a market we are going to bet on our company
Positioning strategy	It consists of defining, in a global sense, how we want the decided strategic segments to perceive us, that is, with what attributes we want them to identify us in the mind of the consumer
Functional strategy	Try to select the marketing tools that, in each specific case and always depending on the objectives set, will be more effective and appropriate (marketing mix)
Loyalty strategy	When the company has set customer loyalty goals, it will be relevant to analyze the options that are presented to achieve them and choose the most suitable strategy

Product. Regarding [7], it indicates that the product may be intended to satisfy a need or be qualified as an added value for the customer; it is similarly numbered as a set of features or benefits of a business concept.

In the same way [8], he mentions that the product contains the four most important elements of marketing since it includes a set of actions such as setting prices or carrying out promotions and advertising.

According to the authors, they indicate that the product is a set of tangible or intangible attributes that are offered to the market for attention or consumption as part of the satisfaction of a need.

Brand. According to [9], a brand can be thought of as a set of related perceptions about a product or service, it is a mental shortcut that simplifies the consumer's life, since it improves the understanding of what is perceived almost automatically, without the need to even think about it.

Quality. Conforming [10] quality is the set of inherent characteristics of a product to meet customer expectations at the lowest cost. This definition introduces three key concepts in modern quality management: expectations, customers, and low cost.

Promotion. From the point of view of [11], the promotion strategy uses advertising to publicize businesses and products with the aim of increasing sales and achieving customer loyalty. Therefore, by implementing the promotion of the products and services offered by companies, they capture the attention of the public.

In the case of [12], it indicates that promotions serve to stimulate the consumer's desire to buy, the effectiveness of the seller through various exhibitions, demonstrations, and other non-repetitive efforts will flexibly attract the attention of customers to the product.

Promotion is one of the variables of the marketing mix, and its main objective is to communicate, persuade, and be present in the mind of the consumer, either directly or indirectly, through a message to the target audience to attract new customers or maintain existing ones and thus generate more income for the company.

Sale promotion. Considering the opinion of [13] indicates that sales processes are a tool that consists of incentives for customers, to increase the purchase of goods or services offered by the company through distribution channels or the department of sales.

Advertising. With respect to [14], advertising is an instrument of marketing strategies, used by companies or institutions to publicize products or services efficiently, with the aim of selling to the consumer.

27.2.2 Sales

The authors [15] define that the sale is part of a commercial or marketing function that provides the company with the necessary income for its operations, continuity, and growth.

On the contrary, for [16] sales are any act created from the exchange of goods and services for money, a direct or indirect relationship between a consumer and a seller, based on strategies to inform and persuade customers; to obtain this constitutes closing a business, such as selling a product or service.

Sales have existed since ancient times, these were previously known as the exchange of one product with another, currently and based on what was previously stated by the authors, and it is understood that sales are an exchange of a good or service for a contribution reasonable economic relationship between both parties, which forges a buyer–seller relationship; This becomes like a contract closure that benefits the parties involved in equal proportions.

Sales process. For [17], this is called the set of procedures that allow companies not only to sell their product, but also to serve customers through methods and techniques to obtain successful sales.

Sánchez and Tello [18] highlight that selling involves a process, where many authors agree that the importance of each stage is identified based on different criteria. So below is a simple outline with seven steps to understand the key elements of the sales process (see Table 27.2).

Table 27.2 Sales process

Process	Description
Preparation	Preparation must be carried out to attend to real and potential clients, although with the latter the process is more complex since little is known about them
Arrangement of the visit	The pertinent contacts are made, choosing the means of communication according to the client. Usually, a phone call is made, an email is sent, or a preliminary appointment is made
Contact and presentation	Information is exchanged, and interest is aroused. It is essential for the seller
Survey and needs	Exploration of true customer needs to decide the attitude to make the sale
Argumentation	If this stage is reached, the client has shown interest and the necessary explanation of the benefits and advantages offered by the product and service over other offers must be generated
Objections	At this stage, the "negatives" or "buts" expressed by the client are handled, and a good argument can refute an objection
Closing	Stage in which the sale can be closed or a later appointment is made to close it. It may also happen that the process is not closed, and the client states that they have not closed the sale

In effect, the sales process is the exchange of a good or service for a monetary value, so to carry out this action a series of steps must be followed that must be considered before a potential client, who is interested in the merchandise offered by the seller, analyzes the benefits and disadvantages of the requested good, and this concludes once the sale has been made.

Customers. According to [19], it indicates that a client is someone who uses the services of a professional or company paying. Due to this, we can distinguish two categories:

- Real clients. This type of client is the one that generates current sales; therefore, it is the source of income that the company currently obtains, giving it a certain market share.
- Potential customers. The client is interested but has not yet decided to buy or go to the service of the company or institution. This type of client is one that can generate a certain volume of sales in the future (short, medium, or long term) and therefore can be considered a source of future income.

Product sale. According to [20], the sale of the product is the action of the seller to obtain the maximum possible benefit from his product, which can be achieved by fixing a good price, but can also include things such as the continuity of the purchase and, therefore, of revenue through customer loyalty.

Types of sales. Regarding [21], it indicates that the sales channel is used as a process to recruit the client in the prospecting stage, until he becomes a loyal client. Therefore, if the company has a sales system, the interaction of the client with the brand becomes effective for the development of the organization.

Palma [22] mentions that there are two types of sale, the difference between them lies in "to whom it is sold", and the use that is going to be given to the product.

The types of sales are how companies make the supply and demand of their products or services, through the implementation of sales strategies, which allow dealing with customers and improve interaction with vendors.

Personal sale. Regarding [23], it highlights that personal selling is a promotional combination tool or a type of sale in which a specific provider offers, promotes, or sells a product or service directly to the person (face to face) to an individual consumer specific. This sales procedure is carried out through the existence of a personal relationship between the buyer and the seller. Two main types can be distinguished: sales outside the company and sales within the company. Within these groups, we have the following formats: Home Sales, Conference Sales, Traditional Sales, Self-Service Sales, and Vending.

Digital sale. The contributions of [24] define digital sales as a method in which there is no direct contact between the buyer and the seller; for this purpose, various transaction channels can be used to generate economic income in the company.

27.3 Methodology

The main objective of this research is to diagnose the current situation regarding the marketing and sales strategies of the bottling and packaging company "DSC WATER", being a non-experimental and cross-sectional study carried out in the year 2022.

For the methodology, a quantitative approach was used with a descriptive research scope where the properties and characteristics of the study variables were analyzed, relying on a deductive method that allowed defining the general problem, starting from the study of the ideal marketing strategies that contribute to the increase in sales and the positioning of the company's market, analyzing the events that go from the general to the specific, so that the research is based on theoretical bases; in addition, the bibliographic research method with which it was possible to collect and analyze information from relevant secondary sources related to marketing and sales strategies.

For the development of this project, the approximate current projection of 500 frequent clients who reside in the three cantons of the province of Santa Elena, provided by the Administrator of the company "DSC WATER", was considered as a population; in relation to the determination of the sample, a non-probabilistic convenience sampling was applied, being defined in 150 clients, justified by reasons such as the limitations in terms of factors of access to information and COVID-19 health emergency in the context study.

The main research instrument was a questionnaire applied to 150 clients, who contributed with their opinion about the marketing and sales strategies of the company "DSC WATER"; it consists of 20 closed questions, structured into three parts: the first with sociodemographic data, a second section with questions related to marketing strategies, and a third section with questions oriented to sales, these last two sections with Likert scale response options.

27.4 Results and Discussion

In Fig. 27.1, regarding the quality of the water of the company "DSC WATER", it is observed that there is a slight tendency qualified as "Normal" and "Bad" with 22% both, similar and very attached is qualified as "Very good" and "Good" with 19% both, concluding that there is more than 60% of clients who would show distrust in the quality of the water offered by "DSC WATER" and could originate from the perception of the quality of water public drinking.

Figure 27.2, related to the promotions offered by the company "DSC WATER" to purchase its products, shows that 52% of respondents indicated that they have "Never" received any promotion, followed by 22% who say they receive "Frequently", on the other hand, only 4% indicate that they "always" receive them; as such, it was determined that most of its clients do not receive promotions, leaving this

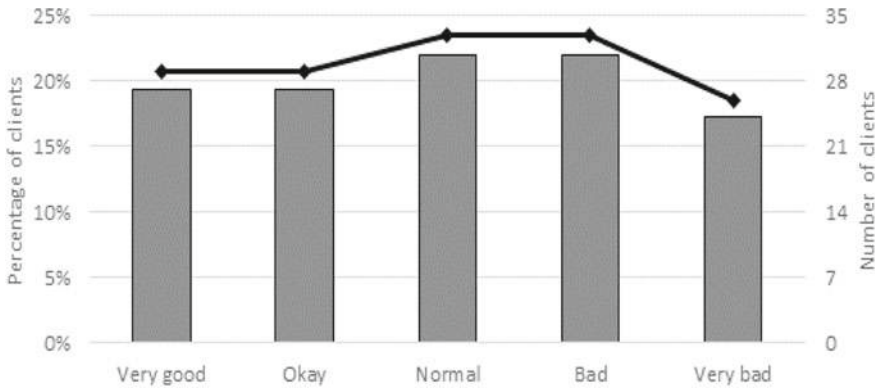


Fig. 27.1 Water quality "DSC WATER"

tool aside, so the option of strengthening this factor with the objective of informing about the promotions of its products is proposed.

In Fig. 27.3, concerning the application of advertising for the products of the company "DSC WATER", it is shown that 36% indicate that they do so "Frequent", unlike 27% who mention that "Never" has done the same; therefore, it is concluded that there is moderate to little publicity for clients, and the application of publicity strategies must be more aggressive.

Figure 27.4, referring to customer preferences when buying bottled water, shows that 71% "Always" prefer above all the "Quality" of the water that is marketed, in second place with 38%, it was determined that "Always". "Good service" is also a decisive factor at the time of purchase, and in last place, it was obtained with 10% who "Always" prefer the "Packaging design"; concluding that the purchase decision goes hand in hand with quality and good service, so these indicators should be reinforced within the company.

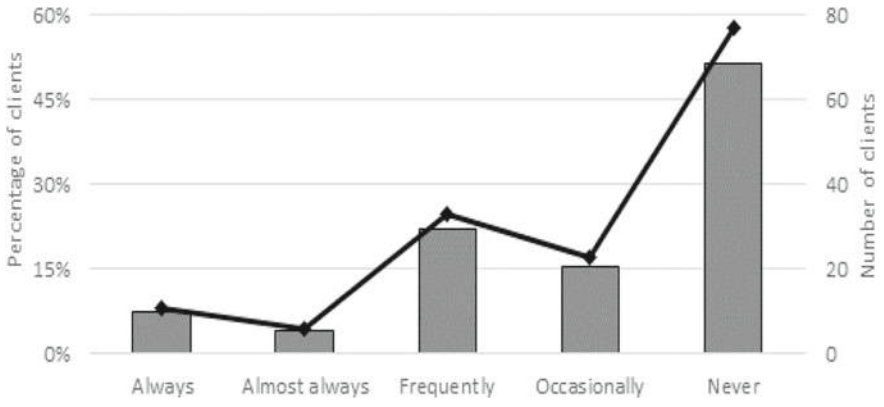


Fig. 27.2 Promotions offered by "DSC WATER"

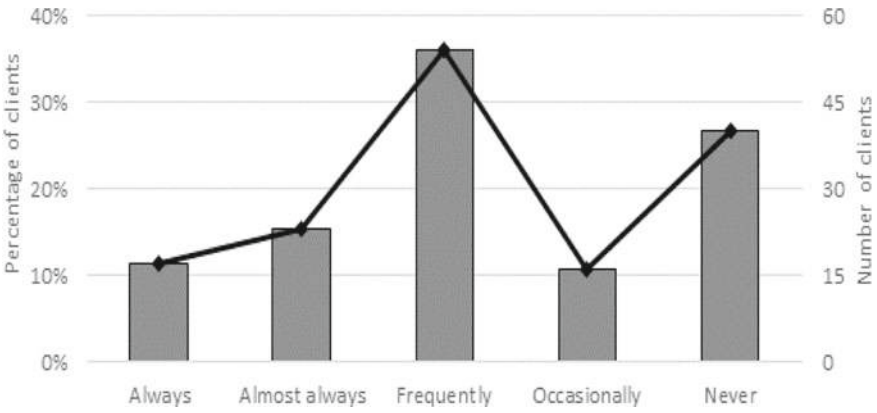


Fig. 27.3 Advertising offered by "DSC WATER"

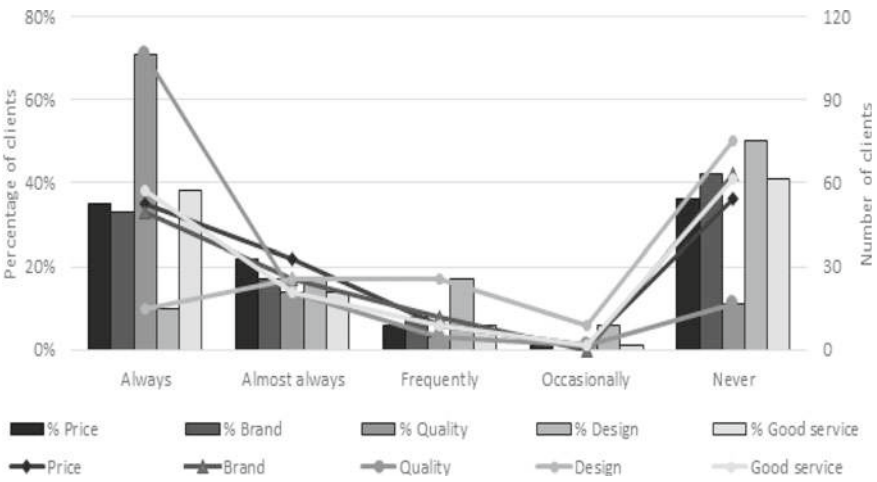


Fig. 27.4 Preferences when buying

In Fig. 27.5, about the purchase method, it is shown that 52% would buy "Always" directly at the "Distribution Point", as opposed to 15% who indicate that "Always" they would make the purchase through "Means digital"; on the other hand, 40% indicate "Never" they would buy through "Digital media" and only 10% mention "Never" they would buy at the "Distribution point". Concluding that customers largely prefer to buy directly at the point of distribution because they have greater contact with the distributor, in that sales through digital media is a new distribution channel and is based on the choice of the product and payment, which can cause distrust of the new, limiting that post-sale monitoring should be essential for this type of practice so that customers really feel that the company cares about their needs.

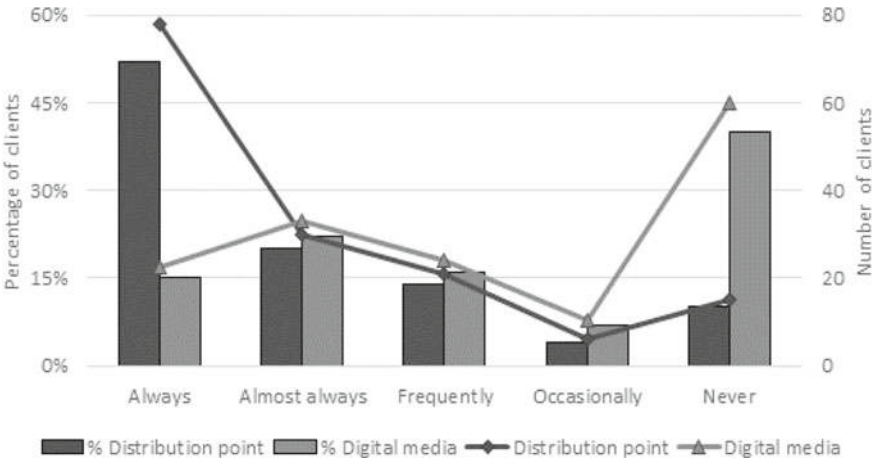


Fig. 27.5 Purchase modalities

In Fig. 27.6, regarding marketing strategies and their influence to improve the level of sales, it was found that 69% indicated that they "Totally agree", on the other hand, only 4% mentioned agreeing "Totally disagree". In this way, it is concluded that in the opinion of customers, marketing strategies have a great influence on sales, becoming a fundamental pillar that contributes to the success of any company and being a determining factor for the achievement of objectives and growth of the business, emphasizing that the increase in sales originates from having solid knowledge about the target market, having a unique value proposition and marketing strategies, all of which will allow the organization to capture the attention of potential customers.

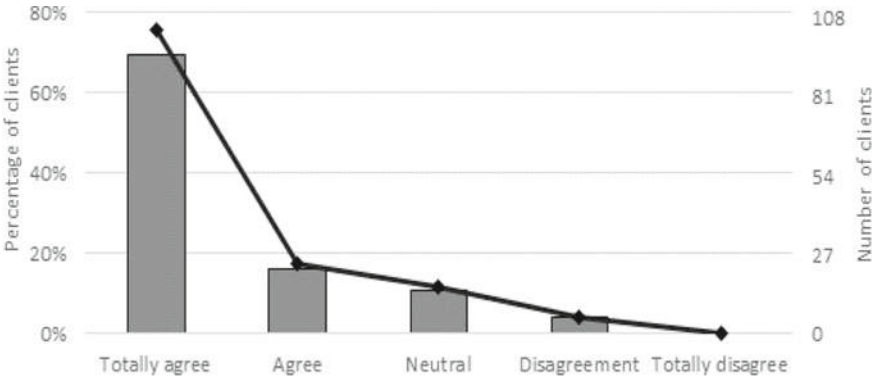


Fig. 27.6 Marketing strategies and sales

27.5 Conclusions and Recommendations

Nowadays, in a globalized, changing, and competitive world, the application of marketing strategies becomes imperative for all types of companies regardless of their size, becoming a key factor to increase the level of their sales.

In the present investigation, it has been possible to diagnose the current situation regarding the marketing and sales strategies of the bottling and packaging company "DSC WATER", the main conclusions being those that are detailed below:

- Regarding the quality of the products offered by the company "DSC WATER", there are more than 60% of customers who show distrust in the quality of the water offered by, which could originate from the perception of the quality of public drinking water.
- Related to the promotions offered by the company "DSC WATER" to acquire its products, it was determined that most of its clients with more than 60% do not receive promotions from the company, leaving aside this valuable marketing tool.
- Concerning the advertising application for the company's "DSC WATER" products, 36% of the clients indicate that they do so "Frequently", on the other hand, 27% mention that "Never"; so it is concluded that there is moderate to little advertising directed at customers.
- Regarding customer preferences when buying bottled water, the purchase decision always goes hand in hand with quality and good service with 71% and 38%, respectively, and becoming a decisive factor.
- About the purchase modality, the clients always prefer to buy directly at the distribution point with more than 70%, because they have more contact with the distributor; meanwhile, about 50% indicate that they never buy through digital means, which, being a new mechanism, could cause mistrust in its use.
- Regarding whether marketing strategies would help improve the level of sales, it is concluded that most of the clients with 85% indicate that they agree with its relevance for companies.

According to the findings obtained, it is recommended that the directors of the company "DSC WATER" develop and apply marketing strategies that include factors such as the product, promotion, price, and place, which are consistent with the current situation and business objectives; with it would be projected to increase its sales, having solid knowledge about the target market and unique value proposition, will allow the business to position its brand, capture the attention of potential customers, and have adequate growth in the market.

This research was limited by access to information in the context of study. Future research could compare and contribute to the discussion of results in other contexts regarding marketing strategies and their influence on sales, as well as a basis for correlational-type research. In addition, the recommendations are expected to make viable and improve the level of sales for the benefit of the company "DSC WATER".

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Part VI
Metaverse and NFT Applied to Marketing

Chapter 28
The Bibliometric Commingling of Metaverse and Non-fungible Tokens in Marketing

Sunday Adewale Olaleye, Deborah Kwafo, Abolaji Jamiu Atobatele, and Olusegun Peter Olaoye

Abstract Historically, business organisations are always looking for a new approach to marketing and advertising their products to reach their target customers. The introduction of the Internet helped businesses to reach more potential customers than it was before. Currently, the newest technologies that have become the centre of attraction in marketing are metaverse and non-fungible tokens (NFTs). Marketing practitioners and scholars continue to show interest in technological metaverse and NFTs as an up-and-coming platform for enhancing consumer satisfaction experience virtually the same as the experience in physical stores. The aim of this study is to examine the impact of commingling of metaverse and NFTs in marketing with the lens of bibliometric analysis through R Bibliometrix. This study contributes to the marketing and financial technology literature by showing academic work's impact, quantity, and quality on metaverse and NFTs. The study sectionalises methodology, results, and conclusions and gives future research insights.

Keywords Metaverse · NFT · Marketing · Blockchain · Argument reality

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28.1 Introduction

Historically, business organisations are always looking for a new approach to marketing and advertising their products to reach their target customers. The introduction of the Internet helped businesses to reach more potential customers than it was before. With the emergence of social media, businesses now have more significant advantages in marketing their products that will reach their customers through multifaceted online platforms [1]. Currently, the newest technologies that have become the centre of attraction in marketing are metaverse and non-fungible tokens (NFTs).

Marketing practitioners and scholars continue to show interest in technological metaverse and NFTs as an up-and-coming platform for enhancing consumer satisfaction experience virtually the same as the experience in physical stores. The introduction of Web 3.0, metaverse, and NFTs will have a tremendous impact on the future of marketing in a remarkable way. As businesses continue to shift their attention to the digital marketing ecosystem, the emergence of metaverse and NFTs will become a platform for present-day marketers. Business organisations will be able to brand their products in this new environment [2].

Metaverse and non-fungible tokens (NFTs) are the new and trendy digital platforms promoting marketing. Although the metaverse concept has existed since the 90s and has been exploited in science fiction [3] and movies [4], it is gradually gaining momentum as a platform for marketing products. Metaverse is a three-dimensional virtual reality that allows human activities to be executed with the help of virtual and augmented reality services. Different authors have defined metaverse in different terms, some of which include: Metaverse as an embodied Internet or spatial Internet [5], a mirror world, an omniverse: a venue of simulation and collaboration, a collective space in virtuality [6], a new type of Internet application and social form that integrates a variety of new technologies [7], a perpetual and persistent multiuser environment merging physical reality with digital virtuality, the post-reality universe [8] and lifelogging [9].

The technology of the metaverse seems to broaden the activities of humans because it has overcome temporal, spatial, and resource-related limitations imposed by nature. The technological build-up of metaverse includes Web 3.0 and a smart contract made up of blockchain technology and non-fungible tokens (NFTs). Metaverse will provide new job profiles, new services and products, new business models, and new marketing strategies as it diffuses into business organisations.

Immersive technologies such as augmented reality (AR) and virtual reality (VR) have further enhanced metaverse in marketing applications. Augmented reality provides digital elements to an already existing space. Generally, AR uses a camera on a smartphone to provide further information about the real world. Virtual reality, on the other hand, uses headsets to generate a new simulation of the world. VR puts the user inside a three-dimensional experience where the user is immersed in a new world where they can have some interactions. One competitive advantage of this immersive technology in metaverse in marketing is that consumers can virtually enter a showroom where they are provided with elements that can be seen in physical

stores. Also, customers in metaverse can interact with each other through avatars. This experience leads to creating immersive marketing opportunities that promote customer experience. An earlier study spotlighted the Ohyay platform as capable of designing immersive virtual spaces [10].

NFTs are unique digital assets or certificates registered with blockchain technology, ensuring authenticity and ownership. This technology allows the recording of assets, ownership of collectibles or artworks, valuable data such as stock transaction price records [11], housing title transfer, and driving records. NFTs only represent a virtual identification, that is, a digital ownership certificate and do not represent an item [12] or an artwork, nor do it represent itself. It is identical but different from Ethereum, Bitcoin and other homogenised tokens [13]. Some distinctive characteristics of NFTs are their uniqueness, non-tampering and non-interchangeability and these functional traits make them exceptional from other blockchain assets. NFTs can be collected, bought, sold, or marketed.

Nearly anything can be on this unique digital technology called NFTs: sports highlights clips, arts, fashion, game items, and information. In 2021, Gartner Hype Cycle for key technologies reported that NFTs would play an essential role in transforming the role of marketing [14]. Given this, marketing managers who would like to adopt NFTs technology should endeavour to know about its impacts on marketing. NFTs play a crucial role in digital economic activities on a virtual reality platform popularly known as the metaverse, which significantly impacts marketing strategy in businesses.

NFTs play a vital role in metaverse because all the products and services in metaverse are mainly NFTs. The technology of "wedding" metaverse and non-fungible tokens (NFTs) is gaining prominence and relevance in online marketing. Metaverse and NFTs marketing is a modern-day digital platform that creates an immersive experience for prospective customers. Businesses can market digital products and non-fungible tokens at high prices and increase brand awareness. Significantly, creating branded NFTs for metaverse marketing has the potential to drive brand awareness. Many major brands like Adidas, Coca-Cola, Nike, Gucci, Dolce, and Gabbana have developed their own branded NFTs for metaverse marketing and have made a considerable profit.

For instance, in 2021, Adidas, one of the global brands, dived into the metaverse, launching collections of NFTs in collaboration with some projects such as Pixel Vault NFT, Bored Ape Yacht Club, and Mutant Ape Yacht Club. In the afternoon, the collections were sold out within seconds, with a record sale of $23.5 million [15]. Another global brand, Dolce and Gabbana [16], also launched an NFT collections in 2021 but with a different strategy from Adidas. The Italian company created an exclusive collection with only 9 NFTs, and the branded collections for Fashion NFTs made $6 million in sales [17].

Another aspect of interest for metaverse and NFTs is that they serve as a promotional platform for marketing. Metaverse has the potential to reach a wider audience as compared to today's marketing tool. It is not geographically limited, and because of that, businesses can reach customers globally. Nike, a global brand, uses metaverse-branded NFTs for its marketing operations. Nike partnered with Roblox to create an

immersive world where the audience can interact, compete, create, and share experiences. Nikeland [18] is a virtual architecture building inspired by Nike's physical headquarters. It is a platform where participants can test their competence through different mini games. Visitors in the Nikeland showroom can decorate their avatar using a virtual collection of Nike clothes, shoes, and other accessories, such as a free exclusive-to Roblox Nike backpack and cap [19].

Also, one of the conventional tools for marketing is an advertisement. Metaverse is a marketing platform for creating, identifying, exploring, connecting, socialising, expressing, and transforming businesses and marketing mindsets. Marketers are using the virtual world of metaverse as a new billboard for marketers with unlimited boundaries for the branding of products. In 2021, global brand Gucci partnered with Roblox to create a unique virtual garden exhibition that can be exclusively accessed on Roblox. This virtual garden exhibition was used for advertising collections of Gucci products [20]. In that same year, global brands examined the successful applications of augmented and virtual marketing campaigns ranging from concerts, digital clothes, showrooms, and collectibles. Big brands like Facebook, Microsoft, Disney, Walmart, and Nike have created a virtual world, experiences, arts, assets, and worlds. This quest for a virtual platform means native advertising can still be integrated into the metaverse platform.

28.1.1 Research Gap and Study Objectives

The practical impacts of NFTs in shaping metaverse in marketing cannot be overemphasised. Many scammers will want to reproduce digital assets on the platform of metaverse, but with the introduction of NFTs, unique ownership rights, assignment, and identification of the rightful owners can be ensured. This development will provide a conducive atmosphere for marketing because scammers may be denied access to reproduce the same goods and services on the virtual platform of metaverse. In this case, the merging of metaverse and NFTs provides a mirror world asset ownership against counterfeiting. For instance, a smart contract allows users of metaverse programs unique digital right management in their NFTs.

The merging of the ecosystem of metaverse and NFTs is already flourishing in many fields. Blockchain technology has provided security solutions to NFTs using blockchain protocols, allowing each participant a unique identity card supported by a smart contract. This process enhances instant payments and reductions of transactional fees and analysis of metaverse and NFTs application in dentistry [21]. Thus, patients can mint an NFT with dental membership and enjoy loyalty benefits such as check-ups, free access or discounts on dental consultation, prophylaxis, instructional videos, and avatar accessories such as grills or dental jewellery. Wang et al. [22] also disclosed that metaverse can integrate NFTs applications. Consequently, metaverse NFTs will serve as an excellent platform promoting play-to-earn games.

Additionally, Wang et al. hinted at the ecosystem of metaverse that could be used as a marketplace to market assets or virtual properties such as arts and parcels of

land. Although several fields combine metaverse and NFTs, we have yet to find a study that summarises the analysis related to the blend of metaverse and NFTs that will share more light for future insights in the marketing field. This study provides a commingling bibliometric literature review of metaverse and NFTs in marketing to bridge the existing gaps in the literature on digital assets.

The study adopts bibliometric analysis. Bibliometric analysis is a critical analysis that defines a particular academic discipline. It provides a better understanding of the researcher's texture in that subject. The researchers working on a particular subject will have an enormous idea and information about the development of trendy issues vital to them and other researchers who may want the information for further studies in that field. In addition, bibliometric analysis discovers important and outstanding papers and journals, particularly in a specific field [23]. The central topics are emerging from this search capture keywords such as metaverse, NFT, marketing, blockchain, argument reality, and virtual worlds that are readily available on a significant academic database such as the Web of Science. The authors focus on discussing the blend of metaverse and NFTs in marketing, and the study will specifically answer the following research questions (RQs):

RQ1: What is the trend of metaverse and NFTs in marketing in terms of publication year?
RQ2: What are the annual scientific articles related to metaverse and NFT in marketing?
RQ3: Which countries have the most cited articles on metaverse and NFT in marketing?
RQ4: Who are the most impactful authors in metaverse and NFT in marketing?
RQ5: What is the most relevant affiliation?

This study contributes to the marketing and financial technology literature by showing academic work's impact, quantity, and quality on metaverse and non-fungible tokens. The study sectionalises methodology, results, and conclusions and gives future research insights.

28.2 Methodology

This study employed quantitative methodology with bibliometric analysis. This methodology is widely used in the academic community globally. For example, the methodology was applied in mobile information systems [24] and information, communication, and technology [25]. This methodology is crucial for obtaining reliable academic data to glean indicators for research gaps and to promote quality research. This methodology is relevant for integrating metaverse and NFTs to create more awareness in the academic circle and society.

This study dwells on science mapping that reveals the relationships between different research domains, scholars, and published articles based on the spatial distribution of metaverse and NFTs. The study utilised the R-package with bibliometrix

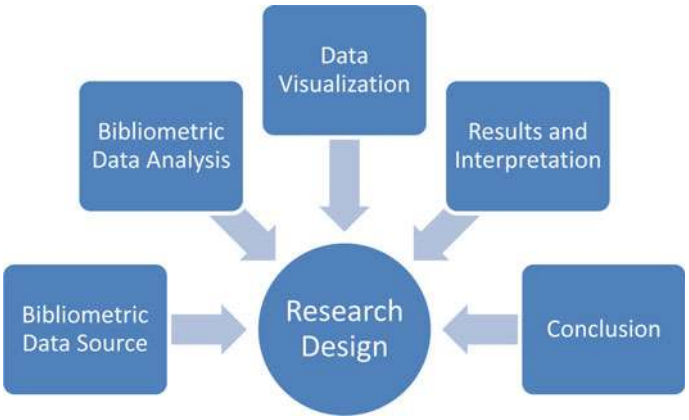


Fig. 28.1 Adopted bibliometric workflow from Olaleye [24] study

library package as proposed by [26]. The study used Web of Science databases for data collection and bibliometrix for data analysis and visualisation, while the authors interpreted the results and gave direction for future research.

This study inferred from [27] bibliometric workflow to accomplish the set objectives (Fig. 28.1). The search string "metaverse OR non-fungible token OR NFT AND marketing" were used in the Web of Science database. Web of Science shows 339 results of scholarly papers. Apart from 161 articles written in English, others written in Spanish, Chinese, French, Korean, Portuguese, and Russian were excluded. After applying different exclusion criteria, the output from the Web of Science was limited to 147 articles (Fig. 28.2). After excluding incompatible titles, the final 38 articles were helpful in the bibliometric analysis with the Biblioshiny app and below are the inclusion and exclusion criteria for this study (Fig. 28.2). Biblioshiny app generates descriptive statistics, annual scientific production, authors citation, authors co-occurrence and keywords plus, most cited countries, most relevant authors and impactful authors, most cited sources, most relevant affiliation, and single and multi-countries publications.

28.3 Results

The result of bibliometric analysis carried out reveals commingling of metaverse and non-fungible token based on country's scientific production, singled-authored documents, international co-authored documents, thematic map keywords, and many other variables.

From Fig. 28.2, the descriptive result of the metaverse and non-fungible tokens in marketing based on inclusion and exclusion flow diagram shows that the total number of documents gathered is 34, which accounted for an annual growth rate of

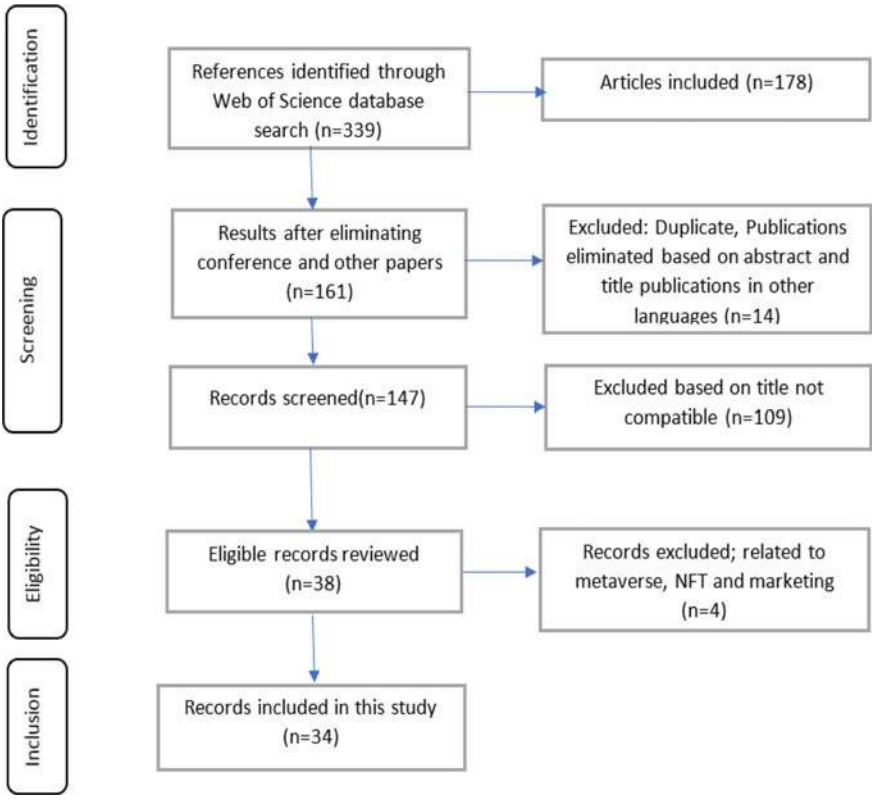


Fig. 28.2 Flow diagram of inclusion and exclusion

16.99%. Also, the study spanned from 2008 to 2022, with 30 sources of data drawn from journals, books, and other sources. Total number of authors were 90, authors of singled-authored documents were 7, international co-authored ship was 42.11%, co-authors per documents were 2.55, authors' keywords were 170. Furthermore, there were 2134 references, coupled with 3.09 document average age and lastly average citation per document was 8.475.

Figure 28.3 shows the number of articles and citation garnered yearly from 2008 to 2022. The article production fluctuated from 2008 to 2022. Despite the increase in metaverse and non-fungible tokens' awareness and use in marketing, it is surprising that the trend in the rate of publications from 2008 to 2021 is relatively low and in 2010, 2012, and 2014, there was no publication reference. Though there was constant fluctuation in the article production for over thirteen years, due to the publication spike in 2022 (18) and the year is still progressing, there is possibility of increasing in academic publication on metaverse and non-fungible tokens in coming years. From 2022, more researchers are becoming interested in metaverse and non-fungible tokens research due to the economy value and societal benefits of comingling metaverse and non-fungible tokens.

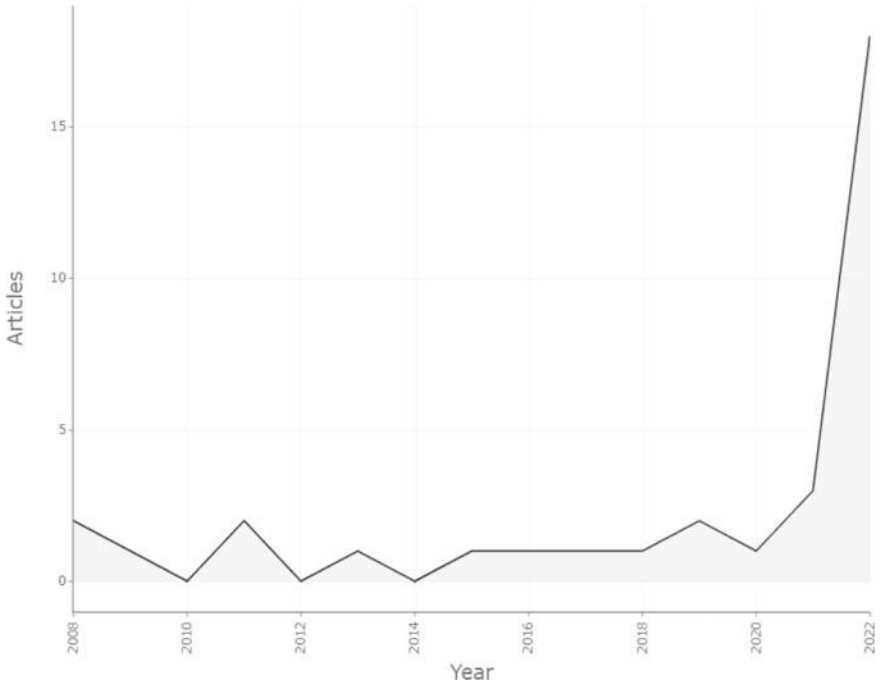


Fig. 28.3 Annual scientific production

The results produced in Fig. 28.4 show how bibliometric commingling of metaverse and non-fungible tokens literature was analysed based on the most cited countries. The darkest blue nodes show the saturation of virtual metaverse and non-fungible tokens used in marketing and followed by dark blue, light blue, and lighter blue colours. Biliometrix app generates the top ten countries, and the UK tops the list of metaverse, and non-fungible literature used with 97 citations, followed by the USA 45, Ireland has 32, Italy possesses 31, Portugal is 17, Israel 15, Spain 15, Australia 14, Germany 14, and India 14. The geographical frequencies of the papers captured in this study is quite interesting. The literature distribution on metaverse and non-fungible tokens cut across North America, Europe, Australia, and Asia continents. The first four countries in higher ranking are UK, USA, Ireland, and Italy, respectively. Conclusively, UK with average citation of 32.33, USA 4.50, Ireland 16.00, and Italy 15.50 are the most cited countries where metaverse and non-fungible tokens are most relevant.

Figure 28.5 shows the distribution of the most impactful authors on metaverse and non-fungible tokens used in marketing between 2008 and 2022. During this era, the four most impactful authors are represented by darker blue colours while the least relevant authors are represented by light blue based on H-index, a metric that is used to measure the quality impact of the authors. The H-index measures the authors productivity and citation based on their publications. The most relevant

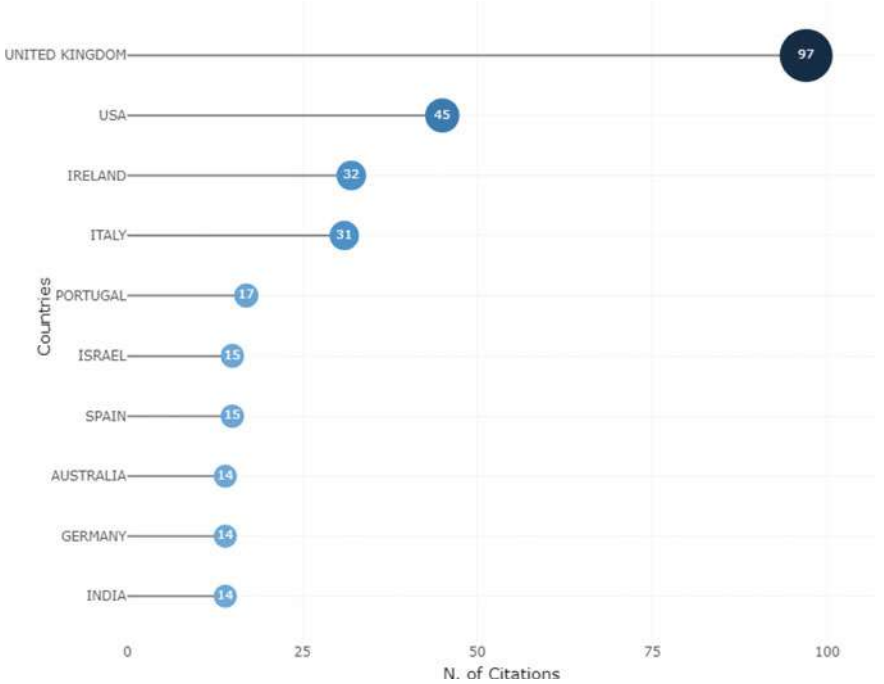


Fig. 28.4 Most cited countries

authors are Bourlakis M., Dowling M., Li F., and Papagiannidis S. with H-index 2. The least impactful authors are Aharon D. Y., Babin B. J., Balaji M. S., Binacci M., Brengman M., and Byun W. K. with H-index 1, respectively. The higher the H-index the better the productivity and citation of the authors. The H-index range in this study is between 1 and 2, and this is an indication that metaverse and non-fungible tokens research is still at the formative stage. It is expected that this H-index will increase in the future as more researchers are productive and commanding more citations.

Figure 28.6 reveals the most relevant affiliation on metaverse and non-fungible tokens used in marketing between 2008 and 2022. However, the most relevant affiliation is represented by the darkest blue, the more relevant are shown in darker blue colour while the least relevant affiliation are represented by light blue colour. University of Oulu led with six articles, Chulalongkorn University, Dublin City University, Nanjing University, and University of Southern California tallies with follows with four articles. The least most relevant affiliations by articles are Northwest University, Queensland University of Technology, Rennes School of Business, University of Helsinki, and University of Johannesburg have three articles each. In relevancy, the affiliations from Finland (University of Oulu and University of Helsinki) are the most relevant affiliations in this study and continent-wise regarding affiliation, Europe continent is more relevant.

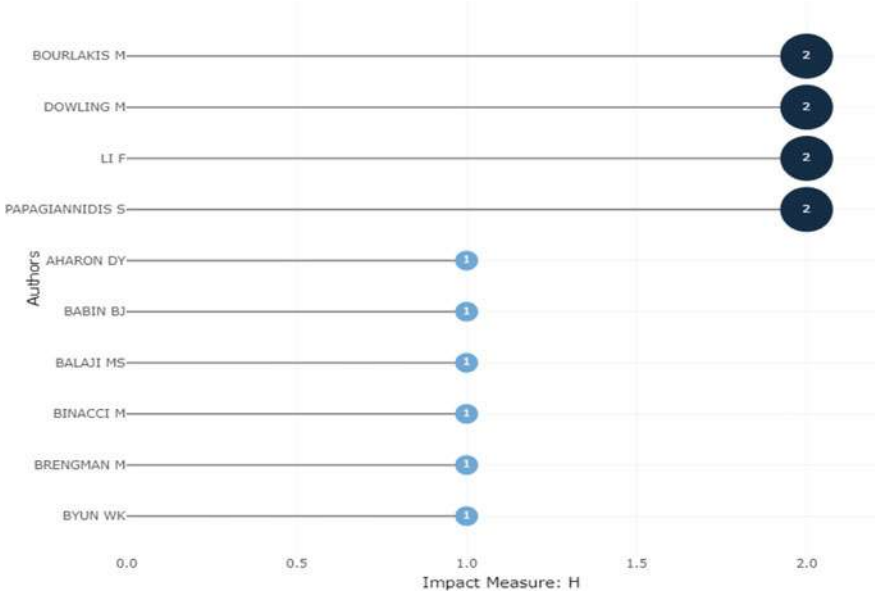


Fig. 28.5 Most impactful authors



Fig. 28.6 Most relevant affiliation

28.4 Conclusion

The importance of metaverse and non-fungible tokens to facilitating marketing in today's business cannot be overemphasised. There is a forecast that metaverse market will skyrocket and worth USD 814.2 billion with CAGR of 43.8 per cent in six years' time due to the wider scope and interest in metaverse companion such as entertainment, socialising, and creativity [28].

One interesting aspect of metaverse is integration with different fields such as gaming, marketing, and health. Similarly, metaverse with commingling of NFTs has divers' managerial implications for the artists, investors, buyers, art institutions, gamers, and academic institutions. With the emergence of metaverse and non-fungible tokens, marketing has been made very possible and easier. Businesses are well coordinated, and prospective buyers need not to visit the stores before awareness is created about a product since metaverse and non-fungible tokens are virtual reality. Also, they are generators of profit as many multinational companies such as Nike, Coca-Cola and others made a lot of profit from the use of metaverse and non-fungible tokens. It also has a charming trait of promoting products and services which equally generated employment opportunities to the people.

Therefore, it is concluded that many companies of the world most, especially the ones in third-world countries should key into this technology to create more awareness about their products and more employment. According to [15] Adidas which is one of the global brands, in 2021 entered the metaverse, via launching collections of NFTs in collaboration with some other projects. This study answered five crucial questions in the bibliometric literature. One, this study shows scanty publication on metaverse and NFTs for nearly one decade and the research domain is just gathering momentum to be more impactful. Second, the early years of publications are insignificant in quantity and the ongoing year recorded the highest publications. Third, UK is more impactful in metaverse and NFTs research. Fourth, Bourlakis M., Dowling M., Li F., and Papagiannidis S. are the most impactful authors in this research domain and University of Oulu is the most relevant affiliation institution in this study.

People who spend time in a virtual environment will be presented with goods and services in a manner that has never been seen before. This will open a new channel for advertising, particularly to younger users of the platform.

This study contributes to the literature of marketing and financial technology by showing the essential of commingling of metaverse and NFTs. Metaverse economy is growing in the business cycle and in academic and NFTs are the linchpin of the metaverse economy. This study shows country and continent gaps of metaverse and NFTs publications, especially African continent.

28.4.1 Limitations and Future Study

This study shows the gaps in the literature on metaverse and NFTs, but it has limitations. This study was limited to only one database (Web of Science) because it is a database of bibliographic citations that span multidisciplinary areas. Future research can expand this work from 2022 upwards and compare databases on metaverse and NFTs. The researcher could employ R Bibliometrix to expunge the data duplication from different databases and integrate the data as one file for bibliometric data analysis. Since the number of articles used for the data analysis is minimal after the rigorous inclusion and exclusion criteria, it is suggested that future researchers employ focus groups qualitatively to understand this study's findings and clarify the conclusions sustainably. The earlier study mentioned that a focus group is appropriate to address less explored but evolving scientific research domains [29]. This study is limited by space as bibliometrics generates a lot of insightful outputs that could not be included in this study.

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Chapter 29
A Systematic Review on the Customer Journey Between Two Worlds: Reality and Immersive World

Joana Neves, Lara Mendes Bacalhau, and Victor Santos

Abstract The digital transformation allowed the existence of new realities, with a greater focus currently on the immersive reality and how brands can get with their consumers, personalized and entertaining experiences so that they buy their products in this new concept of decentralization. However, consumer behaviors are not systematic and in new contexts, it is necessary to study their behaviors and especially what they are predisposed to buy. If e-commerce has gained a greater place in the lives of consumers in recent years, it is necessary to understand what the difference is between a new concept of reality. The purpose of this study was therefore to provide a broad synopsis of pertinent studies in the last 15 years about this new paradigm. This systematic review was guided by the principles of PRISMA-ScR. In doing so, the findings from 30 studies were analyzed and suggestions were made for future studies. The results not only synthesize existing empirical evidence of the consumer buying decision and the different realities but also identify some knowledge gaps in the literature to guide future studies.

Keywords Digital marketing · Virtual reality · Augmented reality · Immersive · Metaverse · Consumer behavior · Buying decision · Online shopping

29.1 Introduction

The technologies have been changing and new realities started to become part of consumer's life. These realities involve Web 3.0, immersive reality, extended reality, and where metaverse is an example. Based on the definition of Web 3.0, we have a

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decentralization authority, giving control to users over how they want their data to be monetized and having stronger ownership of them [1]. Web evolution allows to interact by reading, writing, and owning a little piece of the Internet (by non-fungible tokens—NFTs), have virtual economies and virtual worlds (like Decentraland and The Sandbox), and even have user identity by self-sovereign interoperable identity [2]. This technology also permits to have a better immersive reality since the existence of virtual reality (utilization of the VR headsets to produce realistic images and other body sensors), augmented reality (interactive experience involving the real-world environment, as a combination with virtual and real-time interactions, accurate 3D registration of virtual and real objects), mixed reality (merged of virtual and physical worlds, where interactions among virtual and physical objects are enabled in real time), and extended reality (permit a combination of both real and virtual environments and interactions) that serve as an umbrella for the first three terms [3]. This kind of technology is important for brands to create a unique digital product for new revenue streams, but also helps the customer journey in the immersive world. These experiences allow a greater highlight and focus of attention for users in this type of environment. Products and services are exposed in this immersive reality as in a real environment without major concerns about the real-world environment. Testing and modifying product characteristics is a huge number of possibilities, where imagination and creativity define the limit. Artificial intelligence does have a determinant role in building these environments and all their elements, meaning virtual objects, persons, and interactions as services for searching, selecting, buying, and paying in an immersive world. For marketing new ways of consumer behavior perception is open since new stimulus are created inside this type of environment. "Recording activities, stimulations, changes in a different part of the brain as well as studying the emotional, reactive and cognitive response makes up for most of the Neuromarketing study" [4]. In essence, artificial intelligence allows you to offer better experiences and retain more data to support marketing in new environments not yet fully explored.

E-commerce is established in the life of consumers as academic studies revealed but are also known that consumer behavior is not constant and can change over time, product/service, and even emotional approaches [5]. Does the customer journey in e-commerce could be equal in an immersive world?

In the first step, it's necessary to understand the importance of the metaverse in the immersive worlds, and the focus that brands and marketers in this new reality. The metaverse concept includes the 3D Internet that provided interactive products in an immersive experience in shopping, gaming, and social environment. Even if there is a different meaning for this concept, we can say that metaverse is a social construction that leverages the Web 3.0, blockchain and allows the users to build customs, habits, and new values, since they spend time and socialize in the virtual world with their avatars, co-existing with real world [1]. But, it is also important to note that entering the metaverse requires some essential steps, such as installing a cryptocurrency wallet (like MetaMask), creating an avatar (for example, at ReadyPlayer.me or Decentraland), and exploring different worlds, such as there are different platforms for this purpose (like The Sandbox, Horizon Worlds). The immersive world

is important in understanding consumer behavior since it allows the acquisition of unique products, an immersive and differentiating experience, in which brands seek to present new forms of involvement and attention to their audience. These products can be characterized by digital or physical art, video game products, collective items, media, and music, among other types.

The purpose of this study was to record the existing literature on consumer behavior in the real and immersive world in a structured and comprehensive way to allow a future research agenda on this topic.

29.2 Method

The present study employed a scoping review to map existing literature on buying decision-making in real reality (e-commerce) and immersive reality (i.e., metaverse).

This systematic review was conducted by the checklist of the Preferred Reporting Items for Systematic Reviews and Meta-Analysis. For this study, a comprehensive literature search was undertaken to identify the thematic cause. More specifically, all papers published between 2007 and 2022 were considered with the following criteria to make quality research a systematic study.

In the first step, it's necessary to clarify the formulating research question that we pretend to explore. The main question guiding this systematic review is What do we know about the buying decision in the immersive world and how different is it from the real world? This question raises the following sub-questions:

1. Why do consumers enter the metaverse and what leads to the purchase decision?
2. Does the attraction for novelty affect or alter the purchase decision in the face of new experiences in the immersive reality?
3. What are the differences between impulse and long-term purchase decisions?
4. Are consumers predisposed to immersive reality purchases across a variety of brands?

A protocol was developed in advance to document the analysis method and inclusion criteria, to identify the relevant studies. The following databases were used to find the relevant studies: Web of Science, EBSCO/Business Source Ultimate, and Scopus. These databases were selected because of their coverage in the areas of business and management studies, which includes topics involving marketing and representative academic journals that consider published studies on purchasing decisions in a digital context. Na advanced search mode was firstly used to query the indicated databases with the following Boolean commands:

– Digital Marketing AND Buying Decision OR Online Consumer Behavior*
– Marketing AND Metaverse OR "Immersive Reality"
– "Metaverse Consumer" OR (Metaverse AND "Buying decision" OR "online impulsive buying")
– Metaverse AND Consumer OR Shopping AND immersive Reality

– Commerce AND Metaverse OR (Shopping AND immersive).

Following these search commands, the keywords were further refined to focus on Digital Marketing AND online buying decision; Impulsive buying AND Buying Decisions; Metaverse AND Consumer; Immersive AND Commerce.

The inclusion and exclusion criteria for the study had to adhere to the following inclusion criteria to be selected:

- Since it is a very recent subject and without access to many previous publications, publications from 2007 to 2022 will be included to meet the advancement of technologies and understanding of the current situation experienced.
- Conceptual research or study.
- Peer-reviewed journal articles and conference proceedings.
- Full text/finished articles.
- Published in English.
- Refers to immersive reality, consumer behavior, or online impulse buying in the title and/or abstract and/or body of the article.

Working papers, books, book chapters, and white papers were excluded since the focus was on traditional academic peer-reviewed research and journal articles on the topic and more conclusive evidence. The last search was run on October 05, 2022.

The title, abstract, keywords, author name, journal name, and year of publication of the identified files were exported to EndNote, and the titles and abstracts that were unrelated to the main predetermined research question were analyzed. An eligibility assessment was then performed by carefully reviewing the full texts of the remaining articles independently and purchasing the extracted data.

29.3 Results

As depicted in Fig. 29.1, of the 1586 articles analyzed by title and abstract, 30 are included in the present review. Each study was independently evaluated to determine the presence or absence of each criterion. The decision to include or exclude articles based on the previous criteria was made by their title and abstract, as explained above. As specified in Fig. 29.1, articles that passed the first stage, or cases where a definitive decision could not be made, were reviewed to assess whether they qualified for inclusion. Using reference management software, all duplicate papers were manually removed, including those only discovered in the process. A total of 116 full papers were assessed for suitability, and 86 studies were excluded for failing two reasons: First, don't answer directly to any part of the sub-questions, and second, they don't focus on retail, brand, or any relevant element in the marketing area. The final sample included 30 journal articles and two conference proceedings.

The content of the articles in the final samples was extracted systematically according to a summary tablet that covered authors, year of publication, itinerary, study objectives, methodology, and research approach, as illustrated in Table 29.1.

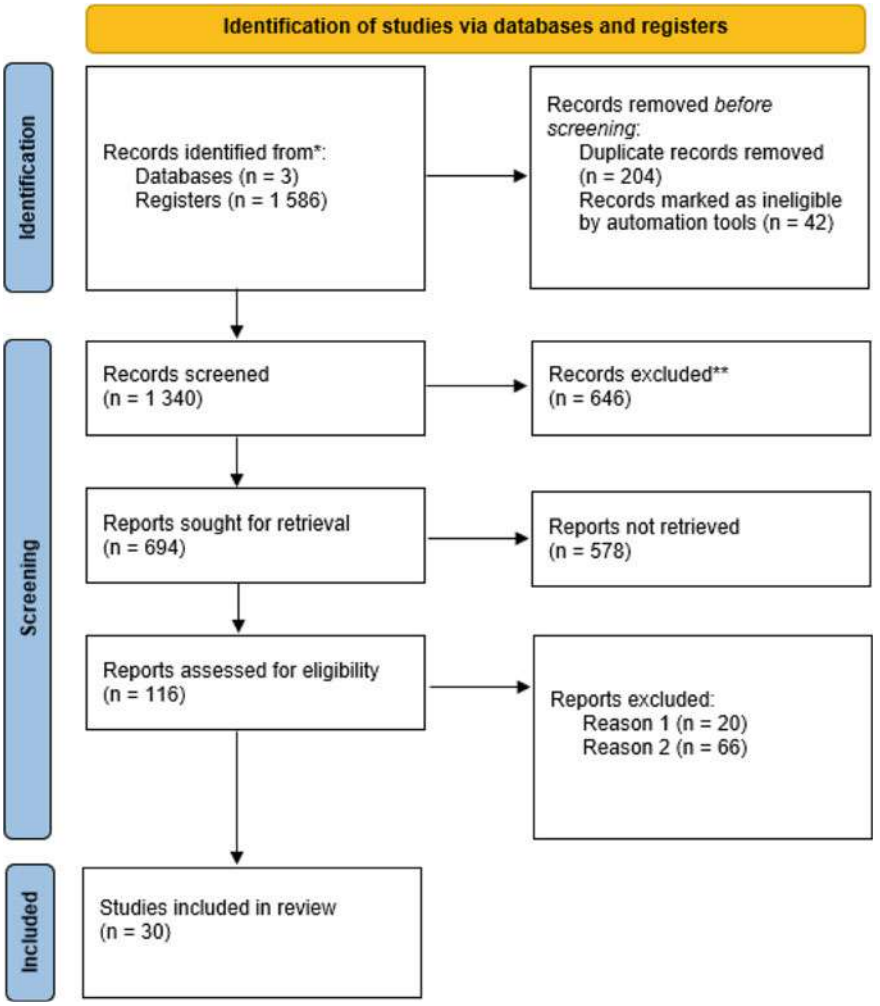


Fig. 29.1 PRISMA flow diagram for the systematic review process to identify relevant studies

After covering a quantitative process to measure and classify the data, it was qualitatively interpreted, applying the empirical methodology to deliver significance in agreement with the sub-questions.

In this systematic review, 30 primary studies deal with online consumer behavior, immersive reality, and impulsive buying in e-commerce. After an initial scholarly focus on what is immersive reality and the impact of metaverse and consumer behavior in this new way of life and buying, the results show that there have recently gradual studies that also investigate the outcome of the buying analysis in immersive reality versus e-commerce and the physical world. In fact, it's possible to see that 8 articles are related to immersive and virtual marketing in consumer behavior [3,

Table 29.1 General description of the key characteristics and the studies included in the review

Study No.	Authors	Journal/ proceeding	Study objective	Methodology and research approach
1	Au et al. (2021) [13]	Journal of organizational computing and electronic commerce	Understand the consumer's online brand-defending behaviors–enablers and styles of online consumers	Conducting a netnographic case study on an aviation-related online community Qualitative
2	Bonetti et al. [19]	Springer International Publishing	Analyzing the augmented reality and virtual reality in physical and Online Retailing	Literature Review
3	Bousba and Arya [6]	Journal of content, community and communication	Examined the antecedents of a brand´s gamification marketing activities in the metaverse and the Impact on consumer's affective brand engagement	Analyzed by SMART-PLS conceptual model Quantitative survey
4	Chen and Yao [25]	Psychology & marketing	Understand the differences in the roles of telepresence and transportation in the context of virtual marketing	Two studies–(1) controlled laboratory experiment; (2) replicated key findings in study (1) and online experiment with a larger sample of users
5	Chen et al. [20]	International journal of human–computer interaction	Investigation about the effectiveness of VR shopping platform factors that impacts consumers' internal stages and lead to an urge to buy impulsively in virtual stores	S–O–R framework Full 2 × 2x2 factorial design experiment
6	Cipresso et al. [21]	Frontiers in psychology	Augmented reality and virtual reality evolution and the outcome of the significant	Research framework

(continued)

Table 29.1 (continued)

Study No.	Authors	Journal/ proceeding	Study objective	Methodology and research approach
7	Dincelli and Yayla [3]	Journal of strategic information systems	Opportunities and challenges for organizations in immersive virtual reality	Hybrid-narrative literature review Qualitative
8	Dobre et al. [22]	Journal of theoretical and applied electronic commerce research	Determining the extent to which millennials and generation Z consumers perceive social media marketing and luxury brands	Collected data from a Facebook page Questionnaires Quantitative
9	Dwivedi et al. [14]	International journal of information management	Metaverse and its transformational impact	Informed narrative and multi-perspective approach from experts with varied disciplinary backgrounds
10	Han and et. [15]	Virtual reality	Review literature discusses issues in the design and employment of virtual reality consumer experience escapes	Review literature Research framework
11	Huang [7]	2021 IEEE international conference on industrial engineering and engineering management, IEEM 2021	Investigates impulse buying in social media live streaming commerce, considering the overall contextual and atmospheric factors	An online survey on Facebook Literature Review
12	Jeon [8]	Proceedings–2022 IEEE conference on virtual reality and 3D user interfaces abstracts and workshops, VRW 2022	How will individuals process social media content within the metaverse reality?	Exploratory study Preliminary evidence
13	Joy et al. [23]	Strategic change-briefings in entrepreneurial finance	Investigating how newly evolved technologies affect the fashion industry	Research charts Practical examples of luxury brands
14	Kim [9]	Journal of interactive advertising	Advertising in the metaverse	Research agenda Qualitative

(continued)

Table 29.1 (continued)

Study No.	Authors	Journal/ proceeding	Study objective	Methodology and research approach
15	Klein and Sharman [10]	Journal of retailing and consumer services	Consumer mediator between consumer intention to participate in online group buying and their decision-making styles	Theoretical framework
16	Kumawat et al. [16]	International journal of computer science and programming language	Highlight the entire journey of growth of immersive technology	Research review
17	Lim and Kim [11]	International journal of human–computer interaction	Effect of emotional intelligence as one of the consumers' psychological characteristics on online value perception/ shopping behaviors	Cognition-affection-conation framework
18	Lombart et al. [12]	Computers in human behavior	Impact of a physical store, a non-immersive virtual store, and an immersive virtual store environment on consumers' perceptions and purchase behavior toward FaVs	Experimental between-subjects design Questionnaire survey
19	Meissner et al. [24]	Journal of business research	Investigate how immersion affects consumer choice	Design of the empirical study Questionnaire Quantitative and Qualitative
20	Novak [17]	Tech Trends (2022)	Discussion of metaverse and evolution of the term	Research agenda
21	Panagiotakopoulos et al. [26]	It professional	Overview of digital scent technology through the recent electrical interfaces	Review literature Qualitative

(continued)

Table 29.1 (continued)

Study No.	Authors	Journal/ proceeding	Study objective	Methodology and research approach
22	Pizzi et al. [18]	Journal of business research	Investigation of consumers displays similar brand perceptions between physical and virtual store environments	Experimental study manipulating store environment Qualitative
23	Rauschnabel et al. [27]	Journal of business research	Discuss a nuanced customer journey model for AR marketing strategy and propose the BICK FOUR framework	BICK FOUR framework Review concepts
24	Riegger et al. [28]	Technological forecasting and social change	Investigate the interplay of personalized content and device technology in customers' response to technology-enabled personalization (TEP)	Mediated moderation analysis Two experiments
25	Schnack et al. [29]	Journal of retailing and consumer services	The research examined the big five personality traits and their impact on purchase behaviors	Shopping experiment in 3D VR convenience store environment Quantitative and qualitative
26	Schnack et al. [30]	Journal of consumer behaviour	Reports study the authenticity of shopper behavior in such immersive virtual environments	Shopper metrics collected Quantitative
27	Sung et al. [31]	International journal of information management	Findings from a study designed–to investigate consumer responses toward an AI-embedded mixed reality	S–O–R framework Quantitative
28	Thaichon et al. [32]	Journal of consumer behaviour	Examine online consumer behavior	Research review Qualitative

(continued)

Table 29.1 (continued)

Study No.	Authors	Journal/ proceeding	Study objective	Methodology and research approach
29	Wu et al. [33]	International journal of information management	Examine the determinants of online impulsive buying–new research model	Empirical research Questionnaire Quantitative
30	Zinko et al. [34]	Journal of organizational and end user computing	Understand the effect of images in the electric word of mouth for both hedonic and utilitarian products	Two-study investigation using web-based review simulations Quantitative

6–12]; 8 articles refer to metaverse and consumers [1, 13–18]; 7 articles involve online consumer behavior [2, 5, 19–24]; 3 articles explore the impulsive behavior [4, 25, 26]; and 4 articles explore the immersive realities and technologies [2, 8, 13, 16]. Furthermore, 25 studies are published in academic journals, with a focus on *Journal of Business Research*, *International Journal of Information Management*, and *Journal of Consumer Behaviour*.

29.4 Discussion

Despite being a theme that has been gaining more prominence in academic articles, it is possible to evidence a range of important studies that seek the understanding of immersive reality, how the consumer inserts himself in it, as well as the differences between the physical and virtual world.

29.4.1 The Importance of VR and AR Technology

Studies highlight that consumer-facing technology, whether experienced directly in-store or online, is crucial to consumer engagement, driven by augmented reality (AR) and virtual reality (VR). AR is understood as the combination of real and digital information in the user's view in an interconnection of the real and virtual world. These virtual elements are added to the visualization of the physical environment, in real time [19]. This definition allows us to understand that technology provides an interaction between the consumer and virtual products, creatively and innovatively, increasing the experiential value. Thus, it can be determined that it boosts experiences, improves product visualization, and, with a greater likelihood of a more favorable image of brands and purchase intentions [14]. When it comes to VR, it

requires a wearable device (usually, a headset) that will lock sensory experiences into the physical world and, increase consumer engagement in 3D worlds [16]. In this way, real-time manipulation and physical movement within the virtual world are possible, through the monitoring of the limbs, allowing increased feedback of the consumers' actions and the psychological feeling the consumers when they are immersed in the simulation [19].

There is no doubt that these technologies have gained greater prominence with technological advances, allowing for greater experience in several areas [21]. For example, a distinctive evolution in the quality of AR images in real time has been possible through VR systems, which facilitate consumer experiences and retention of information for brands. Currently, VR allows the enhancement of the consumer experience by replacing traditional devices (e.g., keyboard and mouse) with more natural interactions (such as gestures) [19]. On the other hand, these technologies are fundamental in immersive environments, such as the metaverse, because it increases consumer retention and engagement with brands and products, in an innovative environment.

29.4.2 Immersive Reality

The term metaverse, although a popular topic in recent years, is not new. The first reference happened in 1992, through the science fiction book Snow Crash by Neal Stephenson. The term consists of social spaces also known as virtual worlds [17]. Undoubtedly, metaverse games are the most popular, with the There (1998), RuneSpace (2001), and Second Life (2003) platforms as pioneers. Second Life was decisive for the incorporation of the business world, and it allows a primary involvement of consumers with companies [14]. However, platforms such as Roblox (2006), Minecraft, and Fortnite (Epic Games) have more recently revolutionized the interconnected aspects of AR and VR technologies [21]. Currently, companies like Meta and Microsoft invest in metaverse platforms.

Undoubtedly, the change in the Facebook group to Meta, where its CEO intends to explore new technologies intertwined with the Metaverse [19], has demonstrated a new position and prominence in companies and consumers. However, other competitors also occupy space, such as Microsoft Mesh, with a greater focus on enterprise segmentation. The decentralization of platforms also allows a new bet of brands in these virtual worlds, such as Decentraland, in which consumers are already using these technologies and where brands already want to be to capture a new digital consumer.

29.4.3 Immersive Reality and the Role of Brands

The new concept of fully immersive reality leads brands, especially those considered luxury, to operate in this environment and increase their relationship with their consumers [7]. This happens due to the personalized interaction that brands can achieve in delivering a fully immersive experience [20]. The studies reviewed show that brands deliver an immersive experience through their products and services, which is carried over into the physical environment. For example, a footwear product is purchased for an avatar in the immersive medium and the consumer receives the same in the physical medium [21]. This consumer journey allows for greater interaction and proximity with brands, increasing their perceived value and their engagement. However, the analysis of studies also proves that digital media promotes a higher percentage of impulse purchases [25]. Although there are not enough studies on this concept, future studies could analyze to what extent purchases in the fully immersive medium are made impulsively, or how brands can capture their consumers knowing this behavior. Furthermore, it is important to keep in mind that studies show that Generation Z has become the new conservatives, in the digital medium, just as Millennials are instrumental in constantly interacting with digital media and are motivated to immersive shopping, and contemplate luxury brands. Generation Z has greater control in their buying behavior, weighing more heavily in their decision, as they are familiar with the Internet of Things to research products and are attracted to a greater experience in the metaverse. Generation Y, according to studies, appreciates product customization more, as they consider brands relevant and prestigious and expect an integrated experience in the purchase decision [20].

Studies also show that younger generations are more latent to experience fully immersive realities, seeking a differentiating, personalized, and fun experience [23]. Purchase decisions are made due to a sense of belonging [13], brand recognition [12], the interconnectedness of products with the physical world, and integration into brand groups and communities [30].

Undoubtedly, consumers have channeled their behaviors along with technological advances, which leads to a greater predisposition for impulse purchases and attraction to novelty [6]. However, the mentioned studies show that impulsive buying, whether in real or immersive environments, is the result of psychological behaviors [14], unique moments, and even belonging to the brand community are reflected in loyalty and demand for exclusive products [29].

29.4.4 What is the Reason for Consumers to Buy Online (E-commerce), and What Will Make Them Enter an Immersive Reality?

First, it is necessary to keep in mind that e-commerce is part of consumers' daily lives, gaining greater prestige after COVID-19. E-commerce offers a wide variety

of products at a single point in time, with a greater focus on cheaper products, which are more advantageous and convenient. In addition, customer reviews are quite important in the evaluation and purchase decision. Being comfortable anywhere and making a purchase is already a requirement of many online consumers and immersive reality increases these possibilities. What consumers are looking for when entering the immersive reality in the online ping-store is a fully customizable experience, watching the products from different angles (which is extremely important, considered as a detail when buying goods with a higher monetary value), greater connection with the brands and, greater loyalty to the final product, i.e., there is a greater likelihood of choosing the right product, or the right size, which reduces the return rate of goods, given the current e-commerce reality.

Consumers opt for limited purchases of products referring to luxury brands, likewise, they wish to contain a differentiation in their avatars (mainly in the entertainment area) [27]. The immersive reality, different from traditional e-commerce, allows a relationship and interaction with products that are essential for consumers, however, it is possible through AI. In this context, this aspect is crucial for certain products and services, as it allows to overcome existing barriers and increase the retention of online commerce. This is because currently, in the metaverse, the greatest popularity is concentrated on prestige brands such as Samsung, Gucci, Louis Vuitton, Nike, Atari, and Forever 21, among others, in which the interaction with the product and the approximation with its physical behavior is essential for the purchase decision. There is a greater focus on brands related to the fashion world, technology (increased presence of car brands), as well as the interconnection with games. Gamification is a strong reality in the metaverse, establishing itself as the differentiating element in the consumer experience, as well as the bet on partnerships between different brands. Thus, the most sought-after products and services are concentrated in the area of fashion, for avatars and the corresponding obtaining in the physical world, events (such as music or product launches), and the involvement with the world of games (such as the partnerships with Fortnite). Immersive reality has also increased the number of members in exclusive clubs, increasing their engagement and exclusivity with brands through NFTs. Finally, it is also possible to mention that this reality has increased the role of conversational marketing, as it allows to have large-scale two-way conversations with consumers, through the sophisticated tools provided by AI that allow getting the emphasis essential for this relationship.

Thus, more than the lure of novelty, consumers want to own a piece of the product that will belong to them on the Internet [8]. Experiences are extremely crucial for engagement in the consumer journey [9, 29], although more studies are needed to identify the concrete factors that lead to the final purchase decision and what steps consumers take until the moment of purchase.

29.5 Conclusion

The purpose of this systematic literature review was to summarize empirical evidence of online consumer behavior and purchase decisions in immersive reality in a clear and structured manner to identify possible gaps for future studies. This study provides insights into existing knowledge and which areas should be given more attention. These knowledge gaps include further studies on the consumer journey in the immersive world (metaverse), how brands ensure their engagement and perceived value to the consumer, as well as an understanding of the perception of value itself and new cultures being created in this new world.

The metaverse guarantees freedom of relationship and interaction between brands and their consumers, just as it is perceived that younger generations are more likely to interact and deepen their buying experiences in this reality. Although this topic is recent, marketers need to understand the new consumers, just as brands need to be increasingly creative and open to the new opportunities that this technology brings.

This systematic review contained certain limitations. The main limitation is that the immersive reality, more specifically, the study of the metaverse and the consumer journey that leads to the purchase decision is not studied in the articles, just as, because it is such a recent subject, it is difficult to understand why consumers are predisposed to purchase certain products over others in this reality.

Thus, consumer behavior in immersive realities like metaverse and Microsoft Mesh among others is a new area to invest in, with growing academic interest. This systematic literature review promotes some clarification regarding the importance of consumer understanding in non-immersive and fully immersive realities, and how it affects the role of brands. However, further studies are important to advance more evidence in marketing and the consumers of the future.

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Part VII
Neuromarketing Technologies

Chapter 30
Two Sides of a Pale Colour: Difference in Attractiveness of a Colour and Product Design Colour for Consumers

Takumi Kato

Abstract Colour types differ slightly depending on the manufacturer even when the same colour type is applied in a product design. However, the colour effects on consumer behaviour have been centred on hue units. Therefore, this study focused on the pale colour, bluish-white. Both positive and negative effects have been discussed regarding this colour, in reference with the perception of healthy food and the human face. Research is rare in the context of attractiveness in industrial product design on this topic. Study 1 extracted pale colour, which is popular for evaluating the colour itself, from the exterior design colour of existing cars. In Study 2, the colour was applied to a fictitious car design, and its effect on attractiveness was compared to that of pure white. The randomized controlled trial in Study 2 supported the following hypothesis: in the context of automobile exterior design, pale colour has a negative impact on attractiveness, even if the colour is appealing. This result indicates that when considering the colours of product design during the development phase, the judgement may be erroneous if the survey is conducted about the colour alone. In addition, in digital showrooms, when presenting the colour of a product design in a format separated from the product, it is important to design the presentation to bridge the discrepancy between the presentation and the actual product. In the practical application of marketing, it is necessary to pay particular attention to the pale colours that have dual impacts.

Keywords Automobile · Bluish-white · CMF · Perceived quality

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30.1 Introduction

Perceived quality in industrial product design refers to colour, material, and finishing (CMF) [1]. Among these, colour has received the most attention due to its influence. Colour is one of the most influential factors in determining a consumer's first impression regarding a product [2]. Since the beginning of the twenty-first century, interest in colour research for sensory marketing has grown rapidly [3]. Colour has a significant impact on people's emotions [4–5], affects their moods [6], and promotes purchase intentions [7] and the willingness to pay [8]. It has been reported that the influence of colour is superior to the objective characteristics of the products, especially in the food industry [9–11].

However, in the aforementioned research on consumer behaviour related to colour, simple hues, such as white and blue, were studied. It is common to introduce perspectives, such as saturation (an achromatic stimulus, i.e. a neutral grey or white), lightness, and light reflection when undertaking more detailed analyses of colour [12–14]. Conversely, product designs developed as "white" vary depending on the brand of the manufacturer. Many companies develop unique colours and use unique colour names to distinguish products, attract consumer attention, and promote sales [15]. For example, Toyota's CAMRY simply provides the exterior design as "white" [16], whereas the Honda ACCORD provides "platinum white pearl" [17], Ford MUSTANG offers "Oxford White" [18], Audi A7 has an "ibis white" [19], and the Tesla MODEL3 has a "pearl white multi-coat" [20]. Each manufacturer produces its own version of the colour white and gives it a unique brand name. There is a lack of discussion regarding these varieties of white in the existing academic research.

The colour focused on in this study is a pale bluish-white. Both positive and negative effects have been discussed regarding this colour, in reference with the perception of healthy food and the human face [21–27]. Research is rare in the context of attractiveness in industrial product design on this topic. Therefore, the present study compared the results of the attractiveness of the colour and the car exterior designs in the Japanese market. This study demonstrates that consumer choices fluctuate depending on the target and conditions based on consumer subjectivity, and that it is significant in the practice of product development.

30.2 Related Works and Hypothesis

Colours have an apparent weight, and pale colours give the impression of being light/weightless [28–29]. This indicates why consumers tend to perceive pale colour food packages as healthy [21, 24]. However, in the context of the human face, the impression is reversed, whereby, a pale colour is considered unhealthy [22, 23, 25, 27]. Thus, robots with a pale-coloured "face" are less likely to attract consumers [26]. This proves that the perception of pale colour changes for consumers based on the target and the context.

In the automobile industry, white is the most common colour. In terms of sales based on exterior design colour, white has the largest share, occupying about 40% of the world market. It is closely followed by black, grey, and silver, which together account for about 40%. That is, the above four achromatic colours occupy about 80% of the world market [30]. Conversely, blue and red, both chromatic colours, account for only 9% and 7%, respectively, in the world market [31].

White-coloured cars have maintained a high resale value due to its popularity irrespective of the car model [32]. It is also the most recalled by consumers among Toyota, Honda, Nissan, and Audi [33]. Automakers, recognizing the importance of this colour, have been engaged in research and development of colours, such as stylish white and luxurious white [34]. Therefore, in the context of automobile design, it is inferred that consumers are not accustomed to pale colour and tend to be attracted to "whiter white" than bluish-white. Colours that deviate from the standards within the product category create consumer scepticism about the product and lead to a decline in reputation [35]. In addition, based on the results of the above robots [26], it is inferred that a pale colour is considered negative even among automobiles that are the same industrial product. Consequently, the following hypothesis was derived:

Hypothesis In the context of automobile exterior design, pale colour has a negative impact on attractiveness, even if the colour itself is appealing.

30.3 Methodology

This study consists of two surveys. In Study 1, existing products were used to evaluate pale colour and other whites. The purpose of Study 1 is to find a pale colour that is attractive in the colour-only evaluation. It is possible to search for realistic colours in this context by using the exterior design colours of cars that actually exist. Simultaneously, in the presence of brand and product styling biases, differences in evaluation between individual colours and the exterior colours of cars were also confirmed. In Study 2, a fictitious product design was created, and the effect of the pale colour extracted in Study 1 was compared with white, without disclosing the manufacturer brand. The hypothesis was tested based on these results.

30.3.1 Study 1

In Japan, Daihatsu TANTO was chosen as a pale colour design sample (Sample 1). Daihatsu is a group company under Toyota and mainly develops compact cars. Honda FIT (Sample 2), Audi A1 (Sample 3), and Tesla Model 3 (Sample 4) were selected as white colour design options. All the cars were selected from the compact category to maintain parity in comparison. Figure 30.1 shows the four colours extracted from the same part of the front mask.



Fig. 30.1 Designs used for study 1

Randomized controlled trial (RCT) was applied as the survey method for verification to ensure high reliability. An online survey was conducted from 14–18 January 2022, with 200 consumers in their 30 s to 50 s in Japan. The survey was distributed to the panel of Cross Marketing Inc., a Japanese research company. All study participants provided informed consent. Next, 100 people each were randomly assigned to the Colour Group and Product Group. The homogeneity of each group was ensured to maintain the accuracy of the RCT. Table 30.1 demonstrates that the attributes of the respondents in both groups and the attributes of the usage status of automobiles are almost uniform.

The nine question items are given in Table 30.2. After completing Question Nos. 1–8, the images corresponding to each group were presented. The Colour Group was shown images of the four colours, and the Product Group was shown the four products, as shown in Fig. 30.1. In question No.9, respondents selected one of the four sample colours in response to the question: "please select the most attractive colour". Although it is not possible to rule out the bias, the following alert was presented; "Please evaluate the colour, not the brand or styling". For verification, the chi-square test was adopted, and the null hypothesis revealed that there was no difference in the distribution of attractive colour responses between the two groups. The analysis environment is R, which is a statistical analysis software.

30.3.2 Study 2

Two car designs were produced with the same styling but different colours. Since there was a concern about bias based on the brand image of an existing car, a new car style was created. No brand logo was attached to the exterior of the cars. The body type was that of a sports utility vehicle (SUV), and the colours were white and the pale colour of Daihatsu TANTO as used in Study 1. RGB values (red, green, blue) were set uniformly to 230 for white. The values for the pale colour were 225 (red), 235 (green), and 240 (blue), where blue was the strongest. Figure 30.2 illustrates the designs made for this study with the mentioned values. Autodesk Vred Design and Adobe Photoshop were used to create the designs.

Table 30.1 Distribution of respondent attributes for each group

Item	Content	Study 1		Study 2	
		Colour	Product	Control	Treatment
Response device	Personal computer	34	32	42	37
	Smartphone/tablet	66	68	58	63
Gender	Male	46	54	57	48
	Female	54	46	43	52
Age	30 s	34	33	31	36
	40 s	36	33	36	29
	50 s	30	34	33	35
Owning car	Yes	74	65	71	68
	No	26	35	29	32
Drive frequency	Not at all	27	36	27	36
	Less than once a month	4	7	9	3
	Once a month	3	2	2	2
	Once every two weeks	2	0	4	3
	One a week	14	10	13	12
	Two–three times a week	12	10	11	7
	Four–six times a week	9	16	6	13
	Every day	29	19	28	24
Brand of the owing car	Toyota	24	24	24	16
	Honda	17	12	11	11
	Nissan	8	1	7	9
	Suzuki	7	4	11	10
	Daihatsu	9	11	5	3
	Mazda	6	5	6	7
	Others	3	8	7	12
	Not owning	26	35	29	32
Body type of the owing car	Micro	25	18	19	24
	Compact	16	15	20	15
	Minivan	16	14	19	12
	SUV	7	6	6	7
	Sedan	10	12	7	10
	Not owning	26	35	29	32
Purchasing emphasis point	Design	17	29	21	18
	Driving	18	12	10	15
	Fuel	12	9	5	12
	Price	16	12	29	15

(continued)

Table 30.1 (continued)

Item	Content	Study 1		Study 2	
		Colour	Product	Control	Treatment
	Safety	8	10	10	15
	Usability	19	17	16	12
	Others	10	11	9	13

Table 30.2 Question list

No	Question	Answer Type	Option
1	Please select the device you are currently using to answer this survey	Single answer	Personal computer, smartphone/tablet
2	Please select your gender	Single answer	Male, female, prefer not to say
3	Please select your age	Single answer	20 s, 30 s, 40 s, 50 s, 60 s, 70 s, or more
4	Please answer the status of your car possession	Single answer	Yes, no
5	Please select how often you use [target brand]	Single answer	Not at all, less than once a month, once a month, once every two weeks, one a week, two–three times a week, four–six times a week, every day
6	Please select the brand of owing the car. If you have more than one, select the brand you are using the most	Single answer	Toyota, Honda, Nissan, Suzuki, Daihatsu, Mazda, others
7	Please select the car body type of owing the car. If you have more than one, select the brand you are using the most	Single answer	Micro, compact, minivan, SUV, sedan
8	Please select the emphasis point when you purchase cars	Single answer	Design, driving, fuel, price, safety, usability, others
9	[Study 1] Please select the most attractive colour. Please evaluate the colour, not the brand or styling	Single answer	Sample 1, sample 2, sample 3, sample 4
	[Study 2] Please mention the degree of attractiveness of the exterior design colour	Seven-point Likert scale	1 = not at all attractive, …, 7 = extremely attractive



Control Group Treatment Group

Fig. 30.2 Designs used for study 2

A randomized controlled trial was applied for the survey. An online survey was conducted from 14–18 February 2022, with 200 consumers in their 30 s to 50 s in Japan. 100 people each were randomly assigned to the Control Group, which represented white, and the Treatment Group, which presented the pale colour. Similar to Survey 1, after completing Question Nos. 1–8 in Table 30.1, the respondents answered the question: "please mention the degree of attractiveness of the exterior design colour" on a 7-point Likert scale (1 = not at all attractive and 7 = extremely attractive). The null hypothesis is that there is no difference in the distribution of responses regarding the degree of colour attractiveness between the two groups.

30.4 Results

Table 30.3 demonstrates that in Study 1, Sample 1 (pale colour) had the highest evaluation in the Colour Group, while Sample 3 had the lowest evaluation. However, in the Product Group, Sample 3 had the highest evaluation, whereas Sample 1 had the second lowest evaluation. The selection rate of pale colour is 31% for the Colour Group and 19% for the Product Group, which is a large difference. As a result of the chi-square test, the p-value was 0.001, the null hypothesis was rejected at the 5% level, and a significant difference was detected. Cramer's V (small: 0.1–0.29, medium: 0.3–0.49, large: ≥0.5;) was calculated at 0.297 to confirm the effect size, which was confirmed to be almost medium.

Table 30.3 Response distributions for Study 1 and the result of the chi-square test

Group	Sample				Total	Selection ratio of pale colour (%)	*p*-value	Cramer's V
	1	2	3	4				
Colour	31	28	12	29	100	31	0.001**	0.297
Product	19	17	36	28	100	19		

Note *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Table 30.4 Response distributions for Study 2 and the result of the chi-square test

Group	Attractiveness							Total	Mean	*p*-value	Cramer's V
	1	2	3	4	5	6	7				
Control	3	15	8	33	23	13	5	100	4.170	0.024*	0.270
Treatment	14	10	15	28	24	8	1	100	3.660		

Note *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

As has already been mentioned, Study 1 was influenced by product styling and manufacturer brands. In particular, the influence of the brand is large, and it affects the behaviour of consumers rather than the objective characteristics of the product [36]. Among the brands presented in the Product Group, Audi received the highest evaluation in brand ranking by J. D. Power in Japan. Conversely, Daihatsu received a significantly lower rating [37]. It should be noted that such brand influences are included. Tesla does not have a great influence since charging stations, parking space, and sufficient subsidies are still scarce in Japan. Only 3238 units of imported electronic vehicles (EVs) were registered in 2020, and 8610 units were registered in 2021 [38]. These figures are negligible compared to the approximately 4.5 million units of new cars sold in 2021 [39]. Hence, Tesla was excluded from the J. D. Power's brand evaluation, and it is assumed that the penetration in the consumer market is still slow.

In Study 2, as given in Table 30.4, the Control Group for white had a mean value of 4.170 while the pale colour Treatment Group had a mean value of 3.660. Furthermore, the former had a higher score. As a result of the chi-square test, the p-value was found to be 0.023, and a significant difference occurred. Cramer's V was calculated at 0.270 to confirm the effect size, which was confirmed to be small. Thus, common results were obtained from Study 1 and Study 2, and the hypothesis was supported.

30.5 Implications

Study 1's results for the Colour Group confirmed that the pale colour is as attractive to consumers as white. This trend is in line with previous studies claiming that a bright and light-looking colour gives a healthy and positive impression [21, 24, 28, 29]. However, the results of Study 1's Product Group and Study 2 highlight that the evaluation was negatively reversed when it came to the context of car exterior design. This result has the same tendency as the human facial expression [22, 23, 25, 27] and the face of the robot [26].

Studies have reported that the appropriate colour for consumers changes depending on the object and conditions, which is supported by the results of this study. For example, on the product display shelves, there is a higher probability of a light-coloured product being sold more and at a faster rate than a dark-coloured

product [40]. In food packaging, the healthy image of a pale colour changes as per the experience that the consumer has with the food item [24]. In automobiles, effective colours differ depending on the model type, such as active red for sports cars [41]. However, in the context of industrial product design, research focusing on the duality of pale colour is extremely rare. This study contributes to the expansion of knowledge about colour.

Furthermore, the results indicate important implications on product development. When considering the colour of a product design during the development phase, there is a concern that the judgement may be wrong if the survey is conducted about the colour alone. Thus, taking advantage of large screens and virtual reality, the automobile industry has set up digital showrooms. For instance, in the Audi showroom in Beijing (opened in 2013), only one car was exhibited, and other cars were projected on the screen. The colours were exhibited on some parts of the exterior design of the projected cars [42]. Similar efforts to provide brand experience, within the limited space of urban areas, are increasing day by day. When constructing such spaces, there remains the risk of providing an inadequate experience if one does not understand that conditions impact consumers' colour preferences, as proved by the results of this study. In addition, consumers may feel disappointed at the difference in the showroom experience and the actual product. Therefore, in the practical application of marketing, it is necessary to pay particular attention to the pale colours that have dual impacts.

30.6 Conclusion

When determining the first impact of a product on consumers, colour is one of the most influential factors. However, the appropriate colour for consumers changes depending on the object and conditions. This study focused on pale colour and discussed its negative effects in the automotive sector. However, research is rare in the context of attractiveness in the design of industrial products. Hence, the impact on the attractiveness of automobile exterior design was examined. As a result, it was clarified that although the pale colour is attractive as an individual colour, it may have a negative effect on product design. Therefore, during the development phase, when considering the colour of the product design, the judgement may be erroneous if the investigation is conducted for the colour alone. In addition, in digital showrooms, when presenting the colour of a product design in a format separated from the product, it is important to design the presentation to bridge the discrepancy between the presentation and the actual product.

This study has four limitations. First, the pale colour is not objectively defined as one colour; therefore, a gradual change from white to blue should be considered. Second, the results are limited to Japanese people, and the conclusions cannot be generalized. Previous studies have reported differences in colour preferences based on gender [43–44] and region [45–46]. Third, the body type of the car used in Study 2 is limited to SUVs. When the colour matches the image of the product/brand,

consumers rate the product as having higher value [47–48]. Therefore, although the image of body type called SUV and the image of pale colour did not match, the result may change with other body types. Fourth, the results were gathered through an online survey and may be different in an offline environment. The colours displayed in the survey depend on the environment settings of the device used by the participants. However, since RCTs were adopted in this study, such noise is mitigated. Further research should attempt to address these limitations.

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Chapter 31
Why Do We Buy Things that We Don't Need: Reflections from Neuropsychology



Carlos Ramos-Galarza and Mónica Bolaños-Pasquel

Abstract The process that human mind follows to buy any article involves a series of steps. This work reflects from a neuropsychological point of view, the implication that executive functions have in this process. Inhibitory control, emotional regulation, decision making, planning, cognitive flexibility, error correction, and internal language regulating behavior are the executive functions that are analyzed on the possibility of generating an automatic or conscious behavior to make a purchase, for example, when an article is acquired because there is the need versus when a purchase is made only because of impulsive. As conclusion, evidence of the complex dynamics when buying a thing is left, where it is possible to consider executive functions for future marketing campaigns, thus, increase the sales of a specific product.

Keywords Buyer behavior · Consumer behavior · Emotional regulation · Executive functions · Inhibitory control · Neuromarketing

31.1 Introduction

Nowadays, the mental process that an individual activates to buy an article is still an enigma, and a focus of great interest in the scope of consumer behavior. From neuropsychology, the context from which this analysis is approached, there would be a set of mental abilities that could shed some lights to understand an individual's buying behavior. For example, from the neuropsychology, it is possible to identify different cerebral functions that are involved in this process, such as the next executive functions: inhibitory control, emotional regulation, decision making, planning capacity, and cognitive flexibility [1].

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31.2 Executive Functions and the Possibility of Purchasing

31.2.1 Inhibitory Control

The purpose of the human frontal lobe is to plan, regulate, and verify cognitive and behavioral activity. This brain structure has a high-level function nominated inhibitory control, which allows humans to control automatic impulses [2, 3].

In the process of purchasing an article, the brain activates a series of structures that determine if the purchase must take place or not. At first, sensory mechanisms are activated at the level of vision, hearing, touch, taste, and smell. The next step is the emotional activation, since an article could bring a reaction of happiness, anger, sadness, rejection, hatred, or disgust. This is followed by a cognitive reaction that generates thoughts about the item that is planned to be bought.

Subsequently, the brain process would take two ways, the first in which the cognitive path ends, and the individual buys an item from an emotional impulse or, in turn, from a more complex brain structure, as the frontal lobe is, where inhibitory control is activated, it is decided consciously whether an item must be bought or not [4].

Figure 31.1 shows the three processes that are activated in the brain when a person wishes to make a purchase. As number 1, there is observed the structure of the reptilian brain system, which is related to the production of impulses that are generated when purchasing an article. In number 2 are the reactions of the limbic system, known as the emotional one. And, in the number three, it is observed the reactions of the neocortex.

In several investigations, it has been found that humans who have a brain difficulty at frontal level show a behavior where inhibitory control does not mediate between impulse and action, generating an automatic behavior, and, in the context of a purchase, it is impulsive and without a truly need or reason that justifies the purchase of certain item [5].

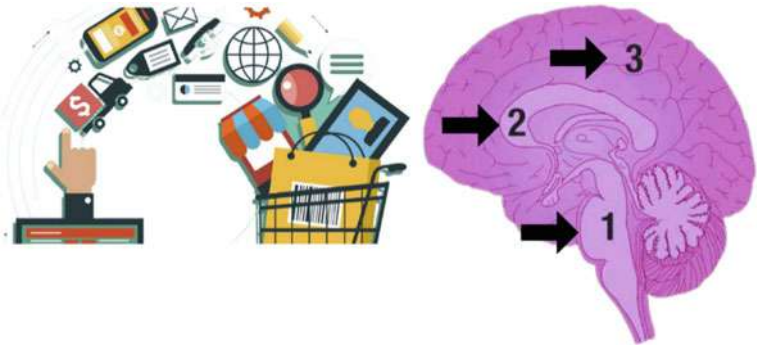


Fig. 31.1 Graphical representation of brain's reaction to a purchase. *Source* Prepared by the authors of this article

31.2.2 Emotional Regulation

Emotions are another aspect of the mammalian brain that is involved in the process of purchasing an article. For example, when a commercial generates an emotion of joy or pleasure in the buyer, his/her brain immediately associates it with a positive act to be performed. In this sense, the person could end up buying an item oriented by an emotion of joy, and not because this item is needed [6].

On the other hand, an emotion can be regulated by the executive functions of the frontal lobe, which allows humans to act with the correct emotion facing the different situations or, in turn, to control an emotion that can be negative at a given moment, such as purchase. In this sense, a buyer that has his/her emotional regulation function right will be able to regulate adequately the emotion that is generated in front of an advertisement of a specific article and will be able to decide whether the purchase is necessary or not, unlike a buyer who presents some difficulties with the emotional regulation, who will act driven by the emotion [7].

31.2.3 Decision Making

Another aspect where emotions play an important role is in the process of decision making. In this context, the neuroscientist Antonio Damasio explains how emotions act on decision making [8]. Figure 31.2 shows a representation of the interaction process between emotion and decision making. Otro aspecto en el cual las emociones tienen un rol importante es en la toma de decisiones.

As it can be seen, emotion precedes the decision, which is why we often buy motivated by the emotion rather than by reason. Here lies the key to understand why an individual may buy items that are useless for him/her. This is the classic case of

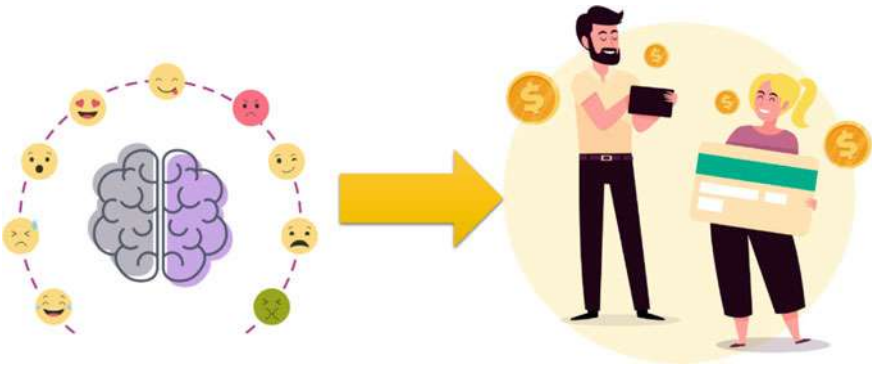


Fig. 31.2 Graphical representation of a purchase decision making process. *Source* Prepared by the authors of this article

how media advertisement can influence on the limbic system of a person motivating him/her to buy the item that is being offered [9].

31.2.4 Planning Capacity

Planning is an executive function belonging to the frontal lobe of the human brain. This high-order mental ability allows the organization of objectives and the actions that must be performed to achieve them. When this function is working correctly, a person will have a behavior oriented to a goal, however, when it is deficient, the individual is like building castles in the air, and his/her behavior is not guided by a plan, is like it would be automatic [10].

On the topic of the purchasing process, an individual who acts with the planning process will have clear objectives that are real and that will determine his/her purchasing processes. On the other hand, an individual who does not act from his/her executive functions does not manage to plan his/her purchases, but carries out actions without a plan, who will buy useless and unsignificant items for his/her daily life, but will be driven by impulse without further reason.

31.2.5 Cognitive Flexibility

Cognitive flexibility is a cognitive ability of the frontal lobe that allows problem solving using various strategies or paths to reach the stated objective. In this sense, when the individual is faced with a purchase, there is a tendency to act through a stereotype or an idealization, which, if it is rigid and not flexible, the individual will end up making a purchase that may not always be necessary.

In the other scenery, if the individual activates his/her flexibility function, he/she will be able to evaluate other possible scenarios before a possible purchase, which will allow him/her to act in a more consciously way and from an automatic impulse. This is the situation suffered by people with frontal lobe damage or with certain immaturity in this brain structure who act impulsively, without a reflection between the impulse to act and though [11].

31.2.6 Correction of Errors

The capacity to correct an error allows a human to learn from a mistake and not to make it again in the future. In the context of purchasing, this is a controversial mental skill, since the buyer does not always learn from a mistake, which may be an unnecessary purchase previously made and makes the same mistake over and over again [12].

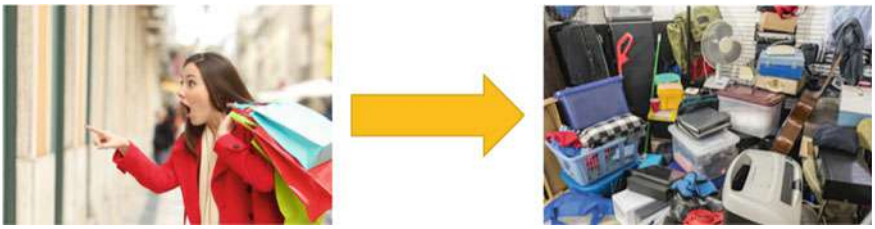


Fig. 31.3 Graphical representation of reiterative purchase and its consequence in a hoarding behavior. *Source* Prepared by the authors of this article

This is the case of many buyers, who acquire and purchase unnecessary stuff for his/her daily live and may develop a hoarder behavior, where useless things are kept and make their purchase without realizing that objects previously acquired may be unnecessary [13] (see Fig. 31.3).

31.2.7 Internal Language Regulating Behavior

Another function of the human frontal lobe is the ability to regulate behavior through internal language. This ability allows us to monitor every act that we perform, which will be influenced by the ideas that we have on our mind. For example, when a person is in each context, and he/she has ideas such as "these are the rules by which I must behave," which determines one or another way of behaving [14].

In the context of consumer behavior, a buyer may have in his/her mind the ideas that originate in a certain advertisement, which may determine the action of buying a specific item. Figure 31.4 shows dynamics of this phenomenon.



Fig. 31.4 Figure shows how advertisement campaigns influence the internal language that regulates purchasing behavior. *Source* Prepared by the authors of this article

31.3 Conclusion

This paper has provided continuity to the research line of neuromarketing [15], where it has been reflected on the cognitive process that a purchase would follow from the theoretical approach of neuropsychology, specifically from the executive functions. These abilities of the frontal lobe are the most developed in the human being and allow it to act in a regulated manner [16], which have been of central interest for the study of neuropsychology [17].

The role of the inhibitory control has been described at the moment when an individual makes a purchase, who if acts correctly can allow a regulated and conscious behavior, however, if it is not activated, the person may have an impulsive behavior buying the first thing that appears in sight, without being something necessary [18].

In the process of purchasing, emotional regulation plays a key role, since if an emotion, such as joy, is highly activated, it is possible that an individual buys an item without a reflection, and just by the emotion, which must be considered when offering a product, since this emotion will influence positively in favor of purchasing [19].

Decision making is key when buying, and it's directly related to emotions; because of it, it is necessary to carry out investigations where emotions aside of perceptions are analyzed, not just the buyers' perception, generating better conditions according to make a purchase [20].

Planning allows the consumer to organize their purchases around personal or group where he/she belongs objectives. Therefore, to improve the likelihood of a purchase, this process must be considered, as it is done in some stores where applications for consumers to plan their purchases are offered [21].

Cognitive flexibility and error correction are two executive functions that are related to obsessive purchasing, the reiterative acquisition of unnecessary articles, and hoarder behavior. When these mental are in place, the buyer can change or create new behavioral patterns around his/her buying behavior [22].

The internal language that regulates behavior has a great influence on buying, since the internal dialogue that every human has, guide his/her behavior, because of it, if there is made a marketing campaign with a content of words that goes directly in this function, it could increase the possibility that an individual purchase a specific product.

As future investigation, there is the interest in analyzing, with correlational as well as experimental studies, how the executive functions are statistically related to humans' purchasing behavior. At the same time is of great interest in this line of research to develop and validate instruments that reliably measure executive functions in the context of consumer behavior.

Another investigation that arises as an interest in this line of research is related to live measurement of buyers, through the use of electroencephalogram techniques, so, it will be possible to identify the different neuronal structures that are activated in the human brain when purchasing.

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Chapter 32
Inclusive Advertising Analyzing Commercial Spots Out of Advertising Campaigns from Mexico, Argentina, and Ecuador



Fanny Paladines, Alejandra Luzuriaga, Andrea Velásquez, and Evana Erazo

Abstract Inclusive advertising is used to communicate through brands and campaigns the values they allow, their ideologies, and attitudes which search to promote equality or positive behavior toward society. This study pursues as an objective to gather information about how commercial spots coming from Mexico, Argentina, and Ecuador in 2019, referred about inclusion and diversity, around the ranges of; communication, special needs models, switching roles between men and women, stereotypes and inclusion, throughout ongoing YouTube campaigns. Each analysis is based on the qualitative method in which the content is examined to determine the characteristics assigned to non-traditional models of selected commercial spots, locating those with effects in speech and with the social impact each ad carries. Denotative and connotative focused analysis diagrams are used as a fundamental tool to describe the elements that constitute inclusion and diversity within advertising creativity. And semi-structured interviews with the creative directors of some advertising agencies coming from the three countries previously mentioned, with the objective of getting to know their intention or objectives regarding the use of this type of campaign.

Keywords Advertising · Inclusion · Diversity · Stereotypes · Advertising creativity

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32.1 Introduction

Advertising is known as one powerful communication tool, it's the reflection of society, it announces in a persuasive way aiming to its target of interest with various strategies, and it has the capability to generate: habits, conducts, behaviors, and values in society. It tries to communicate in a minute and respectful way.

Nowadays, advertising agencies have a new challenge ahead, in which every piece of information must promote inclusion and pursues unifying and integrating every kind of audience, showing diversity and inclusion through the introduction of actors with special needs and capabilities, handicap, and so-called diverse models (which include different skin color, race, culture, behaviors, same sex couples), women playing different roles in society, women practicing "manly" sports or activities, diverse families, men sharing housekeeping activities, men wearing pink and much more. In other words, to promote advertising that unites and does not discriminate.

> Guided by storytelling and connected with reality, emerges the so-called inclusive advertising, commercial stories starred by real people with whom we can relate and activate empathy mechanisms. However inclusive advertising goes further since it poses types of stories any kind of audience can be targeted, defending diversity by presenting groups of individuals who have recently taken a more transcendental role in advertising, contrary to the past where this groups where eclipsed by old school patterns and traditional schemes. [1]

These types of campaigns break with cliches and stereotypes, those considered to be negative behaviors of society, and they focus more on transmitting inclusive messages, centered in social responsibility, without appearances or prejudice, which is a topic not usually referred in advertising, because of the fear of these been rejected or poorly accepted by consumers, that's why there is an evident necessity for the media, education institutes, regulation entities, etc., to enlighten audiences: "behind this current rests the idea that inclusive discourses about inclusion and diversity are better received among younger generations, which had the opportunity to develop inside a more cultural and globalized environment due to the influence of internet and social media" [2].

Viewers are searching for taking over an equal society and it's estimated that through advertising and its way of persuading it is becoming something possible to achieve, by giving exposure through commercials to common people, with natural physical characteristics, showing gender role switching, making gender-less toys, wearing non-stereotypical clothing, these to reduce discrimination, as well as superiority and lack of self-love.

Times where the formula used toward an effective advertising was sexist, patriarchal, racist, and excluding is coming to an end. "Nowadays, groups of interest prefer when companies take part in inclusive campaigns filled with honest social responsibility" [3] (ref. [3], párr. 1). Various brands that used to be well known for spreading stereotypical messages are starting to leave those outside of their campaigns pursuing constant change, and achieving acceptation from consumers, it's a late and uncertain change, however it's useful for society itself. Furthermore, an important thought for

advertising strategists is that "who defines where an organization should focus isn't the market nor tendencies, but consumers and viewers" [4].

In Mexico, there is between 7 and 8 million people with special needs or capabilities, which make 6% of the population, according to figures provided by the National Statistics and Geography Institute [5]. In 2017, 19.3% of people from this group declared that they commonly get stared at in an uncomfortable way, 58% said they have had to deal with mockery and even aggression from others because of their condition, and 48% consider that their rights are little to non-respected, all these detailed by the national poll about discrimination developed by this country's institute [5].

According to organizations that specialize in ensuring the well-being of those with special needs and capabilities, it is possible to evidence that the number of existing people belonging to this group consists of around 460,586 of registered persons, with diverse kinds of physical, psychological, intellectual, visual, and hearing impairments, according to the National Council for the Equality of the Disabled, 2017. Throughout testimony many have stated about been outcasted, victims of discrimination and in some cases, they lack social assistance from the National Council for the Equality of the Disabled [6].

Meanwhile, during the year 2017, population census processes undertaken in Argentina gathered the information that there is a considerable number of people living with some type of deficiency. The National Institute of Statistics and Census INDEC states that "10,2% of the whole population live with disability, while within population from 6 to 14 years old prevail those who suffer from a mental or cognitive deficiency (48,3), population around 65 or older stand out for having motion related disabilities" [7].

32.2 Theoretical Framework

32.2.1 Influence Advertising

In these times publicity announcements invade frequented spaces, it is usual to encounter big banners, signs, TV spots, radio commercials, magazines, newspapers, and all kinds of advertising specially while navigating the internet. In all these pieces, we can observe massive consumption products, accompanied by phrases or images that try to transmit not only affection, and all kinds of emotions, but also rational arguments in charge of engaging consumers, and in consequence, stimulating the desire to acquire the advertised product.

Advertising plays a particularly significant role within the social sphere. It could even be said that it is one of the most powerful agents that acts in the process of production of modern culture itself. This ends up with advertising having a great social visibility as well as it becomes object of numerous criticisms [8].

According to what the author manifested, even though advertising can be a powerful tool for communication, it generates criticism and rejection because of many circumstances, in which some cases because of the use of frequently used stereotypes such as the denigration of women, it ends up spreading messages with content that encourage people to stablish new harmful ways of behaving. Society is nowadays considered to reflect what advertising transmits; young audiences are adapting their daily lifestyle to what they get from the media, because they are the most vulnerable and easy to persuade target.

32.2.2 Stereotypes in Advertising

"The word stereotype is a simplified version of the way we perceive someone or something, as a result of a personal experience, our social environment, a generalized meaning largely shared with our social counterparts" [9]. It is possible to define as a stereotype inside advertising every image, content, situation, predictable characters, which are usually involved within advertising material, with the objective of offering a product and achieving the largest number of possible sales, regardless the characteristics of the characters or scenarios portrayed which may be filled with cliches and prejudice that society tries to pursue and adapt to daily life, destroying or transforming values and new forms of behaving.

Spurgin (as cited in [10]) states:

> "It is not ethical for advertisers (generally speaking) to create images that portray fictional scenarios that end up far away from reality, so the consumer gets easily amazed by it; or for them to modify human portraits giving them a surreal and unachievable perfection (beauty standards generated by image technologies), generating impossible expectations for viewers, or creating personal dissatisfaction or low self-esteem. [10]

It is common to observe a considerable number of commercial ads from local to international, with stereotypical and mistaken images of minorities, especially about women which tend to be treated as an object, cliché or to be belittled or portrayed as inferior toward men. There are traditional stereotypes that have always been a part of commercial ads such as women doing housekeeping activities, boys becoming great scientists, male soccer players, male construction builders, male explorers, and girls are supposed to always be well dressed, wearing makeup, and staying pretty, girls should never handle heavy machinery, men are the ones supposed to be strong, successful and has the possibility to play any role he prefers.

This is what advertising has encouraged for decades, selling perfection, and persuading audiences with the idea that the use of some advertised products will lead to achieving an inexistent reality portrayed by ads, which ends up far from what the advertisers truly offer. "Stereotypes, conscious or unconsciously, shape society's thoughts and categorize roles that do not necessarily represent us, furthermore the lack of positive feminine roles have led us to a lack of equality" [11].

Currently, the overview of an advertising culture full of stereotypes is starting to change; consumers are getting more demanding and are looking for more equalitarian

messages, those without homophobia, prejudice, exclusion, or racism; they don't allow for ads to be disrespectful nor harmful, for this reason brands are in constant change, looking for new alternatives for reaching the audience, choosing instead integration and giving a relevant turnover with the objective of persuading in a more responsible way. "Gender equality in advertising isn't only positive for the world but also for their general profit whatsoever, brands that speak responsibly about equality are rewarded by their customers with trust and sales" [11].

32.2.3 Inclusion and Diversity Advertising

What agencies are pretending to achieve is an equalitarian world based on values, where people are equal, and can play any role a normal person could access and could take part in daily activities without been victims of rejection.

Some advertisers are looking to communicate responsibly including all kinds of audiences, showing this change in their media content, and taking messages of integration to all screens, with the objective of showing a different reality from what the media is used to. Viewers and collaborators as well are becoming more conscious of the problem, and they are also expressing stronger opinions about diversity and inclusion. Millennials, for example, see inclusion as a mandatory part of the corporative culture that defines how a company listens to its workers. Shareholders, clients, and providers are watching this matter very closely [12].

Brands are working for a new focus in their content to post, employing new challenges, that step out from what is traditional and investing to achieve a wider audience, with whom they'll focus depending on their necessities, and with whom they will focus on maintaining a stronger communicational bond and thus contributing to a more conscious and generous society for its members.

32.2.4 Inclusion of the Disabled

On the other hand, nowadays, the media doesn't commonly portray the image of a special needs person; they only do this whenever they need to exhibit content about limitations, problems, or social situations of that matter, which ends up provoking society to conceive having a disability as a burden. Moreover, the topic is often used to get non-government related organizations familiarized with campaigns and institutions that dedicate to promoting disabled and special needs people's achievements in ludic events, encouraging disabled people into pursuing their goals and to accept their characteristics and not to see them as burdens. Mental and physical disabilities are a difficult topic to be portrayed by the media.

In this regard, authors Vega and Martín [13] stated that:

> Audiovisual discourses maintained by the media transmit stereotypes already installed with a decisive influence within society. This fact possesses a transcendental gravity, when we assume the personal beliefs of others as the truth, labelling people with cliches that have more to do with physical appearance than their actual value as a person. This is especially significative for those affected with physical, psychic, or social limitations [13].

For some kinds of audience, advertising can result in a less adequate tool for these kinds of campaigns, given its transcendence, it can be used in favor of including and promoting the rights of the disabled. Advertising under a human criterion can be able to spread the values about equality integration and diversity for a more sensible and equal society "on some occasions disabled people tend to be introduced as incapable of making their own decisions, having fun, or performing any kind of activity by themselves, such as being a mother, working or practicing any kind of sports, among others. These are the stereotypes to avoid" [14].

32.2.5 Gender Inclusion

In these times, people base their daily lives on customs and traditions, promoting a male centered image where men are portrayed in more important and relevant roles in society, leaving women as something secondary, it's what the media is used to broadcast, provoking society to adopt to its behavior prejudice and stereotypes.

Authors Gomez and Paredes (s.f) manifest:

> Equity and gender equality are increasing values in our society. Not in vain, these are both fundamental for modern democracy. Every day we are witnesses to a more sensitive society towards that matter. We can also see, hear, and read throughout the media how a new model of society is advancing, where men and women have equal rights, obligations, and opportunities." [15]

32.2.6 Ethics in Advertising

Advertising is an effective tool when promoting, making known or increasing the consumption of products or services, improving, or repositioning the image of itself, creating prestige and thus persuading the mind of viewers. For achieving its target audience of interest numerous strategies are used, in some cases based on reality and in others on fiction and exaggerations, which can be labeled as non-ethical advertising, which looks only toward profit and commercialization without considering morals or ethics, only basing upon their own benefit as a brand. "The lack of ethics in communication not only harms those who receive the message but also to all those involved. By breaking confidence in their messages, they produce the kind of noise that can disturb and thus making communication fail" [16].

32.3 Methodology

In order to resolve the following research objectives, we applied qualitative method approach such as exploration and description, which complemented each other to obtain the results. The exploration method gave as the denotative and connotative information about each of the analyzed commercial spots. The descriptive method made possible to analyze the opinions given by the creative directors about the goal that was pursuing these types of campaigns.

O1. Establishing the difference between the management of inclusion and diversity campaigns among Mexico, Argentina, and Ecuador:

Analysis techniques used in the content made it possible to compare among these three countries, about the management of these inclusion and diversity campaigns. In favor of giving an answer to this objective throughout a scheme, content analysis of three commercial spots by country was undergone.

To comprehend the creative management of the message and deeply analyze what is transmitted through advertising, identifying connotative and denotative language, a scheme based on the three elements proposed by Van Dijk was used for advertising analysis (picture 1): cognition (to decode the message in the scheme, denotative function), speech (to understand what the message has to say throughout the correlation between verb/ advertising icon), and society:(to elaborate the analysis of the behavior pretended to be generated by the audience through the previously mentioned elements) [17]. A fourth element named stereotype description is also used, which pretends to punctually analyze the models that are included in audiovisual material, with characteristics and differences of the usual actors, which tend to be the main characters of common commercial spots (Tables 32.1 and 32.2).

O2. Getting to know if there are organizations or laws that establish their use in each country:

Bibliographical checking through news blogs such as interviews with advertising agencies directors made it possible for this objective to have an answer.

O3. Getting to know if agencies and announcers are prioritizing inclusion and diversity for social consciousness or as a marketing strategy.

Semi-structured interviews were used to be applied with creative directors that are part of the Ecuadorian Advertising Agencies Association, who have created content or for that matter have taken part in inclusion and diversity campaigns by recognized and widely accepted brands with the strong practice in publishing, they gave their point of view and experience about the topic of this investigation (Table 32.3).

Table 32.1 Analyzed commercial spots

Product	Advertising	Country	Years	Link	Agency
LinkedIn	Inclusion profiles	Argentina	2021	https://www.youtube.com/watch?v=B6j61jg0VHk	Hoy
skip	Feminism & evolution	Argentina	2021	https://www.youtube.com/watch?v=HYfFM3MRZn4	The juju
Cabify	Mornings	Argentina	2021	https://www.youtube.com/watch?v=EuTjgb5B6Ak	Manifiesto
Alpura	The power of people	México	2021	https://www.youtube.com/watch?v=dvyk65fKZD8	BBDO México
Aeroméxico	Fly	México	2021	https://www.youtube.com/watch?v=XBSxHLgw8oQ	FCB México
Cultura colectiva	Mexican Models	México	2021	https://www.youtube.com/watch?v=abFNQUzX9gQ	Grey México
Tramontina	Happy new homes	Ecuador	2021	https://www.youtube.com/watch?v=sQeBaFZbd-Q	Santuario
Chevrolet	What is the beat that moves your life?	Ecuador	2021	https://www.youtube.com/watch?v=bzVP0M_XyIU	DMKStudios S.A
Colgate	Keep smiling	Ecuador	2021	https://www.youtube.com/watch?v=obIf-Vlj2no	Norlop

32.4 Results

Advertising agencies and their advertisers enter a new paradigm of strategic communications, the name of inclusive publishing, real stories based on reality staring people with their own and real characteristics with which audience can be compared and activate their empathy, leaving their prejudice and making responsible campaigns with values and attitudes that promote integration.

The analysis of the questions for the interview has as a reference the experience of creatives in advertising campaigns of inclusion and diversity; who provide us important information about the design, scripts, models, stereotypes that are marginalized, strategies used and other parameters, which have allowed us to know the reality and future expectations of this type of advertising campaign.

Table 32.2 Content mold

Mold: Name of the product Title: Product: Announcer: Length: Release date: Concept: Objective: Pitch of the message:			
Image	Denotation	Connotation	Description of the stereotypes presented
An image (single photogram) is presented, corresponding to the moment of the ad that is going to be meticulously analyzed; the time signature corresponding to the selected image is detailed as well	Denotative elements about the selected photogram are mentioned. Scenarios, environments, and other elements that take part in the action developed by the main characters are also mentioned, introducing their distinctive traits and explicit characteristics. (Cognition according to Van Dijk)	A deeper analysis is made based on the contents of each presented element and what they pretend to transmit to the audience; it manifests the labor done by advertising, relying on subtlety or the lack of it, to create stereotypes. (Discourse, according to Van Dijk)	Women in non-traditional roles Women involved in non-traditional activities Women guided to labor careers Voice of authority Women represented as equal to men Special needs models People with any kind of disability taking part Diverse models Homosexual Couples Different races Diverse ways of dressing and acting Distinctive behaviors Special capabilities

The analyzed agencies are recognized for their trajectory, responsibility, successful work, campaigns committed to social responsibility; advertising material that has achieved virality and for carrying out the strategic communication of renowned and prestigious brands that are accepted and therefore their consumers prefer and choose among several (Table 32.4).

All the interviewees consider these campaigns important, significant and positive, their opinion were accompanied by solid and punctual comments about the reach

Table 32.3 Creative directors of advertising agencies

Nombre	Cargo	Agencia
Danilo Molina	Creative director	Norlop Thompson
Tebo Samaniego	Digital creative director	Norlop JWT
Christian Villalba	Creative president	Santuario
Samuel Estrada	West South America regional director	Commonwealth/ McCann
Francisco Robalino	Creative director	Norlop JWT

they have with the audience, the acceptance they have, because they group the entire public in the same context without neglecting usual aspects and characteristics that advertising avoids. Danilo Molina creative director of Norlop JWT considers that: "Any communication that has a social or aid purpose is important to achieve a change in consumer thinking, sometimes people forget about the problems that our compatriots have or that there are other types of thoughts or ways of living that should not be taken lightly, and should be carried with respect"; the creative confirms that advertising must promote significant changes in the audience, avoid the wrong thinking of the consumer, persuading and raising awareness about responsible advertising.

Before, publishing was handled by models, texts, scripts, and more elements based on what was allowed, evidencing characteristics, behaviors, and traditional ways of living on what is common and normal to see, without taking in mind prejudice and problems that influence society's behavior. Taking to digital screens, billboards, television, radio and other media, messages based on stereotypes, models with no real characteristics, persuading through fantasy about fake things just to reach high selling percentages.

About the content of advertising spots analysis in Argentina, Mexico, and Ecuador, it was determined that there are different regulations and laws that prioritize that publishing must respect all people without limits, likes, race, skin color and more. This law protects in separate ways to all citizens.

Nowadays, in this period numerous changes are being undertaken, it is evident how agencies and their announcers are involving all kinds of audiences in their ads, viewers are begging for a meaningful change, and want to watch onscreen all kinds of bodies, skin colors, races, and they are demanding strategic communication to care about representation in promotional material. Campaigns from recognized brands can be visualized, where models that play main roles are portrayed by people with different kinds of disabilities, their limitations are shown, making them appear as big and powerful regardless of their deficiency, bisexuals having traditional families and traditional lives, male roles being adopted by women, different colored people sharing the same context and numerous ads proposed by agencies to highlight different brands and to show them as sensible and inclusive.

What can be easily noticeable now is that the age of prejudice, homophobia, stereotypes, discrimination, classism, sexism is ending, advertising is looking to

Table 32.4 Interview to creative directors of the ecuadorian publishing association

Christian Villalba creative president of the "Santuario" agency	Tebo Samaniego digital creative director for Norlop JWT	Francisco Robalino, creative director for Norlop JWT	Samuel Estrada West South America regional director commonwealth/ agency McCann	Danilo Molina Creative director for Norlop Thompson
"Santuario was born as an agency with the responsibility to generate communication without taboo, without gender, one that is inclusive and responsible for social causes"	"If the campaign has; the correct supervising, actions that move people to donate, work, or to do something to change, then it does work. If not, they will only remain as looking ads"	"It's a field where one can exploit creativity in a much bigger way. The nature of these campaigns forces us to use a different pitch; stronger, more emotional, happier, etc. But never tender"	"I wouldn't call it strategy, it's more like a responsible attitude toward society and the brands we represent"	"Every time a brand has inside their own values to help this cause, it is right, however it's evident to notice when it's only a strategy"
"That's why they have a responsibility; because advertising is a mirroring of society itself"	"More than an agency decision it's more like a client's decision"	"Campaigns of this kind, without a proper reason, don't build brands or make them grow Personally, I believe this is a very fertile creative field"	"This isn't a strategy coming from creation and conception, we are looking for diversity and inclusion. This isn't a trend it's a way of behaving"	"For the low budget sometimes considered for these campaigns, there is the risk audiences are not going to watch"

(continued)

Table 32.4 (continued)

Christian Villalba creative president of the "Santuario" agency	Tebo Samaniego digital creative director for Norlop JWT	Francisco Robalino, creative director for Norlop JWT	Samuel Estrada West South America regional director commonwealth/ agency McCann	Danilo Molina Creative director for Norlop Thompson
"On the other hand, if these brands are relevant with audiences, they would be room for improvement in positioning and thus improving their impact in sales and services" "The secretary of communication is the one in charge of filtrating and punishing in case any advertising piece; doesn't fit the norm"	"There are laws in charge of topics of discrimination or the use of children in situations out of the normal context of a child; however, I don't believe there are laws in favor of forcing to use a specific group of people, it can be assumed that there isn't a law now in Ecuador that seeks to promote inclusion material in advertising"	"I wouldn't call it strategy, it's more like a responsible attitude toward society and the brands we represent"		"With tramontina we reached more than 50% of the region (LATAM), increased interactions in 40%, achieved 15% more impact in a younger audience Centennials (15 to 25 years old) and Millennials. The brand was reborn, it stopped been the so-called brand for grandma, and it became a more inspirational brand this time

group, unite, and include all kinds of audiences in their ads, reaching all segments and making everybody feel their importance, and to make them accept themselves regarding their limitations or simply been rejected for their differences. Inclusive campaigns mark new directions, breaking with social schemes and centering their attention on minorities which have been excluded for most of the time. A new paradigm in communication, persuading with responsibility, promoting values, diversity, and integration in all types of audiences.

32.5 Discussion and Conclusions

It is determined that most common commercials have changed their discursive content in comparison with past years. They show a line of projection of empowered and secure persons regardless of clichés and society's common stereotypes. This is a meaningful result, thanks to the audiences that asked for changes, worried about

existing problematics, look for communication to be different, responsible, based in values, equality and ideologies that integrate every member of society. In response to this, messages have been reworked in a subtler way, involving different models with natural and diverse characteristics and scenes were different actors take part in regarding their gender, sexual preferences, disabilities, race, culture and more, accompanied with technological, visual, and sound elements.

Argentina is the principal country in widely promoting this kind of ads, choosing to include all audiences, promoting values, behaviors, and actual reality into creative advertising. Mexico is stepping into this new challenge; it is possible to visualize campaigns done in favor of organizations that look for help in favor of punctual causes, marks that expose reality, not fantasy and promoting models of their own nation, showing a sense of empowerment and stiffness in what they do. In Ecuador, the use of these campaigns isn't common; there isn't specific advertising material related to the topic, during the investigation evidence was shown regarding what the creative directors said about nonexistent advertising campaigns of this kind designed in this country, everything is adapted from multinational agencies.

The bibliographical review of documents, articles, and statutes of each country, plus the input from experts on the topic, determined that there isn't organizations or laws that establish that advertising should promote messages of inclusion and diversity, there's only punctual laws that indicate that messages must be treated thoroughly without promoting hate, discrimination, racism, violence, and rejection. Creative directors in Ecuador manifest that now the elaboration of texts and strategies for the creation of contents, take as reference the current Ecuadorian law of communication which has the objective of developing, protecting, and regulating, in the administrative field, the exercise of constitutional rights of communication.

It can be concluded that these kinds of campaigns are growing stronger, because of the level of acceptance coming from new generations such as young audiences. Agencies promote these types of commercials created with respect, values and inclusion taken in mind. With this we seek to change conduct, behaviors and we look to sensitize society about margination, stereotypes, and usual prejudice. According to the point of view of creative minds, it can be inferred that these kinds of campaigns are used both as a selling strategy and as a move for social responsibility, emphasizing that when brands promote these topics, the brand shows itself as more human and solidary, involving all audiences in a same context. Reaching acceptance, acknowledgement and thus sales.

As further investigation lines, we consider important to analyze the emotional effect that this type of campaigns has in the purchase decision, for which, we are the contemplating use as study technique the neuromarketing as well is important to include in the new research the opinion of the companies, the academics and the consumers in order to have a complete point view.

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Chapter 33
Changing Purchase Intentions Toward Bread and Pastry Products as an Example of Ephemeral Aroma Marketing

Jiří Zelený, Lada Petránková, Anna Kubátová, Jan Barták, and Lenka Turnerová

Abstract This paper demonstrates that the typical digital phenomenon of ephemeral marketing can also appear in the case of food when triggering multiple senses, such as smell and taste. Five traditional Czech bread and pastry products (BPPs) were chosen, each produced by a large national producer, a medium-sized regional producer, and a local bakery. We then aimed to identify how the selection between competing BPPs takes place with a focus on their sensory aspects. A sensory evaluation by 105 untrained consumers showed that aroma was the only sensory factor not differentiating the preferences. Two focus groups with regular consumers of BPPs explained that the aroma of certain BPP neither influences choices when eating BPP nor subsequent purchase decisions. The only exception was the traditional bread with a sourdough starter, where the aroma was essential in both sensory evaluation and focus groups. Paradoxically, during the act of shopping itself, the ambient aroma of BPPs in the store is the most significant attractor stimulating non-preferential purchasing decisions. There is a substantial decrease in the importance of the aroma of BPP when comparing the "purchase-consumption" phases. We claim that using qualitative research is crucial, as quantitative categories pre-defined by researchers

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for the sensory evaluation may block the evaluators from expressing “outside the box” ideas.

Keywords Consumer science · Cooking technology · Multisensory marketing · Neuro-sensory aspects · Regional production · Sensory evaluation

33.1 Introduction

Ephemeral marketing, a relatively new concept that has only been marginally explored in the scientific literature, is primarily associated with social networks, i.e., especially with digital content [1–3]. Specifically, ephemeral marketing activities are about trying to attract people with the help of engaging visual content, which has only a temporary character [4]. After a certain period, this content is deleted. Nevertheless, at that time, it has already left an emotional mark on the followers (or potential consumers). Such quick content can also be used as an advertisement, and thanks to the brevity and rarity of the message, the viewers perceive it as more urgent than long advertising messages [5].

However, our research points to the idea that the phenomenon of ephemeral marketing can, in its essence, go beyond the digital space. The intense emotional enthusiasm triggered by a temporary stimulus, which influences the viewers’ subsequent intentions [6], can also appear, for example, in the case of food consumers. By analogy, it does not have to be necessarily based on watching the content of social networks but also on the activation of senses other than sight, e.g., smell or taste. Therefore, this study draws its focus from ephemeral marketing but also partly touches on neuromarketing, as it focuses primarily on consumers’ senses and examines them through the sensory evaluation method. From the investigated object’s perspective, our research also falls into food marketing as bread and pastry products (BPPs) were chosen as specific researched products. Regarding the selected products, this paper aimed to identify how the selection between competing BPPs takes place with a focus on their sensory aspects.

33.2 Literature Review

The complex process of sensorial perception plays a significant role for consumers in forming an image of product quality and influences their subsequent purchase intentions. Depending on the specific product, this complex is more or less elaborate. While the consumer primarily uses sight when choosing digital content, for example, when choosing a perfume, he/she also uses the sense of smell. The selection process of foods is even more elaborate since taste is added to the senses mentioned above. Individual aspects of a product assessed by senses are called sensory aspects. Research has already shown that the sensory aspects categorized under appearance,

aroma, and taste are at least as important as non-sensory aspects [7]. However, other studies have shown that sensory aspects influence consumers' purchase intentions the most [8]. When considering particular sensory aspects, psychological influence on the consumer, which studies often examine, cannot be neglected either. Therefore, some studies may deal with comparing real (perceived) sensory aspects of foods with abstract (imagined) aspects [9].

The use of the senses while assessing the sensory aspects, which simultaneously encompasses marketing activities, is associated with neuromarketing [10] as a discipline belonging to applied social psychology [11]. In its pure form, neuromarketing uses technological devices to measure bodily (especially brain) reactions [12]. Therefore, studies in which these technological devices were omitted and only the appearance of a product was assessed are not considered typical neuromarketing studies. Even the authors of these studies put their research in contrast with neuromarketing investigations [13]. As stated below, our study examines multiple sensory aspects, including food products' appearance, smell, taste, and influence on consumer purchase intentions. Studies focusing primarily on the aroma as an element influencing purchasing decisions in food use the term aroma marketing [14]. These studies may not only include store-bought foods but also examine the effect of aroma on consumer decision-making in restaurants. The different environments in which consumers encounter the aroma can be one of the investigated variables, with the simultaneous use of an aroma diffuser as another. Nonetheless, these studies show that the aroma of freshly baked BPPs can be more dominant than the aroma created by the diffuser [15].

In our case, the selection of BPPs as an object of investigation is determined by their high aromatic attractiveness, which attracts consumers when visiting the store, but also by the fact that they are one of the most traditional products. However, it does not necessarily mean that there are no innovations in BPPs, as innovations can be observed in traditional products or in creating entirely new products. Furthermore, the innovations relate mainly to the composition of BPPs, where the effort is mainly to achieve a healthier product that is, for example, gluten-free, allergen-free, whole grain, or with ingredients increasing levels of antioxidants and probiotics [16].

Examining the individual sensory aspects of baked goods is carried out similarly to other types of food using the sensory evaluation method. For BPPs, it includes the evaluation of sensory aspects such as appearance (e.g., evaluation of porosity and color of the crust), flavor, and texture (e.g., softness) [17, 18]. Sensory evaluation of BPPs has many practical implications, e.g., it helps to detect fake whole-meal bread [19]. Attention is also paid to evaluating the aroma of BPPs. Studies showed that the use of different yeast strains affects bread's aroma, and these changes are also perceived during tasting by trained sensory evaluators [20]. Trained evaluators could also identify bread aroma characteristics categorized as cheese, corn, or yeast [18]. In other cases, evaluators described up to nine different aroma categories [21]. Detectability of the aroma in bread has also been demonstrated in the gluten-free variant (which is less aromatic by default), even by ordinary consumers [22]. In some classic sensory studies using trained evaluators and ordinary consumers, the

negative perception of bread aroma has led to a negative evaluation of the remaining sensory aspects, such as taste and overall evaluation [23].

Only a few studies connect the aforementioned sensory evaluation of BPPs with the marketing approach. It is used, e.g., when determining the BPPs' acceptability extended by a purchase intent [24]. Classic consumer-oriented marketing studies on BPPs might be somewhat limited to data collection as they are carried out using a questionnaire survey [25].

33.3 Research Methodology

The first part of the research consisted of the sensory evaluation of BPPs. In total, 105 regular consumers (not expert evaluators or trained consumers) of BPPs, who at the same time regularly buy BPPs in supermarkets or bakeries, took part. The sensory panel included men (52.38%) and women (47.62%) aged 15 to 72 years, with a mean age of 40.50 ± 10.12. Representation in terms of income was the largest among the group with an average income in the Czech Republic (50.48%), the smaller with below-average income (30.47%), and the smallest with above-average income (19.05%). This distribution also corresponds to the representation of groups according to the highest level of education, where the group with secondary school education was the most represented (56.19%), the group with elementary education less (25.71%), and the group with university education the least (18.10%).

Compared to regular marketing research, where the number of respondents may often exceed several thousand, sensory evaluation is significantly more time-consuming, as the evaluators have to be present in the evaluation room consisting of a laboratory environment. Regarding the conditions in the room used for sensory evaluation (e.g., temperature, noise, environmental aroma, light conditions, booths), we followed ISO 8589 [26]. During our sensory evaluation, panelists were given 75 min to evaluate all 15 samples, with most panelists needing longer than such time (i.e., more than 5 min per sample). We see the advantage of sensory evaluation and its necessity for marketing research mainly in the tangible manifestation of consumer preferences. In order to secure an adequate number of evaluators during sensory evaluation, their experience is essential, as the most current studies show. If trained experts within the sensory evaluation field are included, the number ranging from 8 to 23 evaluators may be sufficient [27–31]. When untrained panelists are involved (as in our study), the sufficient number seems to be between 30 and 81 evaluators [32–34]. Based on the presented literature summarization, we believe that our sample of 105 untrained panelists is sufficient for objective conclusions of sensory evaluation.

Regarding the evaluated products, we opted for two independent variables. To achieve the proclaimed aim, (i) type of producer ($df_p = 2$) was selected. We considered three competing products sufficient to maintain the study's validity. Then, (ii) type of BPP ($df_{\text{BPP}} = 4$) was selected to make sure possible differences in the evaluation were not accidental, grounded on one type of BPP only, and therefore, to achieve sufficient reliability. All tested BPPs are presented in Table 33.1. There were

five evaluated types of products (PA to PE). These products may be considered the most typical Czech BPPs, namely rye bread (PA), white bread roll (PB), multi-grain white bread roll (PC), kneaded short-crust pastry cookies (PD), and classic short-crust pastry cookies (PE). While the products PA, PB, and PC have a dominant salty taste and can be characterized as bread products, the products PD and PE have a dominant sweet taste. Products PD and PE can be categorized as pastries in which, at the same time, yeasts were not used during production. In most cases, using yeasts of *Saccharomyces cerevisiae* strain is typical for PB and PC products in the Czech Republic. The PA products contained the most complex sourdough starter, and they were the only ones that contained the majority of rye flour instead of solely use of wheat flour. For each type of BPP, samples from three different producers were evaluated, and they can be considered competitive products on the market. Sample no. 1 represents a large manufacturer operating throughout the Czech Republic; sample no. 2 represents a medium-sized producer that distributes BPPs within its region; sample no. 3 represents a local bakery that distributes its products via its only shop in a small town. All evaluated products were of the same freshness—baked early in the morning, purchased at 8:00 am, and judged by all panelists between 12:00 pm and 3:00 pm on the same day. The samples were evaluated at room temperature, as in some previous studies [18, 22].

Based on the selection of evaluation criteria [17, 18, 20, 22], preferences for shape, color, and texture were evaluated for all products (PA to PE) in appearance. Furthermore, product aroma preferences were assessed. In our case, the aim was not to describe individual types of aromas as in some other studies [18, 21]. The last set of evaluated criteria differed depending on whether they were salty (PA to PC) or sweet products (PD and PE). The crust, crumb, and overall taste were evaluated for the salty products, followed by the dough, filling, and overall taste for the sweet ones. All criteria were evaluated following a 9-point hedonic scale, which makes possible the manifestation of the acceptability of particular criteria belonging to a product. It also enables between-product comparisons. The scale for hedonic sensory evaluation was chosen according to ISO 4121 [36]. An assumption is made that the level of acceptability (expressed on a hedonic scale) influences consumers' further purchasing decisions. The evaluation was conducted using the Friedman-ANOVA test followed by post hoc testing by Wilcoxon matched pairs test between all compared pairs (both tests at $\alpha = 5\%$) [37].

The second part of the research had a qualitative character. It consisted of two focus groups, each of which had five agents who are regular consumers of BPPs and regularly purchase them. The scenario of the questions was adapted to the findings from the first (quantitative) part of the results. As a qualitative research method, focus groups enable discussion on the presented topic. Some recent research shows that they can be used even for BPPs [38].

The focus groups' topics were primarily based on the sensory evaluation results, i.e., on the aroma factor. Specifically, the topics included: (i) the importance consumers attach to aroma when consuming food at home and for which specific types of food they consider the aroma factor to be the most important when consuming food at home; (ii) the importance consumers attach to aroma when choosing food

Table 33.1 Pictures of evaluated BPPs

	Sample no. 1	Sample no. 2	Sample no. 3
PA			
PB			
PC			
PD			
PE			

Note scale for each picture is in centimeters; author of pictures: Jan Barták [35]

Table 33.2 Participating agents in focus groups

Focus group no	Agent's code	Gender	Age
F1	A1	Female	52
F1	A2	Female	21
F1	A3	Female	56
F1	A4	Male	29
F1	A5	Male	77
F2	A6	Male	33
F2	A7	Male	35
F2	A8	Female	42
F2	A9	Female	83
F2	A10	Male	85

in the store and for which specific foods do they consider aroma most important when buying food in a store; (iii) the importance of the aroma in BPPs, both when eating at home and when buying in a store; (iv) how the facts mentioned above influence purchasing decisions when choosing competing BPPs. Each focus group lasted 90 min. An anonymous overview of the agents is presented in Table 33.2. The results of the qualitative part are presented in the form of a selective transcription.

33.4 Results and Discussion

Statistical testing of the sensory evaluation showed that the vast majority of criteria, namely shape, color, texture, crust, crumb, dough, filling, and overall taste, were rated significantly different depending on the specific producer and for all evaluated products ($p < 0.05$). The situation was the same even in the case of post hoc matched pairs comparisons ($p < 0.05$). These results indicate a higher or lower perceived quality of the compared criteria for individual products and a higher or lower perceived total quality of the products. Based on these results, it is possible to claim that almost every sensory criterion plays an essential role when selecting competitive BPPs. Any other trend did not appear in the results of the above-mentioned criteria.

However, a unique pattern can be seen in one of the evaluated criteria, namely the aroma that did not differ significantly in acceptability ($p = 0.07$ to $p = 0.93$). This trend was detected in all products (PB, PC, PD, PE) except for the PA product ($p < 0.01$). As the hedonic acceptability of the products was measured, these results do not indicate an inability to distinguish individual products according to the aroma. Instead, they point to a perceived indifference regarding the aroma preferences of the evaluated products, as illustrated in Table 33.3. The average grade or the median grade for aroma (PB, PC, PD, PE products) was above the average on a 9-point scale (from 5.20 ± 2.16 to 7.10 ± 1.67; or from 6 to 7 for medians). It can be said that even though aroma was not differentiating sensory aspect, consumers did

not perceive aroma as unpleasant in any of the products. Due to the above-average grades, it cannot be assumed that it negatively affected the evaluation of the other sensory aspects [23]. Nonetheless, the aroma was not perceived as a factor that should influence consumers in their next purchase decision. Based on the aroma perceived indifferently by consumers (from the hedonic perspective), it cannot be stated that there was a clear preference for one product over another. It can be assumed that the repeated purchase of BPPs or the selection of completely different products will be decided based on other than the aroma criterion.

As mentioned above, only rye bread (PA) showed different preferences regarding aroma acceptability. Even for PA, the worst-rated sample was evaluated above the average on the 9-point scale (5.23 ± 2.04; 5 for the median). It cannot be pointed to the fact that any of the PA products did not meet the expected quality standard compared to others, as consumers perceived the aroma of individual products as positive. However, the positivity level was significantly different for all three products, as shown by the post hoc test results. We believe that due to the uniqueness of these Pas' results (compared to remaining tested BPPs), the statistically significant Pas' differences are insufficient to deny the assumption that the aroma of the BPPs is not essential for consumers in their preferential choices. This assumption is relatively robust because it is based on four types of BPPs, representing a notable trend throughout the results' structure. On the contrary, we believe that from the given results, it is impossible to conclude that bread is a product in which aroma plays a statistically significant role in consumer choices. More types of bread would be needed to confirm such an assumption. Nevertheless, it should be pointed out that PAs were the only products with a sourdough starter. As previous research has shown, this variable can play a crucial role in aroma evaluation [20]. At the same time, it is typical for individual producers to use different variants of sourdough starters.

Table 33.3 Results of consumers' sensory evaluation for aroma criterion

Sample no. 1 mean ± sd (med)	Sample no. 2 mean ± sd (med)	Sample no 3. mean ± sd (med)	Friedman-ANOVA by Ranks[1]
(PA) Rye bread			
7.10 ± 1.34 (7)[a]	6.20 ± 1.62 (6)[b]	5.23 ± 2.04 (5)[c]	$\chi 2 = 14.17$; $p < 0.01$*
(PB) White bread roll			
5.64 ± 1.48 (6)	5.80 ± 1.69 (6)	6.53 ± 1.25 (6)	$\chi 2 = 0.30$; $p = 0.07$
(PC) Multi-grain white bread roll			
6.30 ± 1.80 (6.5)	6.60 ± 1.22 (7)	6.27 ± 1.70 (6.5)	$\chi 2 = 0.36$; $p = 0.84$
(PD) Kneaded short-crust pastry cookies			
7.10 ± 1.67 (7)	6.30 ± 1.31 (7)	6.63 ± 1.23 (7)	$\chi 2 = 1.83$; $p = 0.40$
(PE) Classic short-crust pastry cookies			
6.13 ± 1.61 (6)	6.16 ± 1.49 (6)	5.20 ± 2.16 (6)	$\chi 2 = 0.14$; $p = 0.93$

Note [1]Values correspond to ANOVA $\chi 2$; superscript letters (a–c) denote post hoc test results, i.e., statistically significant differences between two samples tested by Wilcoxon matched pairs test ($\alpha = 5\%$); an asterisk demarks statistically significant result ($\alpha = 5\%$)

The second part of the research, in which the qualitative methodology was used, clearly highlighted the need for a closer explanation of the quantitative results. The first question about the importance of aroma in specific foods pointed to particular types of highly aromatic commodities (e.g., A2) but also described the sense of smell as helpful when preventing foodborne diseases of already purchased foods (e.g., A3). For this topic, no agent mentioned BPPs. Examples of statements presented in the form of selective transcriptions can be seen below:

> Aroma is important to me in certain types of food only. For example, at home, I consider it when eating cheese or drinking wine. (A2)
>
> I can tell by the aroma that the food is not spoiled, typically whether milk is not soured. (A3)

The second question, which examined the importance of the food aroma directly in the store, showed the lesser importance of smell when deciding between individual competing products. Only one of the agents named the sense of smell as necessary when choosing food, namely fruit (A4). The vast majority considered the use of smell when choosing between different foods rather unhygienic, especially since the food would have to be held directly in hand and approached to a face for aroma recognition. At the same time, agents mentioned the frequent use of impermeable foils for most products in supermarkets or the impossibility of using the smell in the case of products that are unpackaged but placed behind glass counters. Despite the mentioned responses, aroma plays an elementary role in purchasing certain commodities. The sense of smell is not usually used when choosing between competing foods from different producers. However, it is strongly attractive when passing through a specific supermarket department or visiting a specialized store (e.g., bakery, charcuterie). It primarily includes environments with aromatically distinctive unpackaged foods (e.g., A1 and A10). In these cases, consumers are attracted by the general smell of the department/store, which encourages them to buy the product of that department/store. In this context, the aroma of the bread and pastry department or bakeries was most often mentioned, which is in line with the results of previously conducted studies [15] and is a typical example of aroma marketing [14]. Consumers perceive such ambient aromas as essential, even if they cannot distinguish between specific competing products' aromas. Consumers may even seek out attractive stores because of their unique food aroma (e.g., A9). The mentioned conclusions can be deduced from the statements, examples of which are given below:

> … I do not use it much for food selection as such. When I pick a pineapple, I use my sense of smell to know its ripeness, as it generally works fine with the fruit selection. (A4)
>
> Not that I use my sense of smell when choosing in that store, but it certainly plays a role when, for example, I go through the department where there are grilled chickens and, most of all, fresh bread and pastry goods. (A1)
>
> It was back during the Second World War when we lived next to a bakery. They sometimes put fresh bread in front of our house, and we could smell it up to the third floor… It was such a beautiful smell that I still remember it today. (A10)
>
> I prefer to go to smaller bakeries because it always smells lovely there. I buy the bread and pastry with even more enthusiasm there. (A9)

As the third question, the agents were asked to focus primarily on describing the importance of aroma during the actual consumption of BPPs, including the effect of the consumption process on their subsequent purchase decisions. A highly valued dynamic discussion in F2 started after asking the last question. It enabled a partial clarification of the previous quantitative results of our study. The agents were divided into two subgroups (SG1 and SG2) based on their attitudes. SG1 represented the agents (e.g., A8 and A10) that underlined the unimportance of aroma in the preferential choice of BPPs at the expense of other sensory aspects. Agents from SG1 stated that the BPPs' aroma released during consumption does not influence their future purchasing decisions. Based on the SG1 statements, it is possible to state that the above-average sensory evaluations for most of the BPPs (5.20 ± 2.16 to 7.10 ± 1.67; 6 to 7 for medians), which did not differ between individual samples, may not have been caused by the above-average quality of the aroma. Instead, it might be caused by the inability of consumers to recognize the criterion of aroma in the BPPs they consume. The results, therefore, contradict studies that fully support the detectability of aroma in BPPs [22]. On the contrary, our results support other studies that showed the insignificance of aroma, e.g., in meat [39]. Selective transcriptions can be seen below:

> If I eat bread and pastry at home, I do not deal with any aroma. I do with all other aspects as texture and taste, but not the aroma. Thus, it will not even affect what I buy next. To be honest, we do not even have enough time to deal with it. We have work to do, not enough time, and we cannot deal with something like the aroma of bread. (SG1, A8)

> I agree (note: reacting to A8). I do not deal with the aroma of bread and pastry at home, except for traditional bread, which has a more pronounced aroma. (SG1, A10)

Based on the presented responses, it can be stated that the result of the sensory evaluation for the rye bread (PA; $p < 0.01$), which was the only product where aroma played a significant preferential role, was also confirmed. The role of traditionality might also be critical, as mentioned by A10, due to an inclusion of a sourdough starter as one of the most typical ingredients for Czech bread. In other countries, the sourdough starter may not appear as often in the recipes, and the use of ordinary yeasts may be more common [40]. The above-mentioned mutual complementation of quantitative and qualitative results can be considered a specific form of triangulation, i.e., achieving results using different research methods. Nonetheless, this term is more often used for combining several types of qualitative methods in the social sciences rather than mixing quantitative and qualitative methods [41]. SG2 represented agents (e.g., A9) who advocated the exact opposite opinion compared to SG1, i.e., that for all types of BPPs, the aroma is an essential (perhaps the most important) factor during consumption. Such perception of the aroma also influences their future purchasing decisions, as can be seen below:

> I am certainly dealing with the aroma. I recognize it in bread, every other kind of pastry, and light-colored bread. Moreover, the aroma will influence which bread or pastry I buy next time. I would even say that compared to any other food, the aroma is the most important for bread and pastry. (SG2, A9)

SG2's opposite attitudes were shortly explained during the ensuing dynamic group discussion. The importance of qualitative research was shown as it can be assumed that a questionnaire survey would not have achieved similar results. In particular, it was another interaction between agents A8 and A9 when the latter agent explained her position, saying that she does not consume bread in the standard way at home because she usually reheats it in the oven or bakes it as convenience food. The higher temperature of the bread also causes its higher aromaticity, and the bread's aroma becomes a prominent sensory aspect during consumption. It also influences the subsequent purchase decision of the consumer.

33.5 Final Remarks

The summary of the results can be interpreted so that sensory evaluation as a quantitative research method cannot thoroughly explain the different preferences for products that consumers purchase. Our study showed that almost all tested sensory aspects were essential for consumers of BPPs during sensory evaluation. It also showed high acceptability of the aroma in almost every tasted BPP. Nevertheless, thanks to triangulation [41], it can be argued that aroma paradoxically does not influence consumers' preferences when choosing between competing BPPs (except for traditional bread) and probably does not influence their subsequent purchase decisions. On the contrary, during the act of shopping itself, the ambient aroma of BPPs in the store is the most significant attractor that stimulates purchasing decisions, which is a result that supports the idea of aroma marketing [14, 15]. It is mainly the overall mixture of aromas of a supermarket pastry department or a bakery, which usually does not allow a preferential choice between individual types of products. Even so, there is a significant decrease in the importance of the aroma element of BPPs when comparing the "purchase-consumption" phases. Therefore, we put aroma as one of the sensory aspects of BPPs in connection with ephemeral marketing as it corresponds to its definition [4, 6] in several features. The aroma can attract the consumer's attention at the purchase stage intensively (more than in other commodities), but it becomes irrelevant during consumption as it has already disappeared. An exception to the rule is the aroma revitalization approach done by some consumers' homemade reheating of the BPPs.

Regarding the contribution to theory and practice, our study follows some previous research emphasizing the importance of sensory aspects of food [7, 8] with a focus on the sensory evaluation of baked goods [17, 18], but also includes a marketing overlap as some more rare studies [24]. The results can be used by stakeholders in the field of marketing research (specifically food marketing) or by food producers themselves. In particular, we point out the necessity of including the qualitative part of the research to complement the quantitative part, either sensory or questionnaire survey. The quantitative categories pre-defined by researchers may not allow sufficient space for the respondents to express themselves, in whom it is then possible to obtain typical examples of "thinking outside the box" during qualitative research.

The study has limits in both the quantitative and qualitative parts, indicating possibilities for future research. Specifically, statistical testing of the sensory data depending on socio-demographic characteristics such as gender, age, education, and income were not performed. Another limit concerns the tested samples, typically Czech (Central European), and the following research phase should include international comparisons. Limits may also be related to the specific way of choosing food by Czech consumers, who consider the use of the sense of smell during shopping as unusual and rather unhygienic. It cannot be unequivocally assumed that the same purchasing procedure is also apparent in other countries. Last but not least, future research might be extended to include packaged BPPs.

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Part VIII
Technologies Applied to Tourism Marketing

Chapter 34
Strawberry Fragaria Cultivation in the Municipality of Sibaté, Cundinamarca. Characterization of the Production and Marketing System to Incorporate

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Abstract Agro-industrial wastes are considered a source of utilization, due to the development of research projects framed in valorization issues where the agro-industrial sector is characterized by high rates of generation of organic waste from fruits such as peels, trimmings, stems, seeds, fruit malformations, among others,

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which can sometimes represent more than 50% of the fresh fruit (Torres-León et al., in Frontiers in Sustainable Food Systems, [1]). In that sense, losses include the waste of critical resources such as soil, water, chemicals, energy, and labor (Sagar et al., in Comprehensive Reviews in Food Science and Food Safety 17(3), [2]). Therefore, the importance of the circular economy lies in the rational use of natural resources from non-renewable sources, starting with the elimination of the concept and/or practices that lead to waste, through sustainable production and consumption techniques with the incorporation of new technologies that allow closing cycles in the waste value chain and generating from these by-products that, due to their physical, chemical, and/or microbiological characteristics, have potential for use in the industrial sector (Despeisse et al. in Technological Forecasting and Social Change 115, [3]), promoting the generation of strategies that mitigate environmental problems, originated both by the generation and disposal, as well as by factors resulting from the development of the productive sector. In this aspect, circular agriculture has explored the environmental understanding of farmers and their willingness to pay, without affecting current ecosystems so the project to be developed aims at the industrial valorization of organic waste generated in strawberry crops in the municipality of Sibaté, framed in the circular economy. This becomes important, as far as the project activities are concerned, because it allows to provide the reader with an approach of the current scenario, the farmer's perception in contrast with standardized instruments, and the approach of possible solutions for the strengthening of the community in the rural area, as well as to contribute with the strengthening for future generations aimed at improving and proposing alternatives that mitigate the current problems of the field, through spaces of social appropriation of knowledge that promote the closing of gaps and facilitate the entry of farmers to new markets.

Keywords Strategy · Conservation · Clean production · Utilization

34.1 Objective

The project industrial valorization of organic waste generated in strawberry crops in the municipality of Sibaté Cundinamarca, framed in the circular economy based on theory, practice, perception of the farmer, community in general, and academic institutions with the objective of identifying ways of current management of organic waste in the generation, classification, disposal, and use from strawberry crops, in each of its stages, tending to establish strategies that allow the valorization of the waste generated, through transformation and use techniques, based on a diagnosis that considers the most important aspects of the project, disposal, and use from strawberry crops, in each of its stages, tending to establish strategies to valorize the waste generated, through processing techniques and use from a diagnosis that

includes aspects of greater relevance that are subject to improvement and considered by each of the stakeholders in the object of study and the development of future research.

34.2 Introduction

The increase in the demand for food worldwide has generated a series of environmental impacts associated with agricultural activities affecting water, air, and soil components; however, when a new harvest period arrives, it is necessary to prepare the land or space designated for planting, generating organic waste which is burned or temporarily stored causing the attraction of vectors and bad odors [4]. For this reason, the United Nations Development Program—UNDP, together with partner countries, highlights sustainable production and consumption as a mechanism to minimize the carbon footprint in the different economic activities; however, the food sector provides 22% of the total greenhouse gas emissions generated into the environment due to the conversion of forests into farmland, in turn, every year more than 1300 million tons of food are wasted worldwide [5].

In this regard, the World Bank [6] states that if urgent measures are not taken by 2050, the increase in waste will be 70% corresponding to 3400 million tons of the 2010 million tons recorded for the year 2016, mainly constituted by 44% of food scraps [6]. According to Zacarías [7], regional coordinator of resource efficiency and sustainable consumption of the UN, the collaboration of governments also has a role to play, because sometimes campaigns are created to make citizens aware of the problem, but they end up frustrated because they do not have alternatives, in turn, highlights that the problem comes from the current regulations because in them waste is considered as a waste rather than as a usable material. Likewise, the Food and Agriculture Organization of the United Nations (FAO) defines that 30% of the food produced for human consumption worldwide is lost or wasted during the food supply chain [8].

Now, the agro-industrial sector is characterized by high rates of generation of organic waste from fruits such as bagasse, peels, trimmings, stems, seeds, defective fruits, among others, which can sometimes represent more than 50% of the fresh fruit [1]. In that sense, losses include the waste of critical resources such as soil, water, fertilizers, chemicals, energy, and labor [2]. In this framework, the circular economy becomes important to the extent that it integrates strategies for the rational use of natural resources from non-renewable sources, starting with the elimination of the concept and/or practices conducive to waste, by sustainable production and consumption techniques that give way to the incorporation of new technologies, the closing of cycles in the waste value chain and obtaining by-products that, due to their physical, chemical and/or microbiological characteristics, have potential for use in the industrial sector [3]. Therefore, the focus of the project is directed toward the industrial valorization of organic waste generated in the strawberry crops of the municipality of Sibaté, where different alternatives will be obtained that result in

the use of raw materials and renewable energy sources, reduction in the generation of waste and atmospheric emissions, reuse of products and materials, differentiated value in markets, strengthening of capacities for productive use, additional income from the sale of by-products (as applicable), among other aspects.

At the same time, several researches related to the use of waste from the agro-industrial sector have developed analyses to determine its composition and thus generate new products, renewable energies, obtain biofuels, chemical products, as well as soil recovery, fertilizers, as well as biocompost, fermentation, concentrate through processes and treatments, among others [9]. However, more attention is generated on issues of biofuels and bioenergy, biorefineries, wind energy, energy sustainability, biomass, waste-to-energy technologies, life cycle assessment study, recovery of energy and materials from waste and integrated waste management techniques [10], given the impact that these generate at industrial, commercial, and economic levels [10].

However, as there is a great diversity in the waste generated there is no general strategy applicable for the recovery of active compounds since the attention of the scientific community is focused on optimizing extraction techniques, in order to obtain higher production yields in an ecological and economical way; however, future lines of research should be established for proper management of these wastes, in terms of pretreatment, in order to extend their durability, minimize the loss of bioactive compounds, reduce environmental pollution [11], and strengthen spaces for social appropriation of this knowledge, taking into account the social gaps to which communities are constantly exposed, followed by the identification of variables that have given way to the problems that affect the Agricultural sector.

Likewise, the prospect of new products, repair, and reuse, increasing efficiency in terms of energy and resource consumption, promotion of high-quality remanufacturing and recycling, carbon footprint reductions in the use of water and other critical materials, the elimination of single-use products and programmed obsolescence, and moving toward business models based on products as services focused on sustainable consumption is being presented [12].

Now, through the execution of this research, the current forms of management of organic wastes will be identified, such as their classification in-situ, disposal, and use in each of the cultivation stages, all this through visits to the farms under study, evaluation of the perception given by each farmer, contrasted with the theoretical basis of the project. Likewise, in the execution of the other phases of the project, possible strategies will be established to modify the linear economy for a circular one, through transformation and use techniques determined in relation to the physico-chemical characteristics presented in the collected waste. It is necessary to emphasize that this initiative was born as part of the interdisciplinary work carried out by the research groups of the University of Cundinamarca of the Soacha extension, the Industrial Management Center of the Servicio Nacional de Aprendizaje SENA and the Mayor's Office of the municipality of Sibaté, Cundinamarca as part of the generation of explicit knowledge, aiming to respond to the social needs of the department and to enhance agricultural production in the area through sustainable practices in accordance with the National Policy on Sustainable Production and Consumption

and the National Strategy for Circular Economy Production, as well as to promote development through the articulation of the academy with the industrial sector.

34.3 Methodology

In order to know the current situation concerning the management of organic waste generated during the harvest and post-harvest processes of the Strawberry fragaria fruit in the municipality of Sibaté, Cundinamarca, visits were made to identify the agricultural activity, productive extension in the rural area of the municipality, operational variables and geographic conditions that will be used as an input for the consolidation of a method of information collection through a non-probabilistic sampling by convenience, with the possibility of rejection of the sample, since the choice of the elements does not depend on probability, but on causes related to the characteristics of the research, likewise the procedure is not mechanical or based on probability formulas, but it depends on the decision-making process of the researchers and of course, the samples selected obey other criteria of the research [13].

Therefore, it is proposed to develop a detailed plan of procedures that lead to collect information on the sources from which the data will be obtained; these data will be the result of observations and perceptions provided by the farmers in the area; likewise, the collection method was carried out digitally through a platform of surveys to ten productive units, In this sense, its achievement will allow the identification of issues related to the inventory of organic solid waste management, environmental aspects and impacts of greater relevance, productive process for obtaining the fruit, characteristics of the organic waste generated, operational variables of the crop and the life cycle of raw materials and inputs [14]. The variables defined for the sample selection are detailed below:

(a) Land used for the agricultural production of Strawberry fragaria.
(b) Use of conventional agricultural practices, during the production process.
(c) Not having implemented any technology or process for the utilization of organic waste from the production process.
(d) Geographical location in the rural area of the municipality.

On the other hand, the survey first involved demographic questions identifying factors of the interviewed person such as gender, age, socioeconomic level, marital status, schooling (level of studies), neighborhood or area where he/she lives, membership in certain groups, occupation (activity to which he/she is dedicated), years of living in the current place of residence, among others; subsequently, closed questions were developed with categories or response alternatives that had previously been delimited, meaning that the response possibilities were presented to the participants, who were limited to these [14].

After collecting the information, a process diagram will be made involving the inputs and outputs of each unit operation, developed in the harvest and post-harvest, additionally, the tabulation of quantitative and qualitative data will be made, followed

by the application of the base format defined for the initial environmental review taking as a reference the guidelines defined in the Colombian Technical Guide GTC 93 of 2007 which provides guidelines for the development of the initial environmental review (RAI) and the gap analysis (Gap Analysis), which contemplates the economic, environmental, energy, storage, social aspects, safety, and health at work diagnosis, where aspects of greater relevance in the generation of organic waste that is subject to be improved and considered of greater relevance for their valorization are defined, in accordance with the guidelines stipulated by the circular economy.

34.4 Results Analysis

In compliance with the defined guidelines, a reconnaissance visit was made to the rural area of the municipality of Sibaté, Cundinamarca, where Strawberry Fragaria crops prevail (see Image 34.1). The visit highlighted factors related to inadequate management of waste such as plastic, organic waste resulting from sanitary cleaning, flowers, new harvest processes, elimination of nonconforming product, among other aspects.

Following this, a socio-demographic characterization was made in the population located in the urban area of the municipality, identifying in the population surveyed a major presence of the male gender represented with 70%, while the female gender women with 30%; also, 90% do not have complete academic high school studies while 10% have a professional career or postgraduate degree in the agricultural area or similar; on the other hand, 40% have between 1 and 3 hectares for the cultivation of strawberry fragaria, while 30% have less than one hectare and the other 30% have more than 5 hectares. However, given the fact that it is common to find several productive units in the municipality, there is a social gap framed mainly by the lack of access to higher education that would allow the creation of a structure with qualified

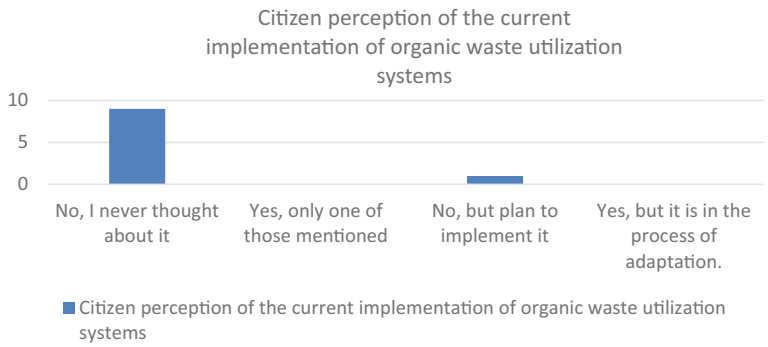


Image 34.1 Strawberry fragaria crop extension. *Source* Authors

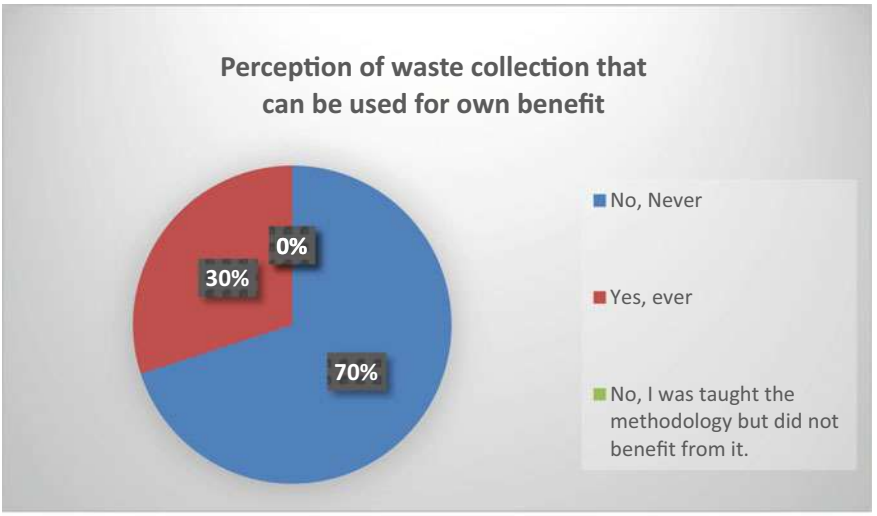
personnel that would generate processes of crop technification and improvement of the current conditions of the crops.

However, 40% of the population stated that once the waste from the pruning process is collected, it is gathered and isolated in order to facilitate its decomposition with other waste, while 30% use it as fertilizer, 20% dispose of it in a conventional waste container and 10% do not give it any specific treatment. However, four of the respondents stated that they have not stipulated any process to control the rate of waste generated, three do it from the beginning to the end of the crop, two are not interested, and one person does it occasionally; however, a more alarming picture was identified since 9 of the respondents have not implemented any process of waste utilization in their area and only 1 describes that although they have not implemented it, they study the possibility of its development (See Graph 34.1).

Likewise, to the question "In the time you have been a farmer, specifically in strawberry planting, have you been involved in any waste collection process that can be reused for your benefit?" 70% of respondents said that they had never carried out this activity, while 30% said that they had done so at some time (See Graph 34.2). However, in conversations with the municipal Secretariat of Agriculture, Development, and Environment, free training sessions are periodically scheduled in partnership with suppliers in the sector, where topics focused on crop sustainability such as integrated pest control and management, efficient water usage and savings, conventional waste utilization systems, waste segregation, control of operational variables in the production units, and other issues are addressed. In addition, professional staff is available to provide continuous support in the solution of technical aspects required by the growers and as a mediator in the allocation of technological or financial aid provided by the local government. This is contradictory in comparison with the responses of the population, given that most of them assure that they have not received any type of education on these issues, which may be related to the lack of interest of the community, resistance to change, high personnel turnover, and the absence of social programs with a wider field of action.

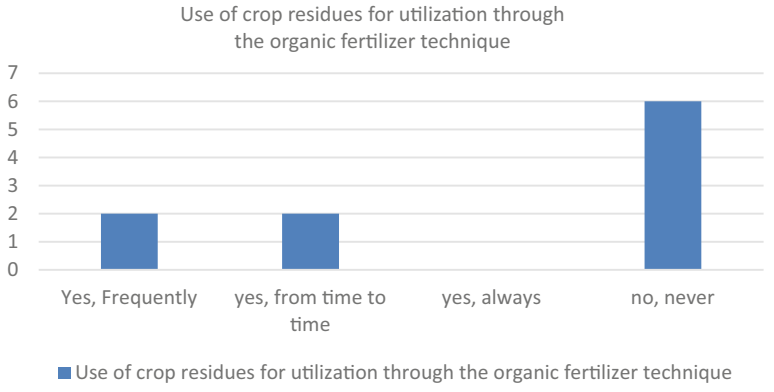


Graph 34.1 Citizen perception of the current implementation of organic waste utilization systems. *Source* Authors



Graph 34.2 Perception of waste collection that can be used for own benefit. *Source* Authors

Similar to the above, six of the respondents stated that they have never used roots, stems, leaves, stolons, flowers or fruit remains for composting, while two say they do it frequently and another two from time to time (see Graph 34.3). In contrast, there is a lack of articulation with technological tools to facilitate the implementation of strategies focused on the use of organic residues generated in the crops, since there is no basic theoretical support to guide personnel in the implementation of activities in favor of environmental conservation.

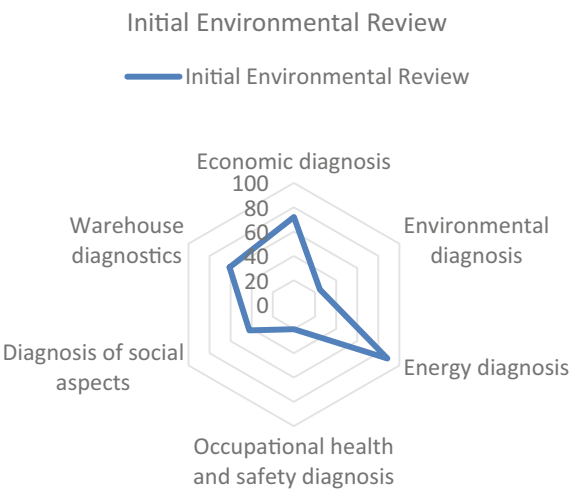


Graph 34.3 Use of crop residues for utilization through the organic fertilizer technique. *Source* Authors

In this context, it is important to detail the importance of generating processes for the valorization of organic waste complemented with strategies that allow a continuous approach to society with technological tools that promote the rational use of natural resources and generate awareness on the proper management of these wastes, since storage conditions must be optimal in order not to generate physical or chemical alterations that prevent their use. Similarly, it is important to emphasize that a large part of the population has not implemented production systems framed in the ENEC circular economy strategies, promoting the closing of cycles in the waste generated through the application of 6 lines of action comprised in the flow of industrial materials and mass consumption products, water, construction materials, biomass, energy, containers, and packaging [15], under such premise it is important to create strategies that are in line with the needs of the sector and enhance its economy through sustainable production.

At the same time, the productive variables contemplated in the process of obtaining strawberries in the municipality were identified in comparison with the Manual of Good Practices developed by the National Learning Service-SENA, projecting a diagram of processes and inputs and outputs, highlighting the high consumption of chemicals in the control and management of chemical pesticides with the presence of substances considered persistent in the ecosystem and the human body, high rates of loss of the final product generated by the variation in weather conditions in the region, production in the open air, presence of diseases in the soil, seedlings, in the fruit or malformations in its physical structure. On the other hand, it is necessary to include technological tools that allow early detection of irregularities in the operational variables, proper handling of hazardous substances, disposal according to the type of waste, adoption of technical methodologies in the execution of each phase of cultivation such as bed formation, installation of irrigation and cover systems, in order to highlight the importance of incorporating a system of sustainable production and consumption according to standards defined by national and international entities for future exports of the product.

Consequently, this information was analyzed through the initial environmental review (RAI), detailing the failure to consolidate strategies to mitigate environmental impacts and respond to the proper management of non-renewable natural resources, management of hazardous and non-hazardous waste, energy and water consumption, among others (note: the score obtained in this aspect is 24.69 on a scale of 1–100 points of compliance). All of this is related to the absence of action mechanisms aimed at safeguarding the health and safety of workers, since their activities are carried out in an empirical manner and there is a latent risk of inhalation of toxic vapors, contact with phytopathogenic microorganisms and persistent organic compounds, among others (note: the score obtained in this aspect is 20.33 on a scale of 1–100 points of compliance). Followed by this, in the social component demonstrating the absence of community mechanisms to facilitate their entry into the professional labor sector since, as mentioned above, not all have a certified study and their work is more given to empirical knowledge; additionally, there is no traceability in the study of the life cycle of the products used in the crops so that there are guidelines focused on food



Graph 34.4 Initial environmental review. *Source* Authors

security (note: the score obtained in this aspect is 42.36 on a scale of 1–100 points of compliance) (see Graph 34.4).

Similarly, there is evidence of inadequate management of the storage areas where appropriate use is made of the compatibility matrix and shelves in the case of chemical substances, followed by the lack of signage and control processes to ensure resupply points in accordance with the needs of the crop (note: the score obtained in this aspect is 61.11 on a scale of 1–100 points of compliance). However, from an economic point of view, there is a need to generate product innovation processes that would allow the company to enter new markets and maximize the operational profits earned through this activity (note: the score obtained in this aspect is 71.90 on a scale of 1–100 points of compliance).

Finally, from the energy component, there is a lack of technologies that promote an adequate use of the resource and those that incorporate renewable sources (note: the score obtained in this aspect is 88.61 on a scale of 1–100 points of compliance).

34.5 Conclusions

According to the information collected, the current conditions for the potential inclusion of circular economy strategies are described. Based on the results of the information collection, it is relevant to mention that considering the levels of training, the recognition of waste as usable organic material, and the poor evaluation rating in "environmental diagnosis," the opportunity to implement strategies according to the conditions observed and the need to appropriate the knowledge with practical exercises understandable to this population, such as the integration of a single collection center for those with little cultivated area, is validated.

On the other hand, the current forms of organic waste management were identified, highlighting that those of the greatest generation are included among the fruits categorized as non-compliant due to malformations in their structure, the presence of phytopathological diseases and those used as a source of food by rodent animals, remains of the topsoil in the processes of soil preparation for new crops including plants considered as weeds in the productive units, plastic waste with remains of chemical substances used for pest control and management, among others. At the same time, knowledge gaps were identified associated with the lack of awareness in the preservation of natural resources and the implementation of solutions that allow their adequate use in accordance with the guidelines defined in the National Policy for Sustainable Production and Consumption and the lines of action described in the National Strategy for Sustainable Production and Consumption.

However, from a productive perspective, there are deficiencies due to the high rates of loss of the final product directly related to the inadequate management of chemical products used for the management and control of pests, which generate loss of the humic properties of the soil and consequently less capacity installed in them. In this sense, it is planned to continue with the development of the research-oriented to generate a proposal for the industrial valorization of the organic residues generated in the Strawberry Fragaria crops of the municipality of Sibaté, Cundinamarca through transformation and utilization techniques in accordance with the parameters defined in the physicochemical characterization of the wastes catalogued with potential for utilization in relation to processes of utilization that are in accordance with the needs of the sector. Following this, an estimate will be made in accordance with the selected solutions that promote their industrialization.

Therefore, it is important to detail that the conditions described above do not favor the integration of the agricultural sector, respectively, to this particular fruit, since its system is based on linear models that fundament its structure in producing in accordance with the needs of the consumer, but not in a circular thinking that contemplates the environment as part of the productive model and the achievement of activities that are projected in the preservation of the environment, optimization of natural resources, improvement of working conditions and minimization of the losses reported in this sector.

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Chapter 35
Digital Nomads: Who They Are and What They Want from the Destinations?



Ana Garcez, Ricardo Correia, and Aida Carvalho

Abstract Although digital nomadism is already an old concept, its visibility has recently become popular, and there are still very few scientific studies developed in this area. This research offers a significant contribution, to the systematization of this concept as it explored the origin of this phenomenon, the characteristics associated with the digital nomad and their preferences regarding destinations. The study provides a set of valuable insights that the entities responsible for destination management might use to format their offer in order to gain attractiveness towards this tourist segment.

Keywords Digital nomads · Destinations · Tourism · Technology

35.1 Introduction

In the current era of ubiquitous computing, where the world of digital and physical are increasingly diffused, the boundaries between the configurations of online and offline have been eroding, creating large-scale networks of people, computers and objects. In this sense, all these changes have been particularly felt in the work environment, in the way employees perform their functions within organizations and in the conditions under which they do so [1–3]. Thanks to disruptive technologies, such as mobile computing, virtual reality, systems that generate big data and cloud services, the barriers of space and time have been broken, making it possible to reach anyone at anytime and anywhere in the world [1]. Therefore, new ways of working

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have emerged, where employees hold the option to perform their professional tasks outside the confines of a conventional office or working hours. In addition, these technologies have also enabled greater productivity at work, as they allow employees to communicate and collaborate with each other and become more autonomous [4, 5].

All this context has favoured the appearance of a segment of travelling workers, commonly called digital nomads, which has been gaining relevance. The aim of this article is precisely to characterize this segment, contextualizing its emergence and identifying its characteristics. This information will be useful for tourism units and destinations managers in order to format their offer to this segment.

35.2 Digital Nomadism

The term "digital nomad" was introduced by Makimoto and Manners in 1997, to describe a new lifestyle where work and leisure would be related [6], having been later recognized as a social phenomenon [7]. In this sense, the concept of digital nomad describes a category of nomadic professionals who carry out their work remotely anywhere in the world, using digital technologies. Thus, "digital nomadism" refers to the lifestyle developed by these professionals [8]. In this line of thought, digital nomadism has been approached from different perspectives, as a form of creative tourism [9], as a type of leisure activity, [10], as a new form of location-independent work [11, 12] and as a new economic activity and a cultural phenomenon [11].

Therefore, Putra and Agirachman [9] characterize digital nomadism as a tourist activity where novelty is assumed as the main motivation. However, although these individuals continually visit new destinations and create new experiences, they cannot be considered tourists, since they are always looking for resources that allow them to perform paid work [13]. Already in the view of Wang et al. [12], digital nomadism has become a specific segment that has facilitated the development of new services and products, which in turn has enabled new forms of consumption, such as digital platforms.

According to Liegl [14], the digital nomad is a worker equipped with digital technologies that enable him to work anytime and from anywhere. It refers to professionals who perform their work digitally through the Internet, and under a lifestyle of constant travel [15]. In the view of Kuzheleva-Sagan and Nosova [16], digital nomadism is a phenomenon of modern society that has emerged as a result of the growth of mobility and digitalization. Müller [7], on the other hand, defines this term as a new generation of location-independent freelancers, that is, young autonomous online entrepreneurs. In other words, they are people who are not dependent on a job in a conventional office, having the freedom to decide freely when and where they want to work, needing only their laptop and a good Internet connection. On the other hand, Wang et al. [12] describe the digital nomad as a teleworker who lives a life of travel and continuous interspersed work.

Digital nomadism has been gaining popularity over the last few years as a modern lifestyle and where work takes place in a different context than the traditional one.

However, there are still few empirical researches that focus on this theme, which ends up restricting the analytical discussion of the literature [8, 13]. In this sense, the existing studies in this area have focused on different perspectives of nomadism, although they lack a coherent and unanimous definition of the term (Table 35.1).

Although in recent years, empirical studies have focused on different angles, positioning the nomad as a product resulting from changing work culture, travel patterns or professional angle or lifestyle, in general, digital nomadism is always associated with mobility, flexibility and the independence of time and location [7, 10, 12, 13, 17, 20].

Nash et al. [13] state that digital nomads is nothing more than teleworkers who have become so geographically mobile as to become free to work and live anywhere in the world, being considered "perpetual travellers." As such, these individuals can be seen as an intersection between travel, leisure and work. In this sense, and although the duration of travel varies according to preferences, lifestyle, visa regime, etc., semipermanent or continuous international travel is the core component of so-called mobile workers [10, 11, 17].

Roughly speaking, digital nomads are characterized by a holistic lifestyle (Fig. 35.1), where the professional, spatial and personal environment are viewed in the same way; that is, this segment of people considers work as something intrinsically motivating and rewarding and is therefore equated with leisure activities [10].

Horton [21] states that the escape from the conventional office atmosphere and the adventurism linked to travel is the main motivation associated with the lifestyle of the digital nomad. Therefore, these individuals will only be able to achieve the

Table 35.1 Definitions and concepts on digital nomadism

Authors	Definitions/Concepts
Liegl [14]	"(…) a mobile knowledge worker equipped with digital technologies to work 'anytime, anywhere' "
Müller [7]	"(…) a new generation of location-independent freelancers, young entrepreneurs, online self-employed persons"
Reichenberger [10]	"(…) young professionals working solely in an online environment while leading a location-independent and often travel reliant lifestyle where the boundaries between work, leisure and travel appear blurred"
Thompson [17]	"(…) ability for individuals to work remotely from their laptop and use their freedom from an office to travel the world"
Richter and Richter [18]	"(…) are redefining work life by pursuing employment that allows for global travel, flexibility in work hours, and a departure from the traditional office environment"
Mancinelli [19]	"(…) individuals who, taking advantage of portable computing technologies and widespread Internet access, can work remotely from any location and use this freedom to explore the world"
Nash et al. [13]	"(…) independent digital workers with extreme forms of spatial mobility and non-existent or loose organizational affiliations"



Fig. 35.1 Holistic digital nomadism. *Source* Reichenberger [10]

holistic state they seek if there is an interdependent relationship between professional, spatial and personal freedom. In other words, the combination of work (professional freedom), leisure (personal freedom) and location independence (spatial freedom) contributes to learning, skill acquisition or advancement and self-development, in the same way that they continuously stimulate creativity through constant movement [10].

35.2.1 Work–Leisure Relationship and Cowork Spaces

There are several authors who suggest that digital nomads actively deal with the blurred boundaries between leisure and work, to the extent that aspects such as fun and self-control end up being transferred to the nomads' professional environment [7, 10, 22].

According to Beatty and Torbert [23], the first attempts to establish a definition of leisure were essentially based on the absence of work, or on the amount of time available after all professional commitments had been carried out, neglecting daily or domestic chores [24]. Nunes and Hutz [25] define leisure as a relatively structured set of activities capable of meeting physical and mental needs. In the same line of thought, Witt and Bishop [26] reinforce this idea by stating that each person defines the concept of leisure according to their preferences and available resources to meet their needs, valuing the results in different ways, according to their values and aspirations. Thus, leisure depends on the meaning that a particular person attributes to it and not the activity itself. In other words, leisure may take on different forms for different people; i.e., an activity may be considered both an obligation and a form of leisure. That

said, and according to Reichenberger [10], leisure can be defined as a component of digital nomadism. Digital nomads tend to seek out locations according to their work expectations, although this is not the main reason for their frequent travel. The emotional and organizational support and the exchange of knowledge facilitate the achievement of results, in this way digital nomads tend to group themselves in communities with similar ideals and lifestyles [27, 28]. In this way, and according to Orel's study [11], the balance between leisure, work and an ideal environment to perform their professional tasks seems to be one of the main motivations for digital nomads.

Digital nomads tend to select their geographical location according to their work expectations [27]. However, the geographical flexibility associated with their lifestyle and the absence of an organizational workspace may lead to blurring boundaries between work and leisure life, as they end up being deprived of socializing with co-workers, which in turn may result in the absence of spontaneous socializing. Although the digital nomad is constantly connected to the Internet, there is no genuine contact, as there is in direct communication and interaction between co-workers [29, 30]. In the face of the loneliness associated with this lifestyle, collaborative workspaces, more commonly referred to as coworking environments, have emerged [11, 31]. These spaces can be described as shared work environments where different types of professionals come together to carry out their work tasks [31].

The idea of coworking was born in California (San Francisco) in the year 2005, with the intention of becoming an alternative to a traditional working environment in a conventional office, breaking the organizational hierarchy and eliminating competition between co-workers, supporting instead the collaboration of independent individuals carrying out their own projects [31].

The use of spaces such as coworking environments aimed at communities, allows them to socialize, eliminating the feeling of isolation while increasing productivity at work and bringing them the ideal balance. Furthermore, it should be noted that coworking spaces should not only be considered as workplaces, but also as places of innovation and well-being since these components are a fundamental part of the nomadic lifestyle [11].

Compared to a traditional office, coworking, enhances freedom, independence and flexible working arrangements. In addition to being more affordable, these help support remote working and the reconciliation of work and personal life [32]. The concept of coworking involves two elements: coworking space and coworking community. The first provides independent professionals with the necessary conditions and infrastructure to execute their individual projects; i.e., it involves fully equipped offices with desks, Internet, printing services and cafeteria services. The second, it is a social structure that enables the performance of intellectual work among peers, manifesting itself through culture, communication, information and knowledge exchange [33]. In other words, and according to Rus and Orel [34], the basis of a coworking space consists in the form of a combined office and cafeteria environment.

Bouncken, Laudien, Fredrich and Görmar [35] states that coworking spaces can be divided between corporate spaces and individual spaces. While corporate spaces

are those that belong to large corporations with established hierarchies and a campus-like environment, individual spaces are those that mainly target freelancers, start-ups and local businesses [35].

From another angle, Orel [11] highlights that coworking can be seen in three different perspectives, i.e., as a catalyst of a community of individuals operating independently, aiming at collaborative establishments and inclusion in new networks [36]. It can also be seen as an environment capable of optimizing and stimulating more efficient work processes [37] and finally as a supportive environment that allows access to work opportunities [38].

According to several studies, it has become clear that the coworking industry is growing considerably due to the rapid growth and expansion of mobile workers seeking to reconcile leisure and work, having increased from 21,000 individuals in 2010, to 2.17 million in 2019 [11, 39].

According to the perspective of Lee et al. [40], there are eight geographical factors for coworking digital nomads that should be taken into account: Internet availability; climate and natural environment, cost of living, community, culture and language, accessibility, time zone and security.

Although the coworking environment, is assumed as a space appreciated and valued by digital nomads, their preferences regarding the purpose of the space vary, and therefore, three niches of digital nomads have been identified by Chevtaeva and Denizci-Guillet [41]: Practical Digital Nomads; Sociable Digital Nomads; Exploratory Digital Nomads. The first niche refers to individuals who see space as an opportunity for focus and networking, devaluing social relationships. The second, represents nomads who seek to combat loneliness by connecting with other peers and the last niche seeks local and authentic experiences (Fig. 35.2).

All this is in line with the studies conducted by [10, 11, 17, 42] that assume the coworking space as an environment capable of enhancing socialization, well-being, self-discipline and the creation of nomadic communities.

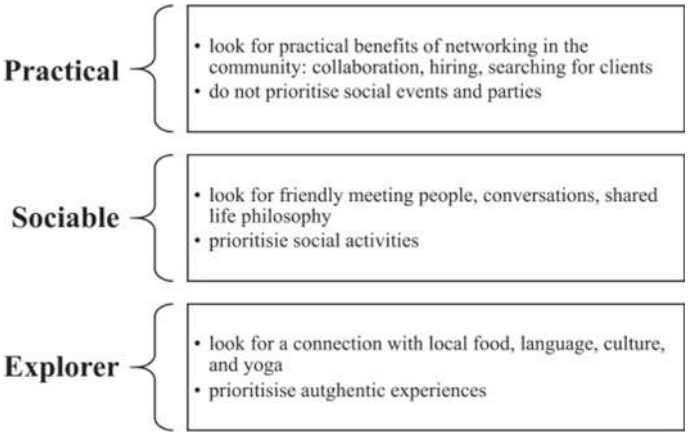


Fig. 35.2 Niches of digital nomads. *Source* Chevtaeva e Denizci-Guillet [41]

However, and although coworking environments are quite advantageous in that they stimulate the sense of community and a pleasant working environment, coexistence and collective learning, these spaces also end up having several inherent disadvantages, including high values, lack of privacy and the noise that can be caused by the conviviality [43].

In the face of all this, being a digital nomad brings several benefits, among which stand out, the independent location, the unlimited creativity, a flexible working schedule, a pleasant climate to carry out the professional tasks and coworking space support. However, and although these individuals do not depend on specialized work areas and rooms for this purpose, they require high Internet coverage and quality and that they find or prepare their workspace themselves rather than relying on a conventional, stable office environment provided by a certain organization [44, 45]. On the other hand, and although nomads are able to adapt their work to their individual and family circumstances, this lifestyle also entails greater business risks as they do not benefit from health insurance, sickness cover or annual leave expenses, which puts them in more precarious situations [13]. Although constant mobility allows these individuals to travel and get to know new places, people and cultures, it also requires the mobilization of resources [46]. In the same line of thought, and according to Matos [47] and Gomes [48], although the nomad has the possibility of developing his professional tasks through the Internet, the contact through this source ends up becoming more impersonal and distant (Table 35.2).

In this way, and although digital nomads may have a more flexible and rewarding professional life, it should be borne in mind that the same space–time freedom that offers them benefits may also become oppressive, insofar as the rate of responsiveness must remain constantly high, which may unbalance the boundaries between personal and professional life [50–52].

35.2.2 Profile of the Digital Nomad

Over the past few years, several empirical studies have been developed and applied with the purpose of obtaining a portrait of the digital nomad. In this sense, and according to the literature, digital nomads are characterized as young adults who are literate and often employed in technology areas (web design, programming, online marketing, online teaching, translation, virtual assistance, professional coaching, online sales and administrative management). They have the ability to work remotely using only a laptop computer, essentially seeking long-term stays [17, 19, 22]. According to a study carried out in 2021 by Kelly and Arelano [53], it was found that digital nomads are mostly female and aged between 25 and 34 years, which corroborates with the study of Reichenberger [10], who states that this segment is made up of individuals in their 20 s and 30 s, since this generation, apart from having developed an affinity with ICT, does not usually have family commitments. The majority are from North America and Europe, i.e., predominantly Western individuals, and stay more than one month in a given location, working around 46 h per week, mainly as

Table 35.2 Advantages and disadvantages of the digital nomad lifestyle

	Description	Authors
Advantages	– Freedom and flexibility of time and movement; – Knowledge of new cultures, countries and people; – New experiences; – Possibility to explore new markets; – Access to new knowledge; – Increased productivity and creativity; – Low levels of stress	Nash et al. [13]; Kamoi [46]; Novriandi [44]; Haking [49]; Reichenberger [10]
Disadvantages	– Unstable income; – Lack of health insurance and sub-subsidies; – Social isolation – Need for high Internet coverage – possible poor time management – Lack of genuine contacts – Different time zones; – Difficulty in building the corporate culture	Haking [49]; Kamoi [46]; Matos [47]; Gomes [48]; Jarrahi et al. [45]; Golden [29]; Orel [11]

freelancers for multiple companies [10, 53, 54]. This segment receives an average of $4500 per month, spending about 36% of that pay check locally. The main motivations for these individuals to lead this lifestyle are essentially, to be able to travel constantly and not only during holidays, for the feeling of freedom, to learn foreign languages and to meet different cultures and people [53]. In other words, Orel [11] states that one of the motivations to follow this lifestyle is the taste for the feeling of geographical freedom and the transition between different places and societies.

However, not everything is advantages, since being a digital nomad brings with it several challenges, namely the uncertainty associated with work, the possible loneliness and financial difficulties, the management and balance between work and leisure and motivation [53].

In this sense, this public ends up becoming more demanding, valuing comfortable spaces and quiet places, attractive destinations where they can benefit from long stays, particularly with people with whom they can share knowledge, fast Internet, fair prices, free coworking and daily schedules. Climate, nature, culture, safety and low cost of living in a destination, as well as a good public transport system and ease of obtaining visas are key components in the selection of a destination. Therefore, tourist

accommodations that intend to receive digital nomads should adapt their rooms/apartments to the needs of this segment, i.e., besides having a cosy, comfortable and quiet space, they should have a place to work, as well as a good Internet connection and a price adapted to their lifestyle, since these people stay for long periods of time [53].

Thompson [54] mentions that this group of people usually select places that are scenic, cosy and comfortable, accessible and welcoming. They are drawn to places that can meet their daily work needs and offer them a wide range of food and accommodation options. Altringer [55] reinforces this idea, in that he states that digital nomads usually travel preferentially to warm destinations with a low cost of living. According to Symonds and Lacono [56], countries like Thailand, Costa Rica, Bansko (Bulgaria), Canary Islands (Spain), Seattle (USA) and Berlin (Germany) are some of the favourite choices of digital nomads.

From another perspective, and taking into account the study of Kelly and Arelano [53], it appears that the preferred destinations for a long-term stay (more than three months) are Indonesia, Mexico and Thailand, followed by Spain, Colombia and Portugal. On the other hand, the preferred destinations for a stay of between one and three months, i.e., an average stay, are mainly Portugal, Indonesia and Georgia, followed by Mexico and Thailand. Lastly, the destinations where nomads choose to stay for a shorter period, i.e., less than a month, are France, Brazil, Iceland, Indonesia, Costa Rica and New Zealand.

In general, for destinations and tourist accommodations to attract digital nomads it is imperative that, besides offering a good Internet connection, all the services offered add value to the daily life of these people. Thus, creating quiet areas for video calls or videoconferences and providing leisure zones, free of technological devices so that the digital nomads can disconnect and relieve the pressure of work are options to be considered. Besides this, presenting activities such as cooking classes, workshops and sports activities, as well as special events and places that allow nomads to establish contacts with other travellers and with the local community, avoiding the loneliness that is associated with this lifestyle, are essential aspects that differentiate and value the places (Fig. 35.3) [53].

Finally, the price must be adapted to this lifestyle, since digital nomads not only seek longer stays, but also face financial uncertainty that can generate anxiety and restlessness. Thus, the best way to combat this problem is to offer flexible payment methods or discounts for early payment [53].

35.3 Conclusion

The digital nomad is a segment that is becoming increasingly relevant in modern society, as they represent a new holistic lifestyle where the goal is to create and generate value, regardless of location. This public is characterized by professionals who work exclusively online, maintaining an independent lifestyle, balancing work with leisure. In other words, the digital nomad tends to celebrate a lifestyle,

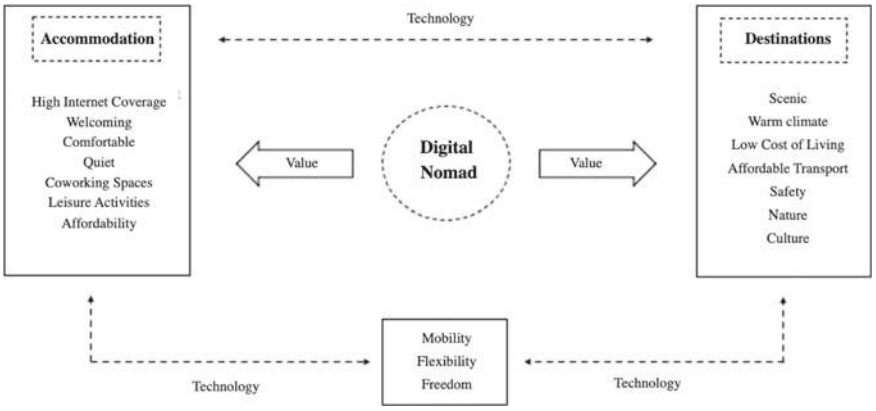


Fig. 35.3 Digital nomad lifestyle

which allows him to travel continuously, carrying out his professional activity from anywhere in the world. However, this tourist segment becomes more demanding, as they value comfortable spaces, quiet places, a good Internet connection, fair prices, free coworking and daily schedules. In this way, their particular characteristics require that the tourist units that intend to position themselves to attract this public adapt and qualify their offer accordingly.

The main limitation of this study is its exclusively theoretical nature. Thus, it is suggested as future research the empirical analysis of cases of destinations or tourist resorts that have formatted their offer based on the characteristics associated with digital nomads. It is also proposed the development of an empirical study that can generate understanding about the formation of preferences of digital nomads for destinations or specific tourist units.

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Chapter 36
Quality Factors for Agritouristic Websites—Comparative Study of Measurement Methods



Karina Cicha and Paulina Rutecka

Abstract In this paper, the authors continued research previously conducted on six selected websites of Polish agritourism farms. The aim of the conducted analysis was to determine whether the expert analysis, based on literature and distinguished quality websites factors, is coherent with the users' analysis, based on the WebQual questionnaire. The conducted analysis involved an expert evaluation. The factors, which were taken under consideration during the analysis, were distinguished from literature and grouped accordingly with the WebQual questionnaire sections and focused on the aesthetics, functionality, and usability of each analyzed website. The main objective of the paper is to discover if there are any discrepancies between the two conducted assessments, as well as to answer the question about the quality of the websites of agritourism farms in Poland.

Keywords Websites · Agritourism · Quality factors · Website quality · Website analysis · Expert analysis · Usability

36.1 Introduction

Websites are currently used by many organizations as a communication and image strategy tool. At the same time, they can fulfill several functions: from informational to sales. In 2000, the number of websites was estimated at around 17 million, in 2005 at 65 million [1], and according to a report prepared by netcraft.com in January 2021, there were already over 1.83 billion active websites on the Internet. According to the CSO report, searching for information about goods and services is a very popular

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reason for using the Internet. About 62.7% of respondents in 2020 in Poland declared that they use the Internet for this purpose [2].

The hotel industry is such a market sector, where the customers who decide on purchase of services in general do not have the opportunity to check for the standard before actual visit in the chosen location. This means that while choosing the hotel, most customers rely on the information they have gathered from ex. the hotel's website or other tourists' opinions shared also online [3–6]. The hotels and other touristic facilities' presence on the Internet allows their owners not only to reach a wide group of customers, but to present their facilities and build a trustworthy image of offered services. According to numerous studies and reports, tourists willingly use search engines, such as Yahoo or Google, to find the information needed to decide what tourist facility they should choose [4]. The websites for the entrepreneurs are, in fact, a global communication and marketing tool websites [7, 8], as well as an online transaction facilitators [9].

For agritourism farms, one of the hotel industry 7-branches, having a website which meets customers' expectations, is particularly important. It needs not only to provide customers with detailed information of the services offered by the facility, but also needs to meet the quality factors for websites in general. To ensure customers with a positive association with the brand. What is also being pointed out in studies, a quality website can:

- help reduce marketing costs [8, 10]; instead of advertising the tourist facility in external touristic services online like Online Travel Agency (OTA), a well-designed home page containing broad information about the touristic object can be an advertisement itself,
- become a sales channel [5, 11]; as it already has been stated, the tourists, who decide to choose a certain hotel or other type of accommodation, decide based on the information they can possess through the web pages, because they do not have the possibility to verify it. The verification moment is by the check-in, so already after the purchase,
- contribute to high SERP rankings; by the proper content, using the SEO techniques, the web page can be easy-to-find,
- have a positive impact on the facility's image; perceiving the touristic facility by its customers as professional and up-to-date may evoke a favorable attitude toward its products and services [12].

The online presence of the agritourism farms in Poland is particularly interesting. On the one hand, as a country, Poland is among those EU countries with the largest number of small area farms, where agricultural production is insufficient, which requires from the farmers conducting activities, such as agritourism, to increase the income [8, 13, 14] and diverse its source. By agrotourism one can understand the touristic activity, narrower in definition than the rural tourism [15, 16]. Rural tourism refers to touristic activity taken in the countryside, while agrotourism, as a touristic activity, needs to be conducted on a working farm [17–19]. Those enterprises are often small, which are run by family and seasonal ones [20]; therefore, the owners of agritourism farms need to look for savings, including for marketing purposes. One of

the results of cutting down on marketing activities is the low quality of the facilities' websites, which was confirmed by the research conducted by Król which analyzed the visibility of agritourism websites in Visegrad Group countries, showing that agritourism enterprises in these countries often do not have websites or their quality is insufficient [21]. Since the web pages are relatively cheap promotional solutions [22] allowing a company to offer their products on a large scale [23], it is important for agritourism farms to familiarize the customers with the services they offer and to bring them to the countryside by using websites to feed this purpose. That is why it is crucial to develop effective methods that can help companies evaluate the performance of their websites [8].

In previously conducted research, the authors of this paper determined the quality factors for agritourism websites [24] by engaging users in online questionnaires using the WebQual form. At this point, the study conducted for this paper focuses on an expert analysis of the same, previously selected websites, to compare the results with the assessment of the websites' users based on the WebQual survey. Lack of discrepancies in both assessments can indicate a simpler to conduct website analysis method.

The following research questions are proposed for this article:

RQ1: Are there any discrepancies between users WebQual and expert's analysis of selected agritourism websites in Poland?
RQ2: Are there any quality factors of analyzed websites which stand out in the expert's analysis in comparison to the users' analysis?
RQ3: To what extent the quality factors are implemented in analyzed agrotouristic websites?

The paper is organized as follows. Section 36.2 contains a review of the relevant literature on website quality factors. Section 36.3 includes the methodology for data retrieval, while Sect. 36.4 presents the data and the results of an expert analysis in comparison to the previously established results. In Sect. 36.5, the authors highlight the contribution of the research, as well as discuss its limitations and draw conclusions about the results and propose possible future research avenues.

36.2 Literature Review

A well-designed and usable web page is an online business card for the company. However, trends in web design are constantly changing. On the one hand, it is related to the changing sense of aesthetics among customers, designers, and owners of the web pages. On the other hand, constant development of the technology allows to implement new and newer solutions, which directly affect the functionality of the websites.

Having a functioning and up-to-date website for the touristic industry is crucial as an element of client–company communication strategy and a tool to reach a wider market [7]. As a promotional tool, touristic websites have been analyzed many times

by the researchers, who indicated that their structure, content, general design as well as functionality are the key factors on which designers should focus on in user-centered design framework [25–28].

What is also being pointed out by the researchers, a competitiveness among touristic websites is equally important [29]. Since the tourists cannot compare actual touristic objects before deciding on purchasing their services, many times they also take into consideration the appearance of the website as a decision-supporting factor and an element evoking their trust toward the company.

There have been, however, studies conducted, which show what websites features meet customers' requirements toward them. It can be stated that aesthetic, safe, user-friendly websites with a simple interface, as well as mobile usability (RWD) are the factors attracting more customers [9, 30–32] or at least ensure them a positive experience from using the website.

Although every year current trends in web design are published online in form of guidelines for web designers, the researchers analyzing websites try to point out clear assessment methods that would suit the type of website, as well as all the goals they should fulfill and at the same time they still be attractive to use for visiting users [33]. The quality assessment conducted throughout the website should provide an answer whether the system actually meets the customers' needs [34]. However, at this point, there is still no single measure of website quality. It is also observable that customers' preferences differ for the same functionalities and page factors depending on the type of site [35] and the industry in which the company operates, that arrows the need for distinguishing general quality factors of the websites, present on various pages apart from the market sector represented by the companies.

The most frequently mentioned elements affecting the quality of the website are: visual aspect/aesthetics, information quality/credibility, functionality, accessibility, reliability, and usability. These elements are used to determine whether a website meets the quality standards. They are also important elements in the process of creating a website, to which website designers pay special attention.

The **visual aspect** concerns the perception of the website. Of course, the perception of whether something is nice or ugly is subjective, but research has shown that there is often agreement among observers of objects as to what constitutes an aesthetic object [36]. According to Norman's [37] theory of emotional evaluation of artifacts, on the first level, the brain makes a quick assessment of whether something is good or bad. In the context of website quality assessment, it assesses graphics, cleanliness, and beauty [37, 38]. There are also studies suggesting a relationship between the appearance of the website and the positive attitude of visitors toward it [36, 38, 39]. What is also important, the quality of the web page influences the visitors' perception of the offered product and services and, as a consequence, the decision of purchase, since they cannot get acquainted with them differently [40].

The **quality of the information** translates into the credibility of the website, which is one of the critical factors determining the intention to use the website [38]. The credibility of the website, apart from the quality of the content, is evidenced by such factors as timeliness of the technologies used, attention to technical details of implementation [41], timeliness of the graphic design concerning market trends, the

possibility of identifying the entity responsible for the website, content regarding the protection of personal data, data encryption on the website. These influence customer's trust, defined as a relationship between the company and the consumer built on a trustworthy dialogue and impartial information [42], which concerns such factors as trust in e-sellers, trust in technology, and trust in transaction security [43].

Web functionality is related to various aspects of websites such as user-friendly interface, information presentation, classification, navigation, artistic design, and personalization [44–46]. Together with web content and information security, web functionality influences the perceived value of a product or service offered online [44].

Accessibility is the possibility of using a website by as many recipients as possible. It determines the extent to which the website can be perceived, understood, and viewed by users, regardless of their characteristics or disabilities, and regardless of the properties of the software and hardware, they use [47]. Accessibility assessment and accessibility standards are determined by the WCAG [48], recommended by the W3C consortium responsible for website standards since 1994.

Reliability of IT systems is defined as a measurable property of a system, used to control and manage the system, and indicate potential problems [49]. Reliability includes such elements as system performance [41] and system and information security that meets the three primary goals of computer security: confidentiality, integrity, and certainty [50].

Usability is the extent to which a system, product, or service can be used by specific users to achieve certain goals with effectiveness, efficiency, and satisfaction in a specific context of use [51]. It determines whether the use of the functionalities available on the website is convenient for the user [52] and whether the website itself is convenient, safe, efficient, and intuitive [39]. The assessment of usability is influenced by: page loading speed, ease of navigation, appearance [53], ease of reading [39], and information distribution [39, 52, 53], correlated with the completeness and up-to-date structure of the website [33].

The elements described above were the basis for the expert analysis of the Polish agritourism websites in designed and conducted research.

36.3 Research Method

The study was designed to be conducted in two parts. The first part, engaging the users group, had already been conducted in 2021 and the results of this part were presented during the ICMarkTech Conference at the end of that year [24] and then published. Preliminary identification of the research group of agritourism farms was carried out in June 2020. The initial group consisted of 1925 tourist facilities from Poland. Their addresses were in generally accessible databases of tourist facilities. Apart from open to public databases, the addresses were also obtained from tourist databases provided by Voivodeship Agricultural Advisory Centers and regional tourist organizations. All of the 1925 facilities were asked via e-mail to participate in the study. From this

group, 107 objects, which is 18%, agreed. The first step was to verify whether those agritourism farms have an active website. Seventy-six of them had an active website, which was the main criterion for entering the study.

The next step in the research was to verify the basic technical parameters of each website. In order to enter the next part of the research, it was obligatory for every website to meet criteria such as:

- usage of a content management system,
- website responsiveness,
- securing the domain with an SSL certificate,
- usage of the Google Analytics system.

Out of a total number of 76 agritourism farms possessing an active website which would meet the technical criteria stated above, only seven finally agreed to participate in the quality survey. The websites of these farms were then tested by users, which were the first part of the designed research. For the same seven agritourism farms, a quality analysis of their websites was conducted in this part of the study.

The first part of the study, engaging the users, based on the WebQual (eQual) version 4.0 [54] survey method, containing 23 questions [55] is divided into three dimensions of website quality: usability, information quality, and service interaction quality [54, 56]. The choice of WebQual survey for the first part of the study was related to the fact that it is one of the best-formalized models, which is characterized by high versatility, used successfully to evaluate various types of web pages, such as online stores, government websites, and the websites of education and higher education institutions [57]. What is also worth mentioning, the results of a survey using the WebQual form are analyzed by the WebQual index, which takes into account not only the user's assessment of the certain assessed criterion but also its importance [58].

In the second part of the study concerning the expert's analysis, the WebQual survey was not used. Instead, the expert, using a separate questionnaire, had analyzed the websites within seven quality factors. Those factors, previously obtained and distinguished based on the extensive literature review, focus on the same aspects as the WebQual form; however, the factors in the survey had been presented differently, according to the user experience components. In 2004, Peter Morville distinguished those features of the user experience, which need to be implemented into the structure of any web page in order to make it user-friendly and ensure its great performance [59]. So-called Morville's honeycomb includes: usefulness, usability, desirability, findability, credibility, accessibility, and visuality. Taking into consideration the requirements, the web page needs to meet to be seen as functional and user-friendly, the expert while conducting the analysis referred to those specific elements or quality factors.

In terms of the **aesthetics of the website,** the expert checked whether: a grid-based layout was used; the F-pattern design was used; sans serif and large enough fonts were used; the fonts are legible and reflect the nature of the website; void spaces are skillfully used; the colors create balance and overall harmony; the photos are

properly selected, harmonious in color, of high quality; own photos were used, no photo banks were used, and photos are not retouched.

In terms of the **information quality**, the expert checked whether: the website provides information on prices in an understandable form; the website contains information about the location, presented in an understandable form; there is a comprehensive visualization of the accommodation on the website; the website provides information on equipment and meals; the website provides information on the distance from important points [hospital, pharmacy, shop, bus stop, etc.]; the website provides information on precautionary measures to ensure the safety of COVID-19.

In terms of **credibility,** the expert checked whether: the website is built using up-to-date technologies; the website has an up-to-date layout in relation to trends; it is possible to identify the party responsible for the website design; the website contains content and consents regarding the protection of personal data; data sent to the website are encrypted; the number of errors and warnings on the website (according to W3C validator).

In terms of **functionality**, the expert checked whether: is there a photo gallery on the website; are there videos on the website; are there any references to the company's social media on the website; is there a virtual tour on the website? is it possible to book a stay online; is there a contact form; is there a price calculator; is there an availability calendar; does the website contain other functionalities.

In terms of **accessibility,** the expert conducted the measurement with the use of WAVE-WCAG 2.0 Validator in terms of WCAG 2.0 requirements. Using the above tool, the expert audited the websites accordingly to WCAG 2.0 guidelines, but only those that could have been automatically checked by analyzing the websites' code, such as the number of critical errors; contrast errors; the number of alerts; the number of alt attributes available; the number of page structure elements (headers); the number of Accessible Rich Internet Applications available.

In terms of **reliability,** the expert checked whether the website is responsive; the system is secured (using Mozilla Observatory); the system is not infected with malware (using Sucuri SiteCheck).

In terms of **usability,** the expert checked whether: the website allows the transaction to be finalized; the site is intuitive; the site is easy to navigate; the site is easy to read; the site has a sitemap; the number of broken links (using BrokenLinksCheck); the site downloads fast enough for both mobile and desktop devices (using Google Page Speed).

For the expert evaluation in the questionnaire, both scale-based questions and yes/no questions were used. The analysis was conducted remotely using Google Forms to submit answers. The form had been divided into seven sections—each section concerned the website of one of the surveyed agritourism farms. The total number of questions in each section was 46. The chosen expert for the research was an IT engineer, with a master's degree, currently working as a web designer and academic teacher, living in Poland, with 10 years of work experience in fields of marketing, e-commerce, and web design.

36.4 Data and Results

This section presents the data description and summary of the results from the data.

36.4.1 Data Description

The number of agritourism farms selected for expert analysis was 7. Those were the websites which:

- met the basic technical criteria specified in the first study,
- were assessed by users in the previous study using the WQ method.

In the study [24] presented during the ICMarkTech 2021 conference, the WebQual quality assessment method was used, consisting in the assessment of individual website features by users. The WebQual tool [54] includes 23 questions [55], originally grouped into three areas: usability, information quality, and service interaction quality. As seven areas were identified on the basis of the literature review: aesthetics, information quality, credibility, functionality, accessibility, reliability, and usability, the next step was to assign WebQual questions to these areas to compare the scores in both methods (Table 36.1).

Table 36.2 presents the responses of the respondents (the mean and standard deviation without the estimator bias for each site). The use of this nomenclature for the tested pages is consistent with their designations in the previous study. The questions were arranged according to the assignment to the expert analysis section. The average score for each website within the area was also calculated.

Table 36.3 presents the final results of the expert analysis. The designation of the examined sites [A1–A7] remained unchanged. The websites were analyzed in, previously determined, areas. The shown scores are the sum of the points scored by the website divided by the maximum points the website could score in the surveyed area.

Table 36.4 shows the normalized results of the areas based on users' ratings in the WebQual survey. For normalization, the average area score was divided by the maximum point value that the users could give to the site.

The users in the WebQual study gave the A2 and A7 pages the best scores, which is in line with the expert assessment, in which the A2 page received the highest score ex aequo with the A1 page. The A7 site came second. Users rated the A1 website a little worse; in their opinion, it took only fourth place. In the opinion of the experts, the A3 site was the worst, and this is in line with the opinion of users.

Table 36.1 Table captions should be placed above the tables

Expert's analysis	WebQual question
Aesthetics	Sense of personalization [SI19] Attractive appearance [UQ05] Appropriate to the type of site [UQ06] Overall view of the Web site [SI23]
Information quality	Information at the right level of detail [IQ14] Provides believable information [IQ10] Provides timely information [IQ11] Provides relevant information [IQ12]
Credibility	Conveys a sense of competency [UQ07] Provides accurate information [UQ09] Confident that goods/services will be delivered as promised [SI22] Good reputation [SI16]
Functionality	Communicate with the organization [SI21] Sense of community [SI20] Positive experience [UQ08]
Accessibility	Interaction with the site is clear and understandable [UQ02] Easy to understand information [IQ13] Information in the appropriate format [IQ15]
Reliability	The information feels secure [SI18] Safe to complete transactions [SI17]
Usability	The site is easy to navigate [UQ03] The site is easy to use [UQ04] Easy to learn to operate [UQ01]

Table 36.5 presents the differences in user and expert assessments. A negative difference shows that the users' rating was higher than the expert's rating.

The biggest differences between users' assessments and the expert's assessment concerned the area of reliability and functionality. In both cases, users rated these areas better than the expert in the analysis, although this trend is visible throughout the whole analysis, where the users rated the pages better than the expert.

Table 36.6 presents a comparison of the average results for the areas, arranged in order from the highest to the lowest rated by users. The area rated the highest by users is reliability, which in the expert's opinion is rather low. However, the expert assessed the aesthetics highly, which, in the opinion of users, had the penultimate position (however, the difference in the result was insignificant and amounted to only 0.5). The worst-rated area is functionality, and the users and the expert agree on this point.

Table 36.2 Means and standard deviations for WebQual results, assigned to seven sections for expert analysis

Web	A1		A2		A3		A4		A5		A6		A7	
Quest	Mean	St. dev	Mean	St. dev	Mean	St. dev	Mean	St. dev	Mean	St. dev	Mean	St. dev	Mean	St. dev
Aesthetics														
UQ05	5.67	1,97	5.83	1.17	3.17	1.33	4.17	1.17	3.67	1.75	5.67	1.37	6	1.1
UQ06	6	1.26	6.17	0.75	3.33	1.75	4.17	0.75	4	2.19	5.67	1.21	6	0.89
SI19	5.5	1.05	5.67	0.52	4.67	1.51	4.5	0.55	4.33	1.86	5.67	1.03	5.83	0.98
SI23	5.33	1.21	5.67	0.52	3.83	0.98	4.17	0.98	4.5	1.87	5.33	0.82	5.83	1.17
Information quality														
IQ10	6.17	0.75	6.5	0.55	4.83	1.72	5.17	0.75	5.17	0.75	6	0.89	6.5	0.55
IQ11	4.67	1.51	6.17	0.75	5	1.26	4.83	0.75	5.67	1.03	6	1.26	6	0.63
IQ12	5.5	1.22	6	0.63	4.5	1.76	4.83	0.75	4.67	1.37	5.5	1.22	5.5	1.05
IQ14	5.17	1.33	5.83	0.75	4.5	1.38	5.17	0.41	5	1.79	6	0.63	5.83	1.17
Credibility														
UQ07	6	1.26	6	1.55	2.83	2.14	4.33	1.03	4.33	1.51	5.83	1.17	6.17	0.98
UQ09	5.67	1.21	6.33	0.52	4.5	1.38	4.67	0.82	4.17	1.72	6.33	0.82	5.67	0.82
SI22	5.5	1.38	6.67	0.52	4.83	1.17	4.67	1.37	5	1.26	5.67	0.52	6.17	0.75
SI16	5.17	1.17	5.5	0.55	4.33	1.03	4.83	0.75	4.33	0.82	5.67	0.82	6	1.26
Functionality														
UQ08	5.33	1.21	5.67	0.82	3.67	1.03	3.67	0.82	4.17	1.83	5.5	1.05	5.67	1.51
SI20	3.5	1.52	4.17	1.72	3.5	1.87	3.83	1.47	3.83	1.72	4.33	1.86	4.17	1.72
SI21	5.67	0.82	6.5	0.55	4.17	1.33	5.33	1.03	5	1.41	5.67	1.03	5.83	0.75

(continued)

Table 36.2 (continued)

Web	A1		A2		A3		A4		A5		A6		A7	
Quest	Mean	St. dev	Mean	St. dev	Mean	St. dev	Mean	St. dev	Mean	St. dev	Mean	St. dev	Mean	St. dev
Accessibility														
UQ02	6	0.63	6.5	0.84	4.83	1.47	5.17	0.41	4.33	1.21	5.5	1.05	5.83	0.98
IQ13	5.67	1.03	6.17	0.41	5.17	1.72	5.33	0.52	4.33	1.37	5.67	1.03	6.17	0.75
IQ15	5.67	1.03	6.5	0.55	4.33	0.82	5.17	0.75	4.33	2.25	5.33	0.82	6.17	0.98
Reliability														
SI17	6.17	1.17	6.17	1.17	5	0.89	5	1.1	5	1.67	5.5	1.05	5.67	1.21
SI18	6.33	0.82	6.17	0.75	4.67	1.03	5	0.63	4.67	1.21	5.67	0.82	6	0.89
Usability														
UQ01	6	0.89	6.5	0.55	4.83	1.17	5.17	0.75	4.83	1.33	5.83	0.75	6	0.89
UQ03	5.67	1.21	6.33	1.03	4.67	1.21	4.67	0.82	4.33	1.37	6	0.89	6	1.1
UQ04	6	0.89	6.33	0.82	4.5	0.84	4.33	0.82	4.67	1.51	6.17	0.98	5.67	1.21

Table 36.3 Expert's analysis results

	A1	A2	A3	A4	A5	A6	A7
Design aesthetics	0.83	0.93	0.55	0.63	0.78	0.80	1.00
Information quality	0.70	0.87	0.60	0.63	0.67	0.67	0.73
Credibility	0.89	0.72	0.61	0.56	0.67	0.78	0.89
Functionality	0.45	0.55	0.27	0.45	0.64	0.55	0.36
Accessibility	0.83	0.80	0.70	0.47	0.80	0.43	0.80
Reliability	0.60	0.53	0.47	0.33	0.53	0.47	0.53
Usability	0.81	0.75	0.53	0.61	0.50	0.69	0.72
Total mean	0.73	0.73	0.53	0.53	0.65	0.63	0.72

Table 36.4 Summary of WebQual divided into areas

	A1	A2	A3	A4	A5	A6	A7
Design aesthetics	0.80	0.83	0.54	0.61	0.59	0.80	0.85
Information quality	0.77	0.88	0.67	0.71	0.73	0.84	0.85
Credibility	0.80	0.88	0.59	0.66	0.64	0.84	0.86
Functionality	0.69	0.78	0.54	0.61	0.62	0.74	0.75
Accessibility	0.83	0.91	0.68	0.75	0.62	0.79	0.87
Reliability	0.89	0.88	0.69	0.71	0.69	0.80	0.83
Usability	0.84	0.91	0.67	0.67	0.66	0.86	0.84
Total mean	0.80	0.87	0.63	0.68	0.65	0.81	0.83

Table 36.5 Differences between the results of WebQual analysis and the expert analysis for assessed pages

	A1	A2	A3	A4	A5	A6	A7
Design aesthetics	0.03	0.1	0.01	0.02	0.19	0	0.15
Information quality	−0.07	−0.01	−0.07	−0.08	−0.06	−0.17	−0.12
Credibility	0.09	−0.16	0.02	−0.1	0.03	−0.06	0.03
Functionality	−0.24	−0.23	−0.27	−0.16	0.02	−0.19	−0.39
Accessibility	0	−0.11	0.02	−0.28	0.18	−0.36	−0.07
Reliability	−0.29	−0.35	−0.22	−0.38	−0.16	−0.33	−0.3
Usability	−0.03	−0.16	−0.14	−0.06	−0.16	−0.17	−0.12
Total mean	−0.07	−0.14	−0.1	−0.15	0	−0.18	−0.11

	Expert analysis			WebQual		
	Equality of variance	F	Significance	t	df	Two-sided significance
Aesthetics	Was assumed	0.002	0.967	0.922	12	0.374
	Was not assumed			0.922	11.620	0.375
Information quality	Was assumed	0.058	0.814	−1.85	12	0.089
	Was not assumed			−1.85	−1.85	−1.85
Credibility	Was assumed	0.001	0.977	−0.322	12	0.753
	Was not assumed			−0.322	11.919	0.753
Functionality	Was assumed	0.601	0.453	−3.59	12	0.004
	Was not assumed			−3.59	10.757	0.004
Accessibility	Was assumed	2.240	0.160	−1.18	12	0.260
	Was not assumed			−1.18	9.926	0.265
Reliability	Was assumed	0.361	0.559	−6.29	12	< 0.001
	Was not assumed			−6.29	11.988	< 0.001
Usability	Was assumed	0.000	1.000	−2.01	12	0.067
	Was not assumed			−2.01	11.935	0.067

Statistical tests were also performed on two datasets. In order to verify the normality of the distribution, the Shapiro–Wilk test was carried out for the areas on certain websites (Table 36.7).

The Shapiro–Wilk test showed that for both the expert assessment and the results from WebQual, the data distribution was close to normal and the null hypothesis of non-normal distribution was rejected. Since the set meets the assumptions about

Table 36.6 Differences between the results of WebQual analysis and expert analysis for areas

	Expert analysis	WebQual	Differences
Reliability	3.46	5.49	−2.03
Accessibility	4.83	5.45	−0.62
Usability	4.61	5.45	−0.84
Information quality	4.87	5.45	−0.58
Credibility	5.12	5.27	−0.15
Design aesthetics	5.52	5.02	0.5
Functionality	3.27	4.73	−1.46

Table 36.7 Results of the Shapiro–Wilk test

	Expert analysis			WebQual		
	Statistics	df	Significance	Statistics	df	Significance
Aesthetics	0.963	7	0.842	0.831	7	0.081
Information quality	0.887	7	0.258	0.936	7	0.602
Credibility	0.930	7	0.550	0.872	7	0.192
Functionality	0.966	7	0.870	0.937	7	0.613
Accessibility	0.768	7	0.019	0.972	7	0.912
Reliability	0.880	7	0.225	0.863	7	0.160
Usability	0.947	7	0.700	0.815	7	0.058

the equality of groups and the normality of the distribution of variables, the next Student's t-test was carried out for two independent groups, testing the truth of the null hypothesis H0: The average result obtained as part of the expert analysis is the same as the average result obtained in the WebQual study.

Since in each case the p-value of Levene's test is higher than the alpha significance level of 0.05, the group variances were considered to be equal. When analyzing the significance of the Sftudent's t-test, it was found that the statistical significance of p-value meets the $p < 0.05$ condition only in two cases: for reliability and functionality, which indicates that answers within these two groups are different from each other.

36.4.2 Results

The results of the expert analysis mostly coincide with the results of the respondents' questionnaires. The highest result in the survey with respondents achieved in order websites A2, A7, and A6, and in the expert analysis websites A2, A7, and A1. The websites with the highest scores in both surveys (A2 and A7) were characterized by a transparent grid layout, and the information was distributed in accordance with the F-pattern design principle. The fonts were legible, compliant with design standards, and thanks to the use of empty spaces, the websites seem readable, easy to navigate, and professionally made. These sites also scored high on credibility in an expert study. In the area of reliability, responsible for the security aspect, these websites achieved average results, although they were well rated in this respect by users, which may suggest that the sense of security experienced by users on the website is not significantly correlated with the actual security. The websites that received the highest marks in the expert analysis also had the highest results in the area of information quality. The weights assigned by users in WebQual [55] show that providing accurate, believable, and timely information is equally important for the users as well as for the expert. The results in the areas of functionality and reliability are the most discrepant and the users assessed these aspects better than the expert.

However, they agree that the functionality area was overall the weakest feature of the pages. The largest discrepancy, both in terms of the difference in assessment of individual parties and the overall level, concerns the area of reliability. Users feel safer on the site than an expert thinks they should. This may be due to the fact that neither of these pages was able to finalize the purchase, or they do not know what elements they should pay special attention to in terms of security.

36.5 Conclusion and Discussion

In this article, the authors presented a comparison of two methods of testing the quality of websites. The popular method of analysis with the participation of users, which is WebQual, was used for the comparison. The disadvantage of this solution is time-consumption and the need to involve more people. It would also be best if the group selected for the study corresponded to the actual target group of the company's customers. As a result of the literature review, a survey tool for expert analysis was developed and it was verified whether there are differences between the results of these approaches to the analysis of the quality of agritourism websites.

The findings of our study indicate that the quality of websites consists of seven main areas, which are: reliability, accessibility, usability, information quality, credibility, design aesthetics, and functionality. Thanks to the analysis of the literature, it was possible to identify specific measures and tools to test the quality of websites.

The data analysis shows that the built tool is likely to identify pages that will also be positively assessed by users, as well as to indicate their strengths and weaknesses. On the other hand, the detected discrepancies in the areas of functionality and reliability require additional research to determine what they resulted from.

The limitation of our research was the fact that we analyzed only seven websites and only six users took part in the WebQual study. The limitation is also testing this tool for only one type of website.

Future research will be carried out to test whether this tool is suitable for analyzing the websites of other tourism enterprises and using a larger research group to verify assumptions. Further research should also concern factors influencing the sense of security of website users.

This study, apart from the theoretical contribution, which is the identification of potential indicators that could be used to study the quality of websites of tourist enterprises offering accommodation, also has implications for practice. The use of a developed tool can be faster and cheaper to test the quality of a website than user research such as WebQual.

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Chapter 37
The Importance of Technology and Digital Media to Promote Tourism Destinations: A Conceptual Review



Sónia Nogueira and Joana Carvalho

Abstract This article discusses the processes of the increasing use of technology and digital media to promote tourism destinations. This paper aims to present the increasing use of technology and digital media to promote tourism destinations. Not only as a theoretical concept but also as an opportunity for small or medium-sized businesses that operate in the tourism sector. It presents the current trends in digital tourism, focusing on digital media and how technology is shaping, influencing, and informing travel decisions impacting tourists' behavior. Our critical overview suggests that we are dealing with a phenomenon rooted in the new opportunities given by the digital expansion with relevant effects for the tourism destinations promotion. However, contributions on this topic within the existing literature remain scarce. Accordingly, we discuss the main studies on this issue and its results to conclude about the current importance of digital media for tourism destination promotion and future research agenda.

Keywords Destinations · Digital media · Technology · Tourism

37.1 Introduction

The idea of leisure tourism and the availability of people to travel, forced the development of tourist destinations, promotion and cultural appreciation, which was motivated by the search for new experiences. Nuenen and Scarles [1] reflect on the importance of the influence of the interactive digital platforms and solutions within tourism practices and behavior such as the emergence of gamification, virtual reality, and augmented reality.

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According to Torres [2], digital marketing techniques are based on defining goals to be achieved, how to get there and finally taking action with active marketing strategies, emphasizing the importance of ensuring their execution and effectiveness. The Internet is essential due to its easy and agile use, dissemination of brands and selling products. Customer' relationships become more intense as the consumer can compare, create, and share content about the company [3]. Digital globalization is a way in which economic transformation processes change the way people consume, invest, trade, and manage businesses and companies in a more digital way [4]. This pandemic will 'force' digital changes, not only at the business level but also at the consumer level [5]. Consumers are expected to focus more and more on online sales, and companies will have to invest a little more in online promotion and sales resources to become more efficient in the new market demands [5]. Many businesses have managed to make the transition from operations to online, and these will be the most 'benefits', as most businesses that were unable to adapt or make the transition to digital lost contact with most of their customers. And consumers and are unlikely to survive this pandemic [5]. Although many managers believe that they will recover with sales after this most difficult phase, everything depends on companies adapting to this pandemic and on consumers' adherence to the new business models [5]. Digital platforms change the way of doing business, as they create more efficient and transparent markets and make it possible to reach consumers on a global scale. They also reduce the costs of international interactions and transactions [4]. Online shopping, previously still very limited to photos, images, and compact product information, is now open to the latest and most innovative technologies, to help as much as possible in the decision process of consumers when making a purchase [5]. These innovative practices start being used in tourism, in which through the use of images with 360° technology, augmented reality (AR) and virtual reality (VR) travelers can personalize the experience in online booking of a hotel (for example). Managers will have to adapt to digital transformations in the market and, thus, be able to recover from this crisis, or even grow in the market [5].

The aim of this article is to get a better understanding of the existent literature on tourism destination promotion using technology and digital media, following Tranfield et al. [6], a systematic review was performed across b-on database, covering tourism destination, promotion, digital media and technology. The search covered a four-year period (2019–2022). An initial search was conducted using the terms: 'tourism destination' and 'digital media' that should be present in the abstract (or resume). Some exclusions were considered by eliminating all non-peer reviewed publications; non-English language articles; untraceable articles; and duplicate versions. Following this proceeding 48 final articles were identified. Next, main themes were checked, and articles were allocated to themes based on their titles, abstracts, and main text. The themes identified are social media (SM), tourism destination (TD), and digital promotion (DP). Thus, this article contributes to a better understanding of the state of the art in the application of technology and digital media to promote tourism destinations.

37.2 Findings and Discussion

The analysis conducted identified 48 articles (see Table 37.1). Digitalization, as a process, uses technology for increasing social and economic connectivity and applied to tourism is boosting innovation in this sector and new business models. The theoretical investigation is crucial to give information on the direction that should be adopted by managers operating in the tourism business or tourism destinations management. In our analysis (Table 37.1) we identified three main keywords: (i) Social media (SM) connected with the use of social networking and its technological potential to reach tourism consumers; (ii) Tourism destination (TD) includes several studies that consider the use of technology to the management and promotion of tourism destinations; and (iii) Digital promotion (DP) that integrates articles considering digital promotion using all the potential of technological platforms and digital marketing techniques. It is possible to conclude a prevalence of articles on tourism destinations (37) and digital promotion (33) which reflects the evolution and application of new digital technologies to the travel and tourism business, mainly connected to tourism destinations.

The application of technology and digital media has extended to the tourism industry, which has had a tremendous effect. Many tourism destinations have incorporated technology into their customer service to promote their tourism destinations. Technology and digital media have helped tourism destinations to withstand competition in the market and to remain competitive in their service delivery in terms of tourists satisfaction. The transition from analog to the digital era and the emerging technological advancements have been adopted and implemented by different sectors of the economy globally [1, 7]. These advancements and the digital have proved to be working and improving service delivery in these sectors, resulting in better performance and increased production. Following the transition's impact on these sectors, people in the tourism sector have not been left behind but adopted technology and digital media to promote their businesses and tourist destinations.

With the use of technology and digital media in its essential strategic operations, the tourism industry is evolving dramatically. It is fueled by the industry's competitive forces and the sector's increasing new ideas and activities [8]. As a result, the adoption of information technology is unavoidable to keep up with the competitive market and respond to changing disruptions. Tourist locations or destinations use innovative technologies and digital media to make it easier for guests to get to tourist sites. Tourist mobility and accessible infrastructure to tourist destinations are essential factors in planning tourism activities [9]. Self-organized vacations will increasingly outnumber travel agency tours. As technology progresses, travelers' curiosity and desire to explore something new grows. Adopting and implementing technology and digital media is essential in promoting tourist destinations.

The importance of technology and digital media has grown dramatically due to the development of web 2.0 technological advancement [10]. Digital media has increased in relevance as a source of communication and information. The majority of the business entities, especially those in the tourism sector, have experienced many

Table 37.1 Article on b-on database (2019–2022)

Journal	Nr.	SM	TD	DP
African journal of hospitality, tourism, and leisure	1	1	1	1
Annals of leisure research	1		1	
Annals of tourism research	1	1	1	1
Conference papers and books	9	3	5	3
Current issues in tourism	2		2	2
Enlightening tourism	1	1	1	1
International journal	1			1
International journal of business and society	1	1		1
Internet journal of environmental research public health	2	1	2	2
International journal of religious tourism and pilgrimage	3		3	2
Journal of architecture, art, and humanistic science	1		1	1
Journal of destination marketing and management	1	1	1	
Journal of Eastern European and Central Asian research	1		1	1
Journal of quality assurance in hospitality and tourism	1		1	1
Journal of sustainable tourism	1		1	1
Journal of travel research	1	1		1
Journal IPTA	1		1	1
Journal pariwisata terapan	1		1	1
Journal siasat bisnis	2		1	1
Management dynamics in the knowledge economy	1	1	1	1
Revista de tourism—studii si cercetari in turism	1	1	1	1
Revista internacional de relaciones públicas	1		1	
Society	1		1	1
Sustainability	7	4	4	5
Tourism management	2		1	
Tourism and hospitality research	1		1	
Tourism geographies	1		1	1
Worldwide hospitality and tourism themes	1		1	1
Total	**48**	**17**	**37**	**33**

SM—Social Media; **TD**—Tourism Destination; **DP**—Digital Promotion; **Nr**.—Number of Articles

changes in their advertising communication activities due to technology and social media [11]. The truth of the information shared on such platforms adds to digital media's authority. Tourists may gain from such information since it offers reliable data on destinations and tourism products. Since digital networking has evolved into one of the essential data sources, it has a significant impact on travelers' decisions about where to visit.

Additionally, tourists' behavior in tourism, especially tourist destination selection, has always been influenced by advancements in ICT, especially Web 2.0, which has primarily transformed how visitors plan and select their locations. Customer behaviors do not persist for lengthy periods, constantly altering as technology progresses. The advent of technology and the proliferation of social media have significantly impacted shifting customer preferences [12]. The impact of digital media on travel decision-making is expected to be enormous. In 2008, it was discovered that 82 percent of internet shoppers used online customer reviews, blog posts, and other online feedback to make travel-related purchasing decisions. The developments in technology and digital media, especially the introduction of Web 2.0 in this present era, led to digital media's evolution, resulting in it being highly crucial to promote a tourist location [13]. In addition, social media has gained relevance as a primary source of research findings in various areas, including clients' decision-making mechanisms, e-word of expression, and tourist destination suggestions. The World Tourism Organization (WTO) understands the importance of digital media and technology in the tourism sector. Travelers and entrepreneurs use their phones or digital tablets to leave comments on locations to explore destinations they are currently visiting. According to the WTO, 40% of international tourists use cell phones to plan their trips and choose vacation spots. They use their phones to access the Web; 40% use it for tourist information and destination decision-making, 26% for tourism, 34% for hotel bookings, and other traveling-related activities. Most international tourists use social media for trips, opinions, and reviews on Facebook or Instagram [13]. Along with its rapid expansion, digital media may be crucial means of promotion for all sizes of businesses. As a result of the tourism sector's optimal value on location reputation, client satisfaction, data sharing, and positive word marketing, it is well-located to benefit from several digital media sites.

The impact and relevance of technology and digital media in the tourism sector have attracted many researchers' attention. As a result, they have ventured into different research studies to establish the importance of technological advancements and digital media in promoting tourist destinations [14]. Their research works have been based on the influence of social media networking in line with the growing technology has had on tourists' choices and decisions regarding where to go for a vacation. The first research on this subject was conducted as a significant review of the literature regarding the growing use of technology and digital media to promote the tourism sector [15]. The research employed a systematic method in article retrieval, in which reputable sites were established ahead of article selection. ISI Science Web, Google Scholar, and Scopus databases were used as sources of the article. The searching was conducted using the topics 'Social networks', 'Web 2.0', 'Social media sites', 'tourism', and 'travel' to search articles that discussed the study's goal of establishing a detailed summary of results and analysis on social and digital media within the hospitality and tourism literary works. Following the review, researchers revealed that digital media and technology anticipated operational benefits were a domineering factor and motivator in influencing people to use social media whenever they needed to choose a tourist destination. It was clear that tourists always use technological advancements and social media platforms to decide on the destination

to visit. The social media platforms helped them access various details concerning different tourist destinations. Based on the online information, they could choose the right destination that favored their interests. In addition, it emerged from the study that digital media had become a popular source of information, altering the reproach of media usage following its availability and easy-to-use practicality [15]. People are more concerned about the openness and effectiveness of digital media when choosing a tourist destination. Following the responses they received through the media, they could make concrete choices on which tourist destination to visit. The researchers stated clearly that the tourists and clients would use the information they received from the media to decide which potential destinations they wished to spend their vacation.

In establishing the importance of technology and digital media in promoting tourist destinations, another research study was conducted on digital media and technology in an innovative tourist destination. The case study was Porto in Portugal. The researchers stated that ICT and its advancement could aid the tourism sector in the study. First, technology and digital media can promote tourism locations and popularize and advertise tourism facilities [16]. Tourist operations can also be monitored using technology, which can assist travelers also during their visits to specific sites. The primary purpose of providing tourists with a distinct destination is to ensure memorable visits. With that aim, the destination must be re-imagined, making it more attractive and thrilling. A visitor does not choose a place exclusively based on its landmarks, idyllic nature, culture, or food.

There are several additional critical considerations. For instance, current tourists expect to be startled by the location's uniqueness. They also want up-to-date data on what to do, where to get off, and how to get there using technology and digital media. Travelers also want to discover if a site has Wi-Fi and Internet connectivity and whether cellphones and other forms of communication are commonly used. As a result, a tourist destination ought to have certain qualities, such as being encircled by contemporary and efficient telecommunication services, having components of enthusiasm and freshness that pique tourists' interest [16], is stuffed with visitors' preferred and expected observations, and is easy to navigate. As a result, the visitor's location becomes a smart one. The research proved that some of the technological advancements and digital media established in Porto city make it a unique tourist destination choice for many tourists. The city is connected with free Wi-Fi and uses big and open data, among other technologies. The adoption of technology makes it easier for tourists to access any information and digital media and technology played a significant role in promoting Porto city as a tourist destination for many.

Furthermore, to learn more about technology and social media in promoting the tourism sector and tourist destinations, [17] conducted a research study was conducted on blockchain technology applications in tourism. The researchers stated that tourism is becoming a critical aspect of many countries' economies, boosting economic growth, jobs, and individual well-being. Adopting and implementing ICT and emerging technologies to support tourism sector operations has resulted in a networked generation of learned tourists. Surprisingly, the tourism industry has been impacted by innovation since introducing Internet services to promote all aspects

of the travel planning process, including pre-trip decisions and post-trip remembrance. Existing technology and digital networks have positively influenced the tourism industry and assured an integrated trip and destination experience [17]. Blockchain technologies and applications in the tourism sector have significantly promoted the sector, even tourist destinations. The researchers outlined that block technology empowers confidence and supports further decentralization through safe travel-related payments, unique loyalty schemes, identifiable tourism services and engagements, and credible online travel evaluations. With all these benefits incorporated into the tourism sector, tourists can choose which destination to go to, utilizing this technology. Block technological advancement and growth promote tourist destinations.

Another research study on technology and tourism was conducted in 2017. Xiang [18] aimed to focus on the implication of the transition to digital media in the tourism sector. Following the study speculations, the fundamental study question was summed up as the perception of the tourism sector on the Web and digital media. The investigators lauded and admired the new technologies and digital multimedia, which appeared to be a game-changer in tourist destinations. Some technology and digital media components have an infinite capacity for storing, displaying, and connecting data in various modes, available all the time and on a global scale [18]. These technologies and media include Email, Facebook, Instagram, WhatsApp, and Twitter. The researchers labored and tried to develop practical solutions for bridging the tourist service, whose products are intangible among tourist destinations and travelers. Before the digital era came, social media platforms and the Internet were non-existent, which meant that no information on a site could be accessible [18]. It was tough for tourists to decide which tourism site to visit since no information was accessible. However, with the new technological developments and social media networking, most information regarding thousands of tourist sites is accessible online. Knowledge of the latest technology is critical for thriving in the fast-growing worldwide tourism sector, especially in destination advertising and promotion. In 2020, Rahimizhian et al. [19] researched the influence of the emergence of 360-degrees videos on the tourism sector and tourist destinations. 360-degree films, famous for their circular presentations, allow users to view an actual occurrence from every angle. The employment of circumferential lenses to capture these videos provides viewers with more realistic and accessible viewpoints. Technology advancements propel the tourism sector to significant developments [19]. Destination promoters can provide their clients a virtual vacation before their real trip by using 360-degree films in their advertising campaigns. By integrating the Technology Acceptance Model (TAM) and motivation theory, a study approach was adapted to evaluate if 360-degree films effectively establish a more favorable perception and alter tourists' behavioral intentions on a tourist location and destination. An online poll collected information from 598 European respondents about Hong Kong as a tourist location. The findings demonstrated that guests' pleasure with a 360-degree perspective of the location is influenced by internal and external motivating factors, which indirectly impact their visit. The findings showed that internal and external motivating factors impact tourists' contentment with a 360-degree perception of the

location, which implicitly influences their trip and electronic word of mouth (eWOM) intentions via conduct engagement and 360-degree videos are an effective tool for attracting customers and influencing their thoughts and actions [19]. As technology gets more affordable and more easily accessible, the promotion will become more important and accessible. Individuals will be more interested in real-life tourism.

Additionally, a research study was done to assess the role of mobile technological developments in tourism development [20]. The researcher noted that the tour and travel business had seen a significant transformation through technological advancements over the last two decades. Mobile technological advancements offer tourists benefits in recognizing, compiling, and buying tourism items and helping the sector's internationalization by giving materials for designing, controlling, and disseminating beneficiaries worldwide [20]. These continuous developments in mobile technologies have made it outstandingly easy for anybody to learn more than they are willing in real-time. All world travelers currently have more mobility, alternatives, and liberty to discover destinations than the previous years because of the global usage of mobile gadgets, pads, and portable devices. In return, mobile technologies are a best match for the hospitality and tourism sector, which is undergoing a significant cultural change in tourists' behavior [20]. Tourist destinations all over the globe have to align with the extraordinary growth and impact of digital media and technology. Magno and Cassia [21] highlight the effect of digital media motivators on tourism and revealed that followers could make decisions, even on tourist destinations, in line with the influencers' suggestions. Digital media and online influencers are a new group of unbiased third-party assessors who use blogging, tweeting, and using other forms of social media to alter audience sentiments. They can expand the impact of the knowledge they receive and share with others because they are already acknowledged as suggestion-makers [21]. The growing relevance of digital media and online influencers have been recorded in domains other than tourists, such as culture and entertainment.

Technological developments and digital media have been proven to promote tourist choice of destinations. Alghizzawi et al. [22], developed some research on social media's obligation to impact some people in the tourism sector in Jordan. The study outlined the continual evolution of communication means that commercial organizations can now use (social media sites) to achieve their promotional goals. Furthermore, the emergence of several social media sites has transformed traditional marketing and tourist strategies [22]. Tourism agencies have benefited from social media by offering relevant data about trips, rates, and their services in a visually appealing and polished manner. In addition, these businesses regard customers as an essential aspect of promoting tourism, and they gain from them by offering relevant information about tourist destinations via social media. The essence of the tourism tours may improve due to the conversation between the tourists. At the early stage of increasing tourism business in Jordan, the digital media sites impacted information effectiveness, quality, and convenience of use. The findings corroborated other research, which found that expressive language in social media platforms impacted the tourist destination and attraction process.

Ly [23] identified essential characteristics of digital media use in the tourism industry and also analyzed travelers' views of digital media, determining crucial features and advantages considering the users' implications. The purpose of social media in a tourist destination and tourism sector in terms of creating value is to understand how the capabilities relate to tourists and how the rewards of using digital media for tourism impact or affect tourists' wealth creation when making vacations and traveling [24]. The most important and diverse social media tools for tourists are necessary and can be a possible and crucial long-term assistance due to their value, rarity, imitability, and non-substitutable nature [23]. If the tourism industry has a unique value creation model and focuses on customizing its operations, it can improve processing costs.

Furthermore, Kakirala and Singh [25] looked into how eWOM via social media promotes the creation of a destination picture by increasing loyalty and confidence among potential tourists and the results showed a positive and robust link between destination satisfaction and loyalty except for Internet reviews. According to primary and secondary effects, eWOM moderates the relationship between tourist destination satisfaction and participation and somewhat moderates the relationship between tourist destination trust and engagement. When it comes to online reviews, eWOM serves as a complete solution. The eWOM functions as a full intermediary between tourist destination trustworthiness and satisfaction in web reviews for prospective tourists using digital media [25]. According to the study, image elements fluctuate based on the interaction scale, the number of web reviews and the amount of eWOM developed. These factors impact the tourists' intention to return to or suggest a place.

37.3 Conclusion

The developments in digital, technology, and Internet-enabled devices have deeply influenced the tourism industry at an infrastructural and communicative level, particularly in tourism: we search for tourist providers, we book trips and activities online, and we talk to our friends and others about our experience, we look for tourism destinations pictures previously to the trip and we read comments and reviews.

Web 2.0 technology and digital media have remarkably affected humans due to technological advancements and Internet usage. They have gradually flourished in the human life domain over the past years. Digital media networks, including Youtube, Facebook posts, WhatsApp, LinkedIn posts, Tweets, blogs, Telegram, and Instagram, have become vital tools and worldwide platforms for marketing and promoting shows and events targeting tourism destinations [26]. A large proportion of active Facebook users write updates and share photos regularly, which helps the tourist and commercial sectors build relationships with their customers. Customers use digital media sites to research tours, make travel choices, and apply their experiences of specific festivals and events [27]. Technological developments and digital media have been proven to promote tourist choice of destinations.

In the context of tourism, technology and digital media has evolved and suffered a great shift in the past two decades: a democratization to digital access and the generalized use of digital media in tourism communications. As a result, many tourists have turned to digital media sites such as Twitter, Facebook, Instagram, and WhatsApp instead of newspapers or radios to access tourist destinations and travel details. Digital media promotes a decision on a specific destination and helps tourists prepare in advance before visiting the destination. Since mobile technology is continually expanding and stretching across numerous tourism industries, it has had a tremendous impact on promoting tourist destinations. Tourists can use their digital mobile devices to access information about various destinations and make the right choice of a destination.

The analysis conducted highlights that there is an ongoing process, of transforming and reshaping tourism through the use of technology and digital media. However, the existence of traditional micro and small businesses is often common and is still blocking this technological development in tourism business practices. Digitalization is bringing new opportunities for the tourism business allowing new ways of accessing new markets and development of a diversity of tourism products and services but still a scarce literature on this topic. Digital promotion starts being considered as new business model and process but it stills missing much more research and development to upgrade and integrate complete digital ecosystems in global tourism value chains. Digitalization brings significant benefits to tourism like more efficiency, entering new markets or internationalization. However, many small traditional tourism businesses are struggling to understand the opportunities and reap these benefits because there is a higher focus on digital marketing and e-commerce and not that much on the wide technological benefits of technology as awareness, increase connectivity, innovation, and global marketplaces.

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Chapter 38
Perspective of Conscious Tourism from the Point of View of Domestic Tourism in the City of Quito Ecuador

Eddy Castillo Montesdeoca, Giovanni Herrera Enríquez, Danny Zambrano Vera, and Marco Soasti Vega

Abstract Conscious tourism is a philosophy that evolves from sustainable tourism, incorporating the ethical dimension in which significant interest groups of the tourist experience participate, such as human beings, host communities, the business sector, and public institutions. Ecuador is a pioneer in promoting this philosophy based on equality and participation in tourist activity focused on the ideology of "give and take". In previous publications, conscious tourism was conceptualized and characterized from the perspective of experts, and case studies were carried out from the perspective of the receiving tourist. This research advances by incorporating the participation of internal tourists who choose a tourist destination in the City of Quito through a survey with a sample of 801 domestic tourists. The case study results identify the knowledge and perception of this philosophy within domestic tourism. Analyzes the relationship between satisfaction and loyalty of tourists based on variables such as motivation, image, quality, or involvement with conscious tourism, which will be very useful when designing and implementing policies that seek social profitability and sustainable economic development.

Keywords Conscious tourism · Image · Domestic tourism · Loyalty · Satisfaction

38.1 Introduction

Tourism generates income that contributes significantly to the economic development of a country and is a vehicle for regional development. Ecuador's tourism sector is projected to produce tangible results in the generation of wealth, employment, good living, and economic impact. An immature destination that assimilates from

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experiences made in other places and implements sustainable and environmentally friendly tourism typologies and products and the search for stakeholder participation [1]. In recent years, tourism has become one of the main economic activities and, in many cases, the only engine of economic development for many cities (Van der Borg, 1996). Tourism is oriented not only toward economic development but also toward the preservation of the cultural heritage of the regions. [2], (Yang & Wall, 2004).

The tourism sector represents "more and more weight in Ecuador's economy, which is mainly oriented to the primary sector. The development of the tourism sector is one of the objectives on which the need to diversify the country's economy is focused" [1], whose behavior is similar in the region (Vázquez et al., 2016). The impact of the pandemic on the tourism sector evidences a significant decrease in 2020, over the growing trend that had been observed in the period 2016 to 2019 [3].

At the XI Ibero-American Conference of Ministers of Tourism in Asuncion—Paraguay, the concept of "Conscious Tourism" was deployed for the first time in May 2011 (World Tourism Organization Network, 2011). Subsequently, at the II International Congress on Ethics and Tourism of the UNWTO, in September 2012, as well as at the International Tourism Fair, FITUR 2012 (Europa Press, 2012), relevance was given to the need for human beings to see travel as a transformative life experience, capable of inducing personal growth and enrichment, and transformed into a celebration of life and a pursuit of happiness (World Tourism Organization, 2013).

"Conscious Tourism" has been defined and characterized in previous works through the perspective of experts, where it is conceptualized: "It is the evolution of Sustainable Tourism; it is a philosophy that encompasses the dimensions of sustainability and ethics; that can be applied to all modalities of tourism". To achieve this, the dimensions of "Conscious Tourism" are given by sustainability (economic, social, environmental) and ethics. The stakeholders of the ethical dimension of "Conscious Tourism" focus on human beings, local host communities, business activities, and public institutions or agencies. Equality and active participation of stakeholders are relevant aspects of "Conscious Tourism", which generates an enriching experience of "Give and Take" [4].

Ecuador develops actions and initiatives related to sustainable tourism, which promotes "Conscious Tourism" with the consequent welfare of stakeholders. The purpose of this work is to: (a) determine the characterization of the conscious domestic tourist; (b) know and analyze the degree of agreement of domestic tourists with the definition of "Conscious Tourism" assumed by the experts; (c) identify the relationship and significant differences in the aspects of image, satisfaction, and loyalty of the conscious domestic tourist.

The case study focuses on the capital of Ecuador, Quito, known as the "Light of America", an ancient city with a Hispanic colonial legacy located in the Middle of the World, which has the most important and least altered historic center in the Americas. It is a city that has been voted by TripAdvisor users as one of the 25 best destinations in South America.

38.2 Theoretical Background and Area of Study

The initial purpose is to understand how domestic tourists visiting the City of Quito, categorized in levels of conscious tourists, are associated with the definition of "Conscious Tourism" that was previously developed by Castillo et al. (2016) through a methodological triangulation that includes the study of experts, as described in the introductory part. It is important to note that the stakeholders of the ethical dimension of "Conscious Tourism" are made up of tourists (human beings), host communities, companies, and public institutions or agencies (see Fig. 38.1).

This study aims to contribute to the proposal of the "Conscious Tourism" philosophy through a case study of the city of Quito from the perspective of domestic tourists visiting the destination. The research aims to determine if domestic tourists visiting Quito are interested in conscious tourism experience-oriented to this new philosophy of tourism.

From a market perspective, tourist satisfaction is essential to the success of destination marketing because it influences tourist behavior. This is because satisfied tourists are more willing to pay more, recommend the destination to other visitors, and are likely to return to the destination [5].

Motivation has been analyzed from socio-psychological and cultural aspects [6]. Motivation is achieved by strong relationships between attitude and behavior, from internal and external motivations of the individual, or derived from anomie and ego enhancement. The experience of tourism emanates from the desire for escape, relaxation, health, exercise (push) or tangible resources, beach, recreation, cultural

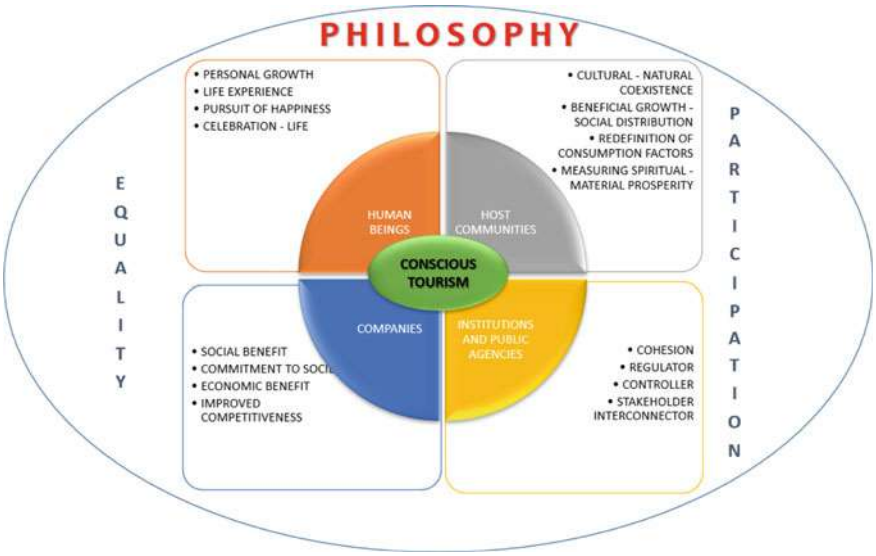


Fig. 38.1 Conceptualization of "conscious tourism"

attractions (pull); or escape from routine and stressful environments in search of recreational opportunities or the pleasure of travel.

The study of the philosophy of "Conscious Tourism" in previous works seeks to identify those existing relationships with the motivations, image, satisfaction, and loyalty of the destination; this study details the findings found from the perspective of domestic tourism in the tourist destination of the City of Quito.

"Conscious Tourism", is a philosophy that considers "good living" as a preponderant factor in the tourist experience, which is related to the tourist welfare that encompasses quality of life, and happiness, among other aspects. Well-being as a socio-psychological benefit that the visitor perceives from the provision of services in a fairer way that provides tourism welfare and economic benefit. Other authors analyze tourism motivation, personal values, well-being, and intention to revisit the destination; while others relate the happiness construct to the well-being approach; and others points out that tourism creates psychological benefits through the fulfillment of levels of needs and that improve the quality of life and well-being of the visitor.

Quality of life plays a preponderant role, and several authors have developed works integrating quality of life and travel motivations; quality of life and leisure travel satisfaction based on goal theory [7], the effect of tourism services on quality of life; the existing relationship with happiness, quality of life and tourism well-being [8–10].

Perceived quality is an evaluative process in which the tourist compares the expectation of the service with what he/she has received from the trip and is measured in terms of food, accommodation, tourist attractions, transportation, and the local environment [11]. Quality has a direct and moderating effectthat it influences behavioral intentions more than actual tourist satisfaction.

Visitor perception is guided by the ability to generate memorable tourism experiences, which conditions satisfaction and loyalty levels [12–16]. Satisfaction and service quality directly function as rebuttal and perception [17]. Satisfaction is positively conditioned by expectations, quality, and perceived value [18],, it influences switching attitude and purchase intention; it hurts tourist complaints and has a positive effect on tourist loyalty.

In this sense, attribute satisfaction has a positive impact on overall satisfaction; satisfaction is an antecedent of tourist loyalty [18], and is associated with image, attributes, expectations, consumer experience or perceived quality [11, 19]. Tourism experience satisfaction can be measured by the sense of enjoyment with destination attributes, by overall judgments and feelings regarding the site experience. Several authors define these two approaches to satisfaction as "attribute" or "transaction-specific" satisfaction and "general" satisfaction [20].

Some studies specify the determinants of satisfaction loyalty, perceived quality, motivation, or destination image [9, 21–23]. *Destination image* is defined as the evolution of an organic, informative, persuasive, and recall image of a particular destination; coupled with consumers' travel experience, destination satisfaction is the primary determinant of destination loyalty [24].

Loyalty is defined as the repurchase of a brand; it is considered to repeat visits and the frequency with which they occur; it is measured through the intention to return and/or recommend the destination to others [24], it is expressed by elements such as recommendation and repeat visits, it is mainly influenced by quality [25], it is key to the overall success of a destination [26], it reduces advertising and promotion costs, provides an effective indicator of tourist satisfaction and is a key factor in determining the viability of the destination.

Ethical aspects provide competitive advantages for companies and destinations. The perception of ethical considerations leads tourists to behave responsibly in the destination searching for more sustainable tourism [27, 28]. The ethical component relates to aspects such as personal growth and the pursuit of happiness, the perception of the ethical component of the destination contributes to shaping expectations and perceived quality. Ethical considerations will affect tourism products' quality and added value [10], perceived destination ethics influence destination image and tourist behavior [29].

The extensive existing and consulted scientific literature explains the relationship between the analyzed variables, such as motivations, aspects of conscious tourism (well-being, happiness), image, and perceived quality that positively influence satisfaction, tourist loyalty, and the ethical component. This work identifies these existing relationships in the case study of the City of Quito in the face of the new philosophy of "Conscious Tourism" from the internal tourist's point of view.

38.3 Methodology

In previous works, conscious tourism has been defined and characterized through a strategic triangulation with expert opinions in [4] and the case study from the perspective of the inbound tourist visiting the City of Quito [30]. This study contributes to developing this new philosophy of tourism from the perception of the tourists themselves, in this case, from the vision of the internal tourist who has stayed more than one night in Quito, which will reaffirm the concept of "Conscious Tourism".

From what is outlined in Fig. 38.1, the aspects to be analyzed are focused on: the relationship between the internal conscious tourist profile with the variables of image (brand, cultural, natural, entertainment, and destination), quality (food, accommodation, attractions, transportation, and local environment), satisfaction, and loyalty (recommending to family and friends, and revisiting the destination); the relationship between the internal conscious tourist profile with the level of agreement with the definition of "Conscious Tourism"; the relationship between the internal conscious tourist profile with the possibility of having a conscious tourism experience and staying longer at the destination.

The identification of study subjects are domestic tourists whose cities of origin are Guayaquil, Ambato, Santo Domingo, Manta, Portoviejo, and Cuenca, and whose chosen destination was the city of Quito—Ecuador, with a relevant tourist experience.

The survey data collection instrument was structured with closed questions, dichotomous, multiple-choice, and Likert scales. Through stratified random sampling, a sample of 801 valid surveys was obtained, composed of 263 surveys from Guayaquil, 132 surveys from Ambato, 115 surveys from Santo Domingo, 109 surveys from Manta, 98 surveys from Portoviejo, and 84 surveys from Cuenca.

A pilot study was conducted to ensure that the target population understood the issues to be studied. Subjects that meet the required profile were identified, and personal surveys were applied to identify the variables, improvements to the form, increases and/or eliminations of questions, corrections of language and form, and the operationality of the instrument. The pilot considered 30 domestic tourists, from which a final survey form was designed in Spanish for fieldwork in tourist areas such as the Historical Center, the "Zona Rosa", the Mitad del Mundo Tourist Zone, the Commercial and Banking Zone, and the Cumbayá and Los Chillos Valleys.

The data analysis is required by the research and fulfills its objectives. The previous process involved fieldwork follow-up, field verification of the survey forms, training and evaluation of the respondents, and finally, validation of the forms. The data were analyzed statistically, and tests of significant differences between the variables under study were performed (Table 38.1).

Regarding the objective of the characterization of the conscious domestic tourist, it is calculated based on the conscious tourist coefficient, which was justified in work done by [30], where issues related to the tourist's motivation to have a conscious tourist experience, stay longer in the destination, categorize themselves as a conscious individual, be interested in the ethics of the destination they visit and agree with the new philosophy are considered relevant.

Table 38.1 Conscientious domestic tourist coefficient: parameters and criteria

Conscious tourist coefficient	Profile	
Criteria	Highly conscientious	Not conscientious
Parámetros		
a. Willingness to have a conscious tourist experience	Yes	No
b. Degree of conscientious tourist	100 to 70	Less than 70
c. Willingness to stay longer for a conscientious tourist experience	5 strongly agree	4 agree
		3 indifferent
d. Importance in the tourism experience. Destination ethics		2 slightly agree
		1 do not agree at all
e. Agreement with the definition of conscious tourism		
Númer de turistas	39	762

38.4 Results and Analysis

38.4.1 Profile of the Domestic Tourists Surveyed

The domestic tourists surveyed belong to the cities of origin that mostly visit the city of Quito, such as Guayaquil, Ambato, Santo Domingo, Manta, Portoviejo, and Cuenca.

The profile of the domestic tourists surveyed has an average age of 36 years; 64% are men, married (41%) and single (34%); with a level of education of university—professional (55%) and secondary—high school (39%); their economic activity is mainly private employees (53%), free professional practice (20%) and civil servant (10%); with an income level of US$ 400—800 (46%), up to US$ 400 (26%), from US$ 801—1200 (20%) mainly.

Most domestic tourists travel accompanied (82%), with an average of 2.5 companions, mainly spouses and children (46%).

The average individual expenditure of domestic tourists is US$ 33.7; Santo Domingo is US$ 40.4; Cuenca is US$ 38.7; Guayaquil is US 37.6; Portoviejo is US$34.2; mainly.

Quito is the leading destination for 97% of the trip. The destinations visited by domestic tourists surveyed are mainly Mitad del Mundo (16.3%), Mall—shopping centers (13.0%), Parks (12.3%), Museums (11.7%), El Panecillo (11.1%), El Teleférico (10.7%), Churches (10.3%), among others.

The length of stay in Ecuador by domestic tourists from Manta is 5.2 days; Cuenca is 4.9 days; Santo Domingo and Portoviejo are 4.6 days; Ambato is 4.0 days, and Guayaquil is 3.3 days on average.

The level of importance of the aspects of tourism travel according to the tourists surveyed was rated on a Likert scale of 1 to 5, where one is not at all critical and five is very important. For domestic tourists, the essential aspects are cultural heritage (4.38); historical, artistic, and natural heritage (4.32); safety (4.24); image of the destination (4.16); climate (4.14); quality of services (4.13); gastronomy (4.08); hotel infrastructure (4.07), transportation (4.05), mainly. According to the city of origin of the visitor, it can be noted that visitors from Portoviejo value the cultural heritage (4.76), the historical-artistic heritage (4.71), the natural heritage (4.70), the quality of services (4.45), the climate (4.43); while those coming from Ambato rate the image of the destination (4.28) and the hotel infrastructure (4.20); those coming from Guayaquil rate gastronomy (4.25) and transportation (4.19) the highest; for those coming from Cuenca, safety (4.54). Other aspects that are valued, but to a lesser extent, are social equity (3.91), destination ethics (3.89), and political stability (3.64).

38.4.2 *Categorization of "Conscious Tourism" From the Perspective of the Domestic Tourist*

The definition of "Conscious Tourism" was rated by domestic tourists on a Likert scale of 1 to 5, where one is not at all in agreement and five is very much in agreement; their level of agreement with the following concept: "Ecuador is a pioneer in establishing a new philosophy of tourism, which seeks sustainable, responsible, inclusive, and ethical tourism. It is a philosophy that evolves, that is dynamic, that is active, that promotes equality and the participation of all, in addition to being an experience of giving and receiving" domestic tourists mostly agree with this definition.

Most domestic tourists surveyed are willing to have a conscious tourism experience. In the case of being able to carry out this "Conscious Tourism" experience, most of them agree to stay longer in the destination and spend more money on their stay.

Domestic tourists were asked about their tourism experience of the last visit to the City of Quito on a scale of 1 to 5, where 1 is not at all in agreement and 5 is very much in agreement. To the question "The tourist experience of your last visit to Quito has allowed you to…" respondents rated with averages above 3.5 in all aspects, as shown in (Tables 38.2 and 38.3). It is important to emphasize that a transformative life experience (3.98), the search for happiness (3.83), and personal growth (3.83) are the most highly valued.

Regarding the aspects of the host communities, the company, and the control agencies, the coexistence between the cultural and natural heritage was valued at 3.95; the coexistence between hosts and visitors at 3.88; they coincide in valuing

Table 38.2 Level of agreement—aspects of tourists (human beings) in the domestic tourism experience of the last visit to Quito

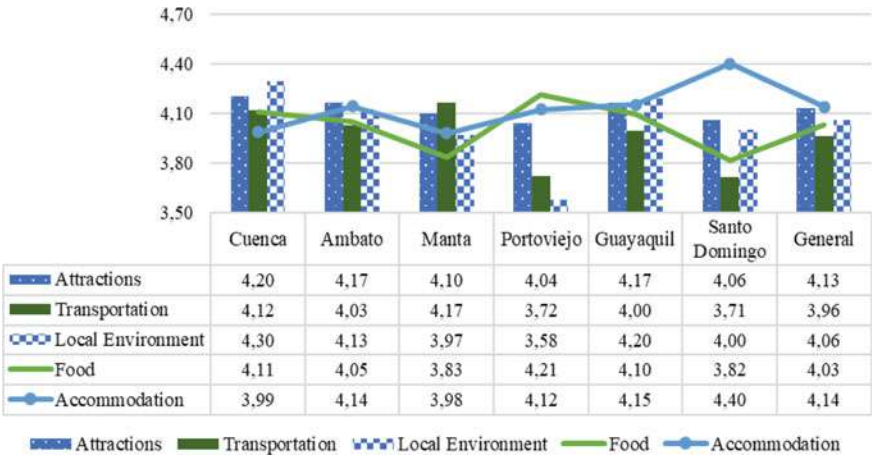
Issue	Average level of agreement						
	Cuenca	Ambato	Manta	Portoviejo	Guayaquil	Santo Domingo	General
Personal growth	3.85	3.73	3.61	4.17	3.75	3.86	3.83
A transformative life experience	3.75	4.05	3.88	4.09	3.83	4.28	3.98
Pursuit of happiness	4.06	3.78	3.64	4.01	3.73	3.87	3.85
A celebration of life	4.07	3.77	3.61	3.69	3.68	3.39	3.70
A living together as equals among the participants	3.86	3.83	3.49	3.72	3.76	3.5	3.69
Active participation	3.94	3.91	3.6	3.64	3.92	3.81	3.80

Table 38.3 Contrast profile of the conscious domestic tourist versus image, quality, satisfaction, and loyalty

Test of independent samples							
Variables		Variances	Levene's test for quality of variances		t-test for equality of means		
			F	Sig	t	gl	Sig. (bilateral)
Image	Quito Destination Branding	Equal	4.454	0.035	0.176	799	0.861
		Not equal			0.208	43.826	0.837
	Quito's cultural image	Equal	0.326	0.568	− 0.668	799	0.504
		Not equal			− 0.703	42.477	0.486
	Quito's natural image	Equal	3.157	0.076	0.169	799	0.866
		Not equal			0.201	43.934	0.842
	Quito's entertainment image	Equal	0.026	0.873	0.535	799	0.593
		Not equal			0.562	42.448	0.577
Quality	Food	Equal	1.659	0.198	− 0.034	799	0.973
		Not equal			− 0.037	42.708	0.971
	Accommodation	Equal	1.373	0.242	0.886	799	0.376
		Not equal			1.065	44.070	0.293
	Attractions	Equal	0.037	0.848	− 0.227	799	0.821
		Not equal			− 0.232	42.184	0.818
	Transportation	Equal	0.489	0.485	− 0.854	799	0.393
		Not equal			− 0.834	41.774	0.409
	Local environment	Equal	1.119	0.291	1.378	799	0.169
		Not equal			1.799	45.346	0.079
Satisfaction	Satisfaction with your visit to Quito	Equal	0.170	0.681	− 0.490	799	0.624
		Not equal			− 0.485	41.892	0.630
Loyalty	Recommend Quito to friends and family	Equal	0.298	0.585	0.059	799	0.953
		Not equal			0.063	42.577	0.950
	Returning to Quito	Equal	0.088	0.767	0.830	799	0.407
		Not equal			0.856	42.269	0.397

at 3.87 the equitable distribution of resources and social benefit; while responsible consumption is estimated with 3.83; social commitment is appreciated with 3.80 and finally spiritual prosperity is rated with 3.79 more than material prosperity.

Regarding the quality of tourist services in Quito, lodging, attractions, local environment, and food exceed 4.0, except for transportation. Visitors from Cuenca



	Cuenca	Ambato	Manta	Portoviejo	Guayaquil	Santo Domingo	General
Attractions	4,20	4,17	4,10	4,04	4,17	4,06	4,13
Transportation	4,12	4,03	4,17	3,72	4,00	3,71	3,96
Local Environment	4,30	4,13	3,97	3,58	4,20	4,00	4,06
Food	4,11	4,05	3,83	4,21	4,10	3,82	4,03
Accommodation	3,99	4,14	3,98	4,12	4,15	4,40	4,14

Fig. 38.2 Level of agreement on the quality of services: attractions, transportation, local environment, food, and accommodation in Quito

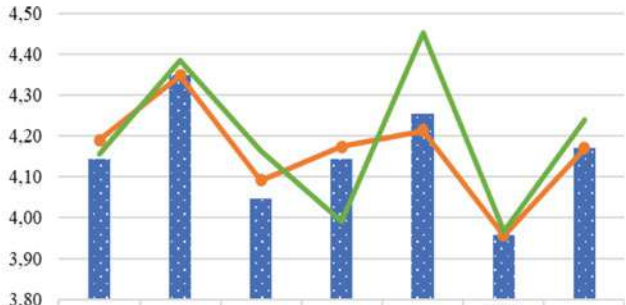
rate attractions (4.20) and the local environment (4.30) the highest; visitors from Manta rate transportation (4.17) the highest; visitors from Portoviejo rate food (4.21) the highest; and visitors from Santo Domingo rate lodging (4.40) the highest (see Fig. 38.2).

Concerning whether the image of Quito as a destination is favorable, it was rated on a scale of 1 to 5, where 1 is not at all in agreement and 5 is very much in agreement. The highest mean of 4.11 is for the natural image, an aspect that best relates to the definition of "Conscious Tourism"; 4.08 is for the entertainment image; 4.06 is for the cultural image, and 4.0 is for the Quito destination brand.

Overall satisfaction and aspects related to the loyalty of the domestic tourist investigated were rated on a scale of 1 to 5, where 1 is not at all in agreement and 5 is very much in agreement. Overall satisfaction with the visit to Quito was 4.17. Regarding loyalty-related aspects, the aspect of recommending the destination of Quito to family and friends is 4.17. Finally, the aspect of revisiting the destination Quito is 4.27, with the most likely cities of origin being Guayaquil (4.45), Ambato (4.39), Manta (1.17), Cuenca (4.15) (see Fig. 38.3).

38.4.3 Contrasting Research Variables

When analyzing the significant differences between variables and contrasting the hypotheses, the respective statistical tests are carried out in the IBM SPSS Statistic 22 program. The relationship between different constructs such as the profile of the



	Cuenca	Ambato	Manta	Portoviejo	Guayaquil	Santo Domingo	General
You would recommend Quito to your family and friends	4,14	4,35	4,05	4,14	4,25	3,96	4,17
Overall, are you satisfied with your visit to Quito?	4,19	4,35	4,09	4,17	4,21	3,96	4,17
Visit Quito again	4,15	4,39	4,17	3,99	4,45	3,97	4,24

Fig. 38.3 Level of agreement on the quality of services: attractions, transportation, local environment, food, and accommodation in Quito

conscious tourist versus the image, quality, satisfaction, and loyalty of the destination, the definition of "Conscious Tourism" and permanence in the destination are contrasted.

The coefficient of the internal conscious tourist can be profiled as those visitors who are highly conscious based on sociodemographic characteristics and aspects valued as important by the experts, such as those who come from Guayaquil (84.6%), Santo Domingo (10.3%); between 23 and 27 years old (33.3%); of male gender (71.8%); with professional university studies (53.8%); whose main economic activity is a private employee (69.2%); who travel accompanied (82.1%); having Quito as their main destination. In addition, it can be noted that they have an average stay in Quito of 3.59 days, with an average individual expenditure of US$ 36.89.

The highly conscious domestic tourist differs from the non-conscious one in the greater interest and higher valuation of aspects related to the destination's ethics and the opportunity to have a conscious tourism experience; being willing to spend more and stay longer in the destination.

In Table 38.4, when contrasting the profile of the conscious tourist versus image (brand, cultural, natural, entertainment, destination), quality (food, lodging, attractions, transportation, gastronomy, and local environment), satisfaction, and loyalty (recommend and return), there is a strong relationship. The definition of "Conscious Tourism" was rated by domestic tourists on a Likert scale of 1 to 5, where 1 is not at all in agreement and 5 is very much in agreement; their level of agreement with the following concept: "Ecuador is a pioneer in establishing a new philosophy of tourism, which seeks sustainable, responsible, inclusive, and ethical tourism. It is a philosophy that evolves, that is dynamic, that is active, that promotes equality and the participation of all, in addition to being an experience of giving and receiving" domestic tourists mostly agree with this definition.

Table 38.4 Contrast the profile of the conscious domestic tourist versus the level of agreement with the definition of "conscious tourism"

Test of independent samples						
Variables	Variances	Levene's test for quality of variances		t-test for equality of means		
		F	Sig	t	gl	Sig. (bilateral)
Degree of agreement with the definition of "conscious tourism"	Equal	1.637	0.201	− 0.768	799	0.443
	Not equal			− 0.806	42.439	0.425

Most domestic tourists surveyed are willing to have a conscious tourism experience. In the case of being able to carry out this "Conscious Tourism" experience, most of them agree to stay longer in the destination and spend more money on their stay.

In this context, when contrasting the profile of the conscious domestic tourist versus the level of agreement with the definition of "Conscious Tourism", it can be concluded that there is a relationship. The profile of the highly conscious domestic tourist agrees with the definition of "Conscious Tourism" with a mean of 4.15, close to the profile of the non-conscious domestic tourist with a mean of 4.24.

When contrasting the profile of the conscious domestic tourist versus the case of having a conscious domestic tourism experience, staying longer at the destination, and spending more money for the stay at the destination, it is observed that there is a relationship, as shown in Table 38.5.

Table 38.5 Contrast the profile of the conscious domestic tourist versus the level of agreement with the definition of "conscious tourism", versus willing to stay longer, versus spending more money for the stay

Test of independent samples						
Variables	Variances	Levene's test for quality of variances		t-test for equality of means		
		F	Sig	t	gl	Sig. (bilateral)
Degree of agreement definition of conscious tourism	Equal	1.637	0.201	− 0.768	799	0.443
	Not equal			− 0.806	42.439	0.425
Would be willing to stay longer in the destination	Equal	0.474	0.491	0.927	738	0.354
	Not equal			1.095	40.350	0.280
Would be willing to spend more money during the stay	Equal	3.155	0.076	1.284	738	0.200
	Not equal			1.717	42.153	0.093

The profile of the highly conscious domestic tourist has a higher level of agreement with staying in the destination, with a mean of 4.36, than the profile of the non-conscious tourist, with a mean of 4.26. The profile of the highly conscious domestic tourist has a higher level of agreement with spending more money during their stay, with a mean of 4.22, than the profile of the non-conscious domestic tourist, with a mean of 3.99.

38.5 Conclusions

In the twenty-first century, the events of public knowledge have had an important impact on the management of the national and international tourism sector. The effects of the pandemic on tourism activities continue to affect, and its economic recovery is slow if there is no generalized global solution to the health emergency. Tourism demand has fallen drastically, and its recovery is minimal compared to the records achieved in the years before the pandemic.

Current and future tourism demand is changing and is focused on the search for an enriching tourism experience, which allows visitors to grow, well-being, and personal and family development through a transforming experience. The different destinations in this context should try to promote an offer that benefits the different interest groups such as the host communities, the companies, the control organizations, and the visitors.

"Conscious Tourism" in its beginnings, was pioneered and promoted by Ecuador. Significant contributions have been developed to mature the concept and its characteristics. As a result of these studies, it has been identified that conscious tourism is the evolution of sustainable tourism; it is a philosophy that encompasses the dimensions of sustainability (triple dimensions: economic, social, and environmental) and ethics [1, 4].

This research work aims to present findings that allow us to clarify the relationship between the concept of conscious tourism and the characterization of tourists who travel within this philosophy of tourism from the perspective of the internal visitor. In the first instance, the concept is contrasted with the opinion of domestic tourists who visited the city of Quito at the end of 2018 and the beginning of 2019. The results of the research reveal a high degree of agreement with the starting definition. In the second instance, another of the advances of the work has been to ratify the characterization of the conscious tourist from the perspective of the internal visitor and to relate this profile with the image of the destination, quality and satisfaction, and tourist loyalty.

The structure of the questionnaire applied is oriented to characterize domestic tourists as highly conscious and not conscious, according to their willingness to have a conscious tourism experience, their position of themselves as conscious domestic tourists, their capacity to have a conscious tourism experience, to stay longer in the destination, to the relevance given to ethical aspects in the tourism experience, and

the degree of agreement or disagreement with the definition of conscious tourism proposed in previous works by experts.

The results determine that highly conscious domestic tourists evaluate with a higher level of importance to stay longer in the destination and spend more money during their stay. In this sense, they also consider the image of Quito (destination brand, nature, and entertainment) and the quality (food, accommodation, and local environment); they state that they would recommend the destination to family and friends, and they are willing to revisit the city in the future. In addition, the levels of satisfaction and loyalty expressed by conscious domestic tourists are like those of other tourists, and there is a relationship between the two groups.

The case study's findings allow visualizing concrete actions and policies in the tourism sector through destination management to potentiate and take advantage of this expanding tourism demand market. The ethical dimension is the differentiating factor of "Conscious Tourism", this can be the positioning factor for both external and internal tourists seeking personal growth, a search for happiness or well-being, and an enriching and transforming life experience in which visitors, local host communities, control agencies, and companies participate. The ethical dimension must contemplate a rewarding experience for both demand and supply.

The results of the research on the perception of the internal tourist and previous studies on the external tourist and the philosophy of Conscious Tourism in the case study of the city of Quito will allow future analyses to contrast the findings and present the relationships between the dimensions studied, sustainability and the differentiating factor of ethics. This will lead to the replication of these studies in other important national destinations such as the Galapagos National Park, Guayaquil, and Cuenca, among others, to promote Conscious Tourism and increase inbound and domestic demand as a favorite destination for tourists to Ecuador.

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Chapter 39
Technology Watch Applied to Tourism Marketing, Commercialization and Sales



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Abstract The relationship between tourism and technological trends has generated greater possibilities for the actors in its value chain, including an increase in the flow of tourists and the possibility of a more enriching experience. Thus, the use of new technologies has become indispensable for the development of tourism activity. Tourism generates a gamified and intensive management of information, a situation that opens the way for the development and use of ICT for its benefit, supporting the reorganization of resources, efficiency and security in processes and facilitating data analysis and decision-making. With the above, the aim is to identify technological trends applied to marketing, sales and commercialization, through the proposal and application of a technology watch model and the creation of bibliometric maps in VOSviewer using concurrence analysis, in order to visualize the relationships between technological trends and the aforementioned links in the tourism value chain. In this way, it became evident that the most relevant application is found in the sales and marketing links; through the promotion of destinations on social networks, the sale of airline tickets, museum tickets and online accommodation bookings. Using technologies such as: augmented reality, virtual reality, geolocation and big data in the marketing link and artificial intelligence, IoT, big data and virtual reality for the sales link.

Keywords Technology · Marketing · Tourism

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39.1 Introduction

Tourism activity is characterized by an intensive use of information, a circumstance that explains the notable impact of ICTs on consumption and production processes in this field. It is therefore essential to identify the technologies that are being used around the world to obtain valuable data to improve the management of business activity, the quality of customer service and, along the same lines to increase efficiency in each of the links in the value chain of this sector.

This research seeks to identify the technological trends applied to the sales and commercialization links of the tourism value chain around the world, through the application of a technology watch model, using multiple bibliographic managers and visualizing through graphs the relationships between variables (technology used, link in the value chain and country of publication), as well as the elaboration of bibliometric maps using VOSviewer, from the selection of articles available in Scopus, and the use of keywords, countries and years of publication as units of analysis, thus obtaining maps that show the relationships between technological trends and the links of marketing, commercialization and sale of tourism value.

The technology watch model used is an adaptation of diffetent models, from which the main characteristics were taken for the planning phase the different phases.

39.2 Methodology

For the development of this research, a two-phase methodology was proposed, the first focused on the mapping of technologies in tourism segmented in the area of marketing, commercialization and sales, and the second on the identification of these technologies in the tourism sales and commercialization links.

For phase 1, entitled: “Mapping of technologies used in the marketing, commercialization and sale of tourism, segmented by region and typology”, five activities were carried out: (a). Identification of key words (b). Construction and organization of the thesaurus (c). Selection of information sources (d). Construction of the equation formula for the mapping of technologies used in the marketing, commercialization and sale of tourism, segmented by region and type. Construction of the search equation formula (e). Visualization of the units of analysis in VOSviewer maps.

Phase 2, which consists of the “Review of technological trends in the commercialization and sales links in the tourism value chain”, is developed through the following three activities: (a). Review and tabulation of research articles (b). Definition of classification criteria (c). Creation of graphs and definition of relations between the different links in the value chain.

39.3 Mapping of Technologies

The mapping of technologies used in the marketing, commercialization and sale of tourism, segmented by region and typology, is carried out in order to evaluate the use of technologies in the commercial activity of tourism, formulate search equations and generate bibliometric maps for the analysis of the field of study.

39.3.1 Identifying Keywords

In order to carry out the monitoring of the different technologies applied in tourism, the key words with which the searches were carried out were defined in the first instance. The aim of these is to observe the development themes of these technologies. The keywords are:

Technology, commercialization, sales, marketing, tourism, technology 4.0, blockchain, big data, artificial intelligence (AI), Internet of Things, drones, remote sensing, virtual reality, augmented reality, mixed reality, websites, mobile applications, robotics, mobile geolocation, cloud computing, cybersecurity, autonomous transport, biotechnology, nanotechnology, artificial neural network.

39.3.2 Construction and Organization of the Thesaurus

For the construction of the thesaurus, the keywords found in the previous section are related—see Fig. 39.1.

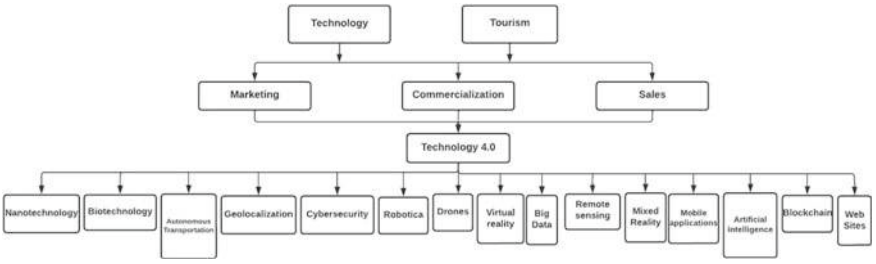


Fig. 39.1 Thesaurus technology watch in tourism. *Source* Prepared by the authors

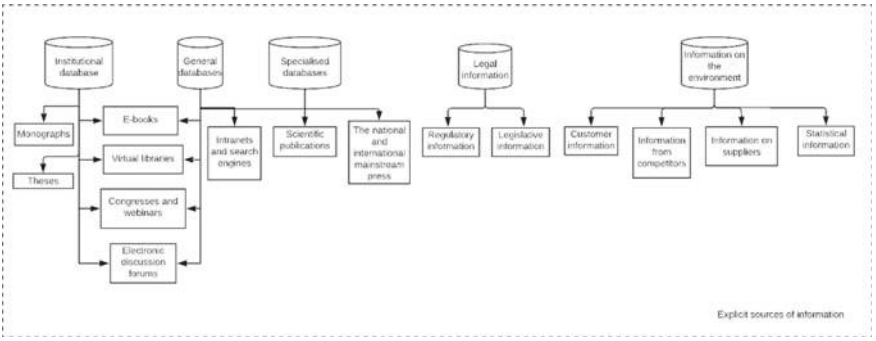


Fig. 39.2 Diagram of the types of information used in the development of technology watch. *Source* Prepared by the authors

39.3.3 Selection of Information Sources

Given the importance of having reliable or valid information, the use of databases recognized by the majority of academics is proposed: Scopus, Google Scholar, Dialnet, and Repositories universities. In addition, the following sources of information were also taken into account as shown in the Fig. 39.2.

39.3.4 Search Equation Formula

Given the keywords found above and their relationship described in the thesaurus, four search equations are established:

Equation 1: Technology AND Tourism AND Marketing AND (Blockchain OR "Big Data" OR "Artificial Intelligence" OR "Smart City" OR "Internet of Things" OR "Technological Trends" OR Drones OR "Remote Sensing" OR "Virtual Reality" OR "Augmented reality" OR "Websites" OR "Mobile apps" OR "Robotics" OR "Cloud computing" OR Cybersecurity OR "IOT" OR "Autonomous transportation" OR Biotechnology OR Nanotechnology OR "Mobile geolocation" OR "Mixed Reality" OR "Radio Frequency Identification" OR Cloudfront OR "Artificial Neural Network" OR "Machine Learning" OR "Immersive Reality" OR "Content Manager" OR "Near Field Communication" OR "Database NoSQL" OR Biometrics OR "Data Mining" OR "Optical Character Recognition" OR "Secure Authentication" OR "Augmented Virtuality" OR "Business Intelligence" OR "Electronic Beacon" OR "Distributed Reality" OR "Quantum Computing" OR "Speech Recognition" OR "Tin Character Recognition magnetic card" OR "AI" OR "Web Pages" OR "Non-relational Database" OR "Business Intelligence").

Equation 2: Tecnología AND turismo AND Marketing AND (blockchain OR macrodatos OR "Inteligencia artificial" OR "Smart City" OR "Internet de las cosas"

OR "Tendencia* Tecnológica*" OR drones OR teledetección OR "Realidad virtual" OR "Realidad aumentada" OR "Sitios web" OR "Aplicaciones móviles" OR robótica OR "Computación en la nube" OR ciberseguridad OR "Transporte autónomo" OR biotecnología OR nanotecnología OR "Geolocalización móvil" OR "Realidad mixta" OR "Identificación por radiofrecuencia" OR cloudfront OR "Red* neuronal* artificial" OR "Aprendizaje automático" OR "Realidad inmersiva" OR "Gestor de contenidos" OR "Comunicación de campo cercano" OR "Base de datos NoSQL" OR biometría OR "Minería de datos" OR "Reconocimiento óptico de caracteres" OR "Autenticación segura" OR "Virtualidad Aumentada" OR "Inteligencia de negocios" OR "Baliza electrónica" OR "Realidad distribuida" OR "Computación cuántica" OR "Reconocimiento de voz" OR "Reconocimiento de caracteres en tinta magnética" OR ia OR "Páginas Web" OR "Base de datos no relacional" OR "Inteligencia empresarial").

Equation 3: Technology AND Tourism AND Commercialization AND ("Blockchain" OR "Big Data" OR "Artificial Intelligence" OR "Smart City" OR "Internet of Things" OR "Technological Trends" OR "Drones" OR "Remote Sensing" OR "Virtual Reality" OR "Augmented reality" OR "Websites" OR "Mobile apps" OR "Robotics" OR "Cloud computing" OR "Cybersecurity" OR "IOT" OR "Autonomous transportation" OR "Biotechnology" OR "Nanotechnology" OR "Mobile geolocation" OR "Mixed Reality" OR "Radio Frequency Identification" OR "Cloudfront" OR "Artificial Neural Network" OR "Machine Learning" OR "Immersive Reality" OR "Content Manager" OR "Near Field Communication" OR "Database NoSQL" OR "Biometrics" OR "Data Mining" OR "Optical Character Recognition" OR "Secure Authentication" OR "Augmented Virtuality" OR "Business Intelligence" OR "Electronic Beacon" OR "Distributed Reality" OR "Quantum Computing" OR "Speech Recognition" OR "Tin Character Recognition magnetic card" OR "AI" OR "Web Pages" OR "Non-relational Database" OR "Business Intelligence").

Equation 4: Technology AND Tourism AND Sales AND ("Blockchain" OR "Big Data" OR "Artificial Intelligence" OR "Smart City" OR "Internet of Things" OR "Technological Trends" OR "Drones" OR "Remote Sensing" OR "Virtual Reality" OR "Augmented reality" OR "Websites" OR "Mobile apps" OR "Robotics" OR "Cloud computing" OR "Cybersecurity" OR "IOT" OR "Autonomous transportation" OR "Biotechnology" OR "Nanotechnology" OR "Mobile geolocation" OR "Mixed Reality" OR "Radio Frequency Identification" OR "Cloudfront" OR "Artificial Neural Network" OR "Machine Learning" OR "Immersive Reality" OR "Content Manager" OR "Near Field Communication" OR "Database NoSQL" OR "Biometrics" OR "Data Mining" OR "Optical Character Recognition" OR "Secure Authentication" OR "Augmented Virtuality" OR "Business Intelligence" OR "Electronic Beacon" OR "Distributed Reality" OR "Quantum Computing" OR "Speech Recognition" OR "Tin Character Recognition magnetic card" OR "AI" OR "Web Pages" OR "Non-relational Database" OR "Business Intelligence").

39.3.5 Visualization of the Units of Analysis on Maps

With the above equations, bibliometric maps were created by applying concurrency analysis using VOSviewer, the maps show the relationships between technology trends and marketing units in the tourism value chain.

Equation 1. Relationship between Technology, Tourism, Marketing and Technology Trends. These bibliometric maps show that the number of publications on technology, tourism, marketing and technology trends has been increasing since 2014. The countries that publish the most on this topic are China with (84) documents, followed not very closely by the United States, United Kingdom, Greece and Spain, with (49), (36), (26) and (26), respectively. As for technological trends, big data, virtual reality, websites, data mining and augmented reality—see Figs. 39.3 and 39.4.

Equation 2. Relationship between Technology, Tourism, Marketing and Technological Trends (Spanish). These bibliometric maps show that the number of publications on technology, tourism, marketing and technological trends has been increasing since 2018. The countries that publish the most on this topic are Spain with (68) documents, followed not very closely by Portugal, Colombia, Mexico and Ecuador, with (19), (14), (11) and (7), respectively. As for technological trends, smart city, Internet of Things, e-learning and websites—see Figs. 39.5 and 39.6.

Equation 3. Relationship between Technology, Tourism, Commercialization and Technology Trends. These bibliometric maps show that the number of publications on technology, tourism, commercialization and technological trends has been increasing since 2011. The countries that publish the most on this topic are the United States with (3) documents, followed not very closely by Australia, Canada,

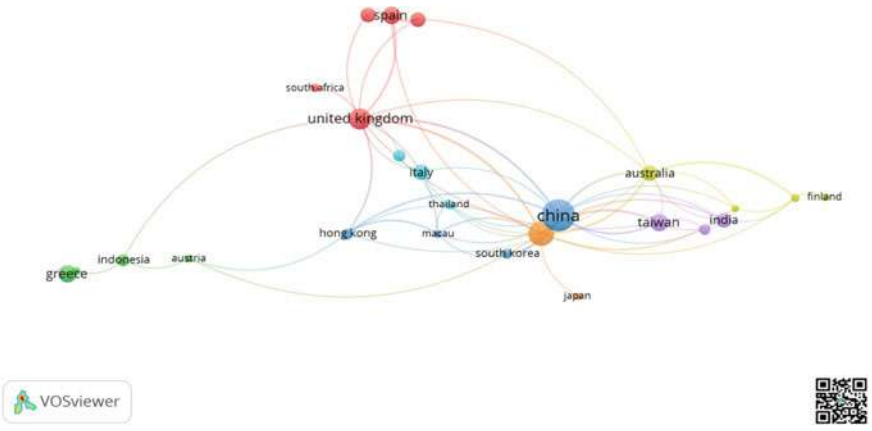


Fig. 39.3 Bibliometric map of concurrence of countries in equation 1. *Source* Prepared by the authors

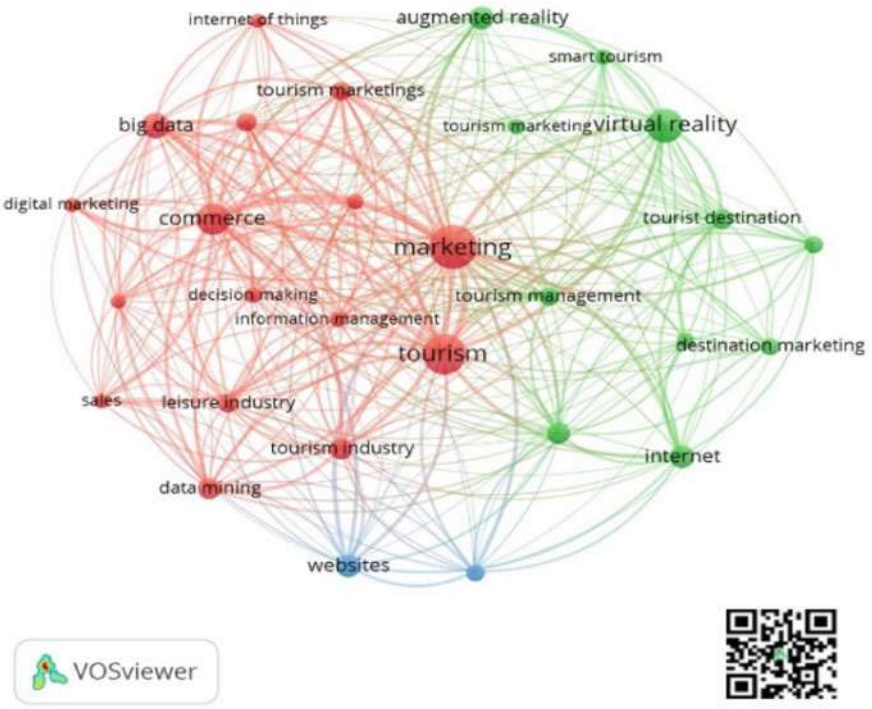


Fig. 39.4 Bibliometric map of equation 1, keyword co-occurrence analysis. *Source* Prepared by the authors

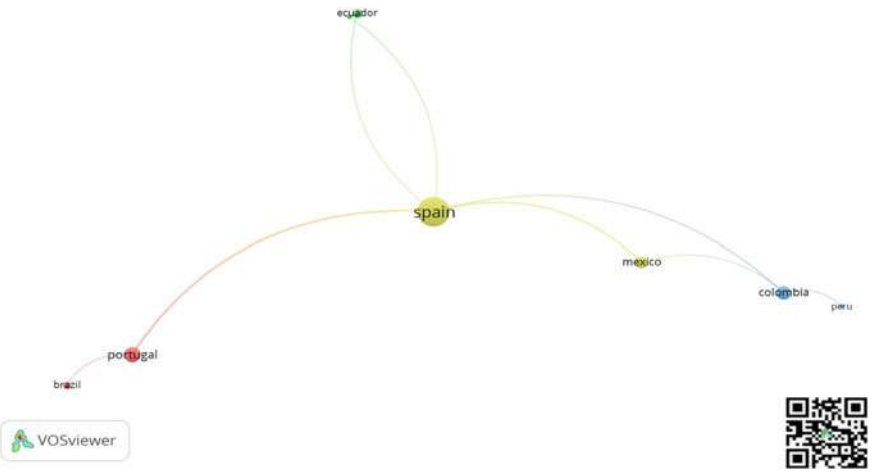


Fig. 39.5 Bibliometric map with the concurrence of countries in equation 2. *Source* Prepared by the authors

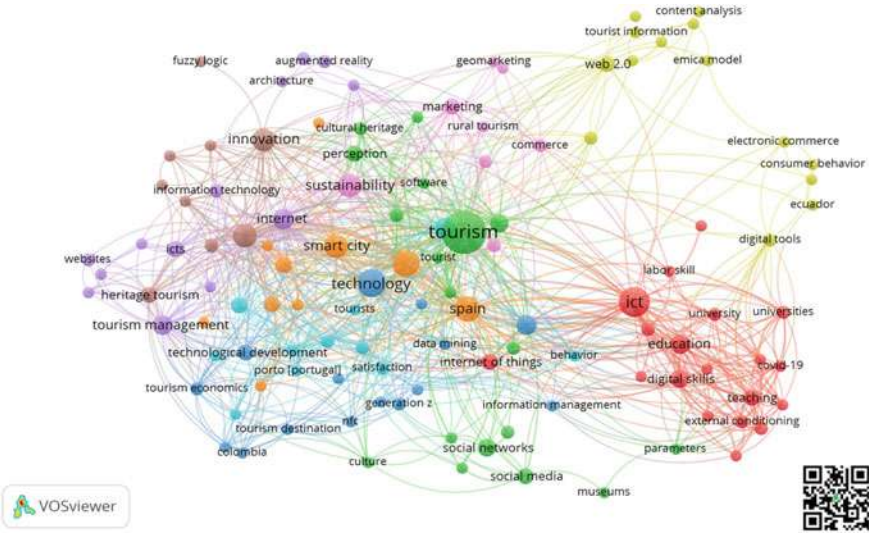


Fig. 39.6 Bibliometric map of equation 2, keyword co-occurrence analysis. *Source* Prepared by the authors

India and New Zealand, with (1) document respectively, as for technological trends, biotechnology, robotics, remote sensing and data engineering—see Figs. 39.7 and 39.8.

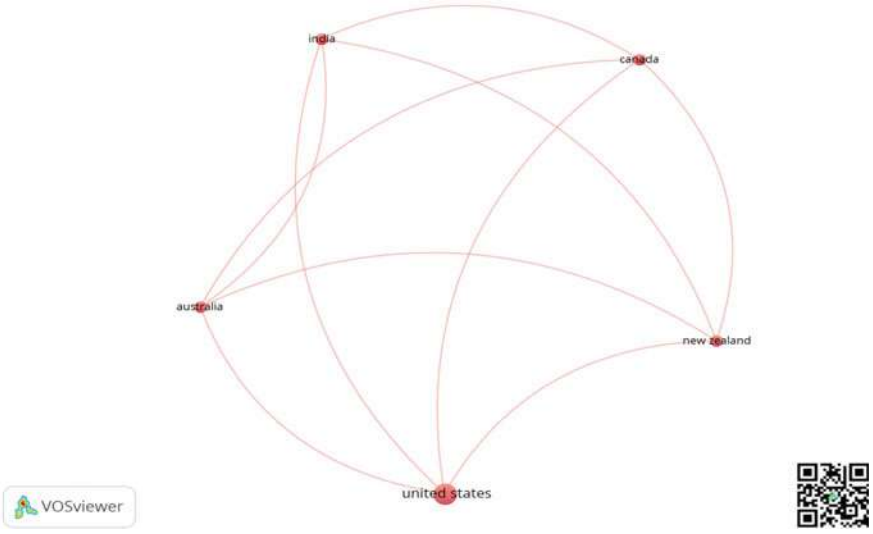


Fig. 39.7 Bibliometric map with the concurrence of countries in equation 3. *Source* Prepared by the authors

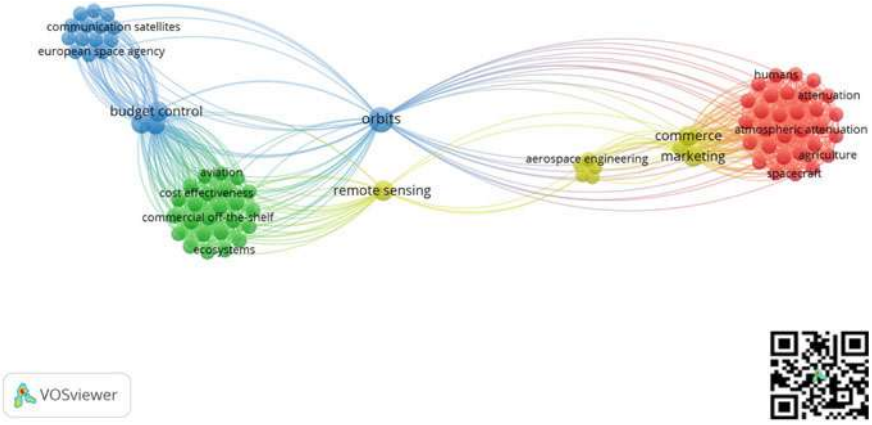


Fig. 39.8 Bibliometric map of equation 3, keyword co-occurrence analysis. *Source* Prepared by the authors

Equation 4. Relationship between Technology, Tourism, Sales and Technology Trends. These bibliometric maps show that the number of publications on technology, tourism, sales and technological trends has been increasing since 2017. The countries that publish the most on this topic are China with (13) documents, followed not very closely by Italy, Portugal, the United States and India, with (5) documents respectively, and in terms of technological trends, websites, artificial intelligence, data mining, big data and virtual reality—see Figs. 39.9 and 39.10.



Fig. 39.9 Bibliometric map with concurrence of countries in equation 4. *Source* Prepared by the authors

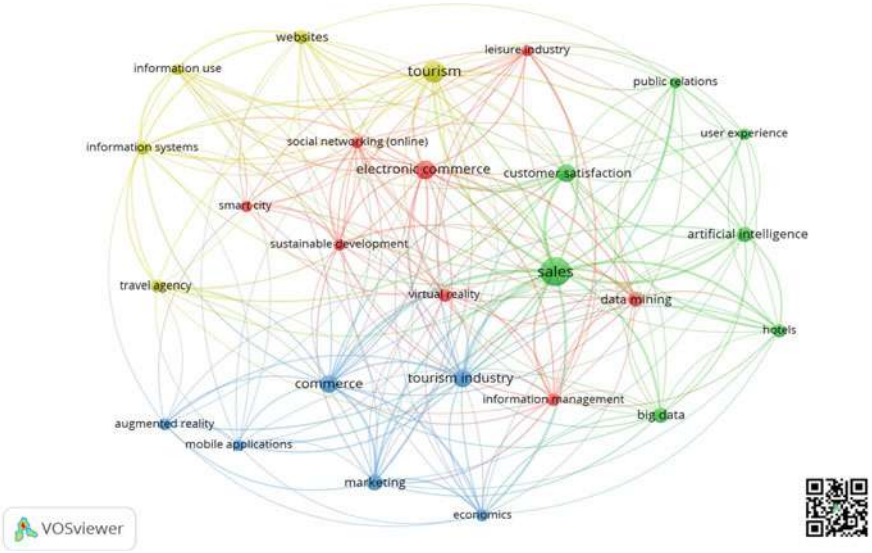


Fig. 39.10 Equation 4 bibliometric map, keyword co-occurrence analysis. *Source* Prepared by the authors

39.4 Review of Technological Trends in the Marketing and Sales Links in the Tourism Value Chain

As a result of the review and tabulation of 109 research articles, the classification criteria were determined and from this the relationships between previously defined classification criteria were plotted.

39.4.1 Charting and Defining Relationships Between Ranking Criteria

The relationships between criteria that the reader will find are:

- Sales and commercialization links in the tourism value chain.
- The sales and marketing links of the tourism value chain and the countries in which the articles were published.
- The sales and commercialization links of the tourism value chain among technological trends.

Commercialization and sales in the value chain: Commercialization is found with technological application in 46 of the articles reviewed, while selling is found in 34 documents.

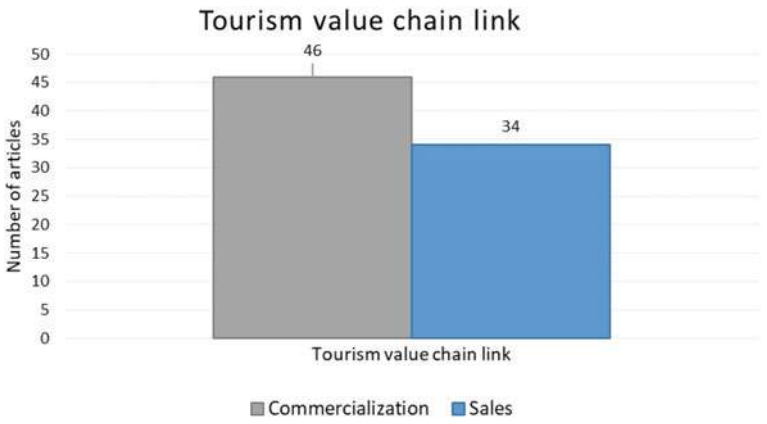


Fig. 39.11 Trade and sales link in the value chain versus number of items. *Source* Prepared by the authors

Figure 39.11 highlights commercialization, this is largely supported by the Internet which is now considered a promotional tool, as well as a distribution channel, that has helped tourism businesses to use a range of activities to complement offline promotions [2].

E-tourism contributes to the virtualization of processes and their value chain: accommodation, transport, leisure, travel, catering, intermediation and ancillary services. This concept includes all business functions, such as marketing, finance, accounting, production, strategy, planning and management [3]. E-commerce is currently dominated by the sale of airline tickets (especially from low-cost airlines), so that traditional agencies still have an ideal market in the sale of complex package holidays to demonstrate their expertise and professionalism [3].

The enormous advances in the use and development of ever faster and simpler e-commerce solutions are forever changing the way people consume the same products and services as before, but now in a more personalized way, without geographical barriers, with almost no intermediaries and from a computer with an Internet connection [2].

Relationship between the tourism value chain and the countries in which the articles were published: Spain is the country with the highest bibliographic density, with the most outstanding being the commercialization link with (18), the second country to be highlighted is Colombia, which has the highest number of articles in the commercialization link with (5) and sales with (4)—see Fig. 39.12.

Spain stands out in commercialization, as it has three times as many publications as its closest competitor, Colombia, due to the fact that in Spain there are a large number of platforms developed for the purpose of offering tourism products and services. Such is the case of online platforms for the rental of tourist accommodation, which has experienced significant growth over the last five years. This has largely changed the patterns of tourist accommodation consumption and, in line with this, the applicable regulations [4].

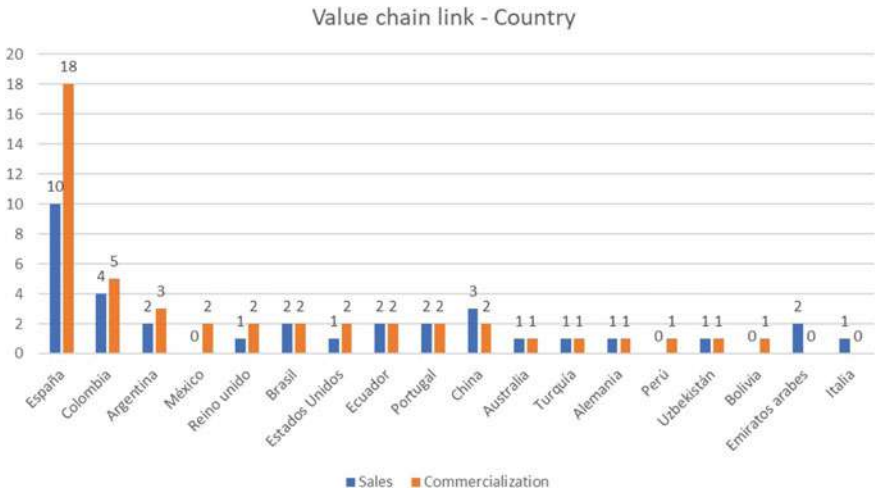


Fig. 39.12 Trade and sales link in the value chain versus countries. *Source* Prepared by the authors

Once again, Spain, Colombia and China stand out in sales, and this has a lot to do with the implementation of e-commerce: in Spain at least, in the third quarter of 2020, e-commerce exceeded 12.8 billion euros. Moreover, according to the "Global Ecommerce 2020" report, Spain was among the countries with the highest growth in e-commerce in the year [5].

Spain's bibliographic leadership in these links of the tourism value chain is due to the fact that it has frequently validated the importance of government support and investment in the tourism sector, due to its special weight in GDP, employment, social and territorial structuring of the country and its autonomous communities. [6].

Marketing among technology trends: It is evident that the (5) technological trends that mostly support the marketing link in the tourism sector are: augmented reality with a total of (17) articles, virtual reality (15), mobile geolocation (13), big data (12) and artificial intelligence with (12) articles—see Fig. 39.13.

Today's tourist wants to use any device with Internet at his disposal, to find out information about flights, hotels, restaurants, tour packages, payment methods, etc. This is one of the many advantages offered by technological trends in the tourism sector, which allow them to implement and continuously update their services and/or products in their facilities and on their virtual platforms, with the aim of maintaining a competitive advantage within their business environment [7].

In the commercialization link, the trend that stands out the most is augmented reality, as it allows improving service provision for consumers who are more familiar with technology, providing personalized information, increasing interaction with suppliers and reducing response time in the search for information. In other words, from the point of view of attracting new demand and marketing destinations, the introduction of augmented reality as an element of the tourist visit can allow better segmentation of target markets and improve their satisfaction with the visit [8].

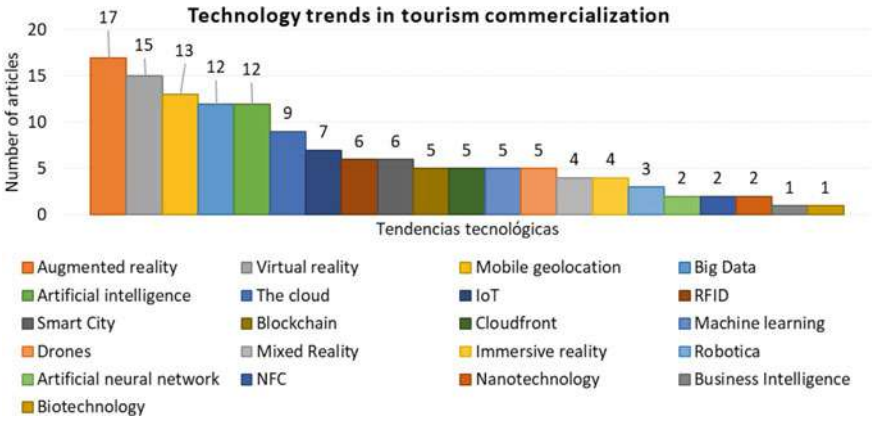


Fig. 39.13 Technology trends in the comercialization link. *Source* Prepared by the authors

Another technological trend to highlight in this link is virtual reality, which presents information about tourism products and services in a different, much more eye-catching way. This new system has a positive influence on the most important processes within the purchase cycle of the traveler [1]. This is evidenced by an experiment carried out by the Fachhochschule University, in which a 360-degree promotional video of Dubrovnik was compared with conventional tourist material (tourist brochure). Although the brochure contained the same information as the video. The study revealed that the immersive visualization resulted in up to 67% more desire to visit the place, demonstrating the degree of benefit it can bring to destination commercialization [9].

Selling among technology trends: It is evident that the five technological trends that mostly support the sales link in the tourism sector are: big data with (13) articles, virtual reality and artificial intelligence with (10) articles each, the Internet of Things (IoT) with (9) articles and augmented reality (8)—see Fig. 39.14.

Since the emergence of online sales, practically all areas of business have been transformed. Consumers have not only discovered a new channel to acquire what they want, but also a place to research, look for alternatives, read recommendations and find advice for their current and future purchases, even experiencing the purchase before making it [10].

The tourism market was also impacted by this phenomenon. Before, travelers adapted their needs to what they found within their reach or what was recommended by their usual travel agent. However, the Internet came to influence this travel dynamic and consumers discovered that their computers and smartphones were the most important channels for finding what they wanted, new experiences and new places to visit [10].

In the sales link, the use of trends such as big data, virtual reality and artificial intelligence, is used for the purpose of analyzing the consumption patterns of tourists



Fig. 39.14 Technology trends in the sales link. *Source* Prepared by the authors

and identifying their profile, facilitating the power of decision or matching motivations and destinations to improve marketing strategies and sales of services and/or products, along with the promotion of the destination.

This is where Hiberus stands out, a company that for a decade has capitalized on its experience in the creation of technologies to automate, develop and manage processes aimed at improving the quality of the services offered by large tour operators. It has become one of the leading ticketing providers, using technologies such as Cloud and IoT [11].

Another useful tool for sales in the tourism industry is point of sale (POS), also known as "points of sale", which are systems that process the operations of consumption centers (restaurants, nightclubs, bars, business centers, etc.) to issue a bill that is paid by the consumer [12].

39.5 Conclusions

1. On the basis of the principle that bibliometric mapping shows a correlation between the search parameters that create information circuits and thus the ability to integrate and analyze information, the following findings were made according to each link analyzed:

    - Marketing: Has a growing trend in terms of the number of publications in both English and Spanish. For publications in English, the countries that stand out are China, USA and Spain, with big data, data mining, virtual reality and augmented reality being the trends with the highest number of publications. For publications in Spanish, the countries with the highest bibliographic density are Spain, Portugal and Colombia, and the trends to be highlighted are smart cities, IoT and websites.

- Commercialization: Even though the publications on this subject have a growing trend, the bibliographic density is low with respect to marketing, the country that stands out in this link is the USA and the most relevant trends are robotics, remote sensing and data engineering.
- Sales: The publications that relate this link with the tourism sector and technology show a growing trend since the year, the countries that stand out most are China, USA, Italy and Portugal and the trends to be taken into account are artificial intelligence, data mining, big data and virtual reality, coinciding with the results of the technology watch carried out in this link.

2. Technology watch, whose main objective is the observation, collection, analysis and dissemination of information, contributed to the acquisition of specific knowledge about the tourism sector, becoming a key tool in the projection of decision-making and contributing to the search for new elements and approaches for the application of technology in the sector, and it is important to highlight its generalities classified in the links of the value chain investigated, as shown below:

   - Tourism organizations rely on technologies such as augmented reality, virtual reality, geolocation and big data for the marketing and promotion of destinations, products and services, with the aim of making them more attractive to visitors and encouraging tourism activity in the area.
   - For sales activities, technological trends such as artificial intelligence, IoT, big data and virtual reality play a role in innovation, security and trust in transactions, supporting the development of collaborative economy platforms.

3. This research identified a series of absences and lack of data related to specific aspects of the sector, such as: types of tourism and specific geographic sites for which there is no bibliography or it is very difficult to obtain, as well as publications in languages other than Spanish and English, which slows down the opening of markets and affects decision-making oriented to the development of the sector in specific geographies.

Hence, the amount of information found on the application of technologies in tourism in the African continent is almost nil, in relation to Europe, America and Asia, which prevented us from developing an objective characterization of the current state of tourism in this part of the world and its level of adoption of technology in this sector.

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Chapter 40
Sustainable Tourism e-Communication Impact on Tourism Behavior



Catarina Azevedo, Mafalda Teles Roxo, and Amélia Brandão

Abstract This study develops some sustainable tourism advertising effects and consumer environmental awareness-raising and examines them by advertising certification and advertising format in a field experiment. The tourism advertising effects are analyzed by five dependent variables: trust and credibility, environmentalism, ad relevance, realism, and flow. Several ANOVA and multiple comparison tests were performed to understand whether these variables varied between groups. Experimental research findings indicate that flow and video format affect tourism advertising and consumer environmental awareness-raising. This study demonstrates the importance of understanding the concept of sustainable tourism and awareness-raising. It also points to identifying the best communication strategies to promote a sustainable destination, as different communication methods may lead to different results. In addition, it provides valuable information for marketers to consider when implementing their communication strategies.

Keywords Sustainable tourism · E-advertising · Awareness-raising · Environmentalism

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40.1 Introduction

Tourism and related businesses contributed to at least 10% of total global employment in 2019 [1]. This sector has experienced years of sustained growth, facing an average increase of 4% per year in arrivals through 2019 [2]. Moreover, it was responsible for 10.4% of the world's gross domestic product (GDP) in 2019 [3].

One of the major industries of global development that are part of the 2030's agenda for sustainable development goals (SDGs) is tourism [4]. The World Tourism Organization (UNWTO) defined the concept of sustainable tourism as "one whose practices and principles can apply to all forms of tourism in all types of destinations, including mass tourism and the various niche tourism segments" [5]. Sustainability principles are related to tourism's environmental, economic, and sociocultural sides, and the best balance must be set among these three pillars to guarantee its long-term sustainability [6].

There is not yet a consensus regarding a definition of sustainable tourism, as it highly depends on the context applicable [7]. However, from now in this research, sustainable tourism will be tourism that "meets the needs of present tourists and host regions while protecting and enhancing future opportunities. It is envisaged as leading to management of all resources in such a way that economic, social, and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity, and life" [8].

Environmental friendliness is becoming more important to consumers when choosing a product or service [9]. Therefore, the importance of a solid sustainability-based communication campaign is increasing to make consumers aware of the availability of sustainable travel products. Sustainable communication is a vital part of the sustainable marketing strategy that adopts an integrative and holistic approach to achieve corporate objectives and focuses on long-term goals of sustainable development [10].

Although there are several research studies regarding sustainable tourism, few are related to sustainable tourism e-communication. Most of them touch on the innovation of sustainable tourism e-communication or sustainable tourism development metrics. Thus, to expand the studies in the view of sustainability in tourism and how it can be achieved through e-communication, the main goals of this manuscript are the following: analyze the impact of e-communication in raising awareness and social education for sustainability in tourism; and analyze the effectiveness of e-communication in promoting sustainable behavior in tourism. Regarding so, the manuscript will answer the following research question: What is the most effective way to communicate a sustainable tourism destination?

An experimental design with e-communication scenarios was developed to achieve the two research objectives and answer the research question. A questionnaire was applied to study the research hypotheses and variables of those scenarios through a quantitative methodology. After data collection, data were analyzed in IBM software SPSS Statistics™.

40.2 Literature Review

Sustainable Tourism: Tourism is one of the industries that mostly impact the world economy and is directly related to economic growth [11] and employment, responsible for the development of most activities inside a destination. Nowadays, there are many activities under tourism, and several types of tourism have been raising. One of those new concepts that was introduced was sustainable tourism, which is "a social, cultural, and economic phenomenon which entails the movement of people to countries or places outside their usual environment for personal or business/professional purposes. These people are called visitors and tourism has to do with their activities, some of which involve tourism expenditure" [12].

Tourism is being called to minimize its negative impact and contribute to sustainable development. UNWTO developed a statement on sustainable tourism: "meets the needs of present tourists and host regions while protecting and enhancing opportunity for the future. It is envisaged as leading to management of all resources in such a way that economic, social, and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity, and life" [8]. United Nations Environment Program and World Tourism Organization (UNEP-UNWTO) also documented the 12 goals of sustainable tourism development, having in attention the three sustainability "pillars": social, economic, and environmental [13]. Social sustainability is related to human rights, respect, and equal opportunities for all; economic sustainability is generating prosperity at various levels of society; and environmental sustainability is about preserving and managing resources, namely the non-renewable ones or those vital in life support.

Marketing and Sustainability: These concepts of marketing and sustainability may seem incompatible [14] because marketing (and advertising) have been criticized for promoting fraudulent messages in the communication of sustainable products or services [15], encouraging consumption growth and even overconsumption, most of the times with greenwashing involved.

Nonetheless, marketing is vital for economies, sustainable tourism destinations, and promoting sustainable activities. Thus, a good marketing management strategy can shape the number and types of tourists who visit a destination. It can be held responsible for ensuring the maintenance of sustainable destinations that contribute to economic development and growth [15]. Communication becomes essential because all stakeholders are a part of sustainable tourism, and information dissemination is not only important but mandatory. Communication is fundamental for every business's success and is the process that can achieve public relations goals, being vital as it is structured and done to inform, convince, motivate, and provide mutual understanding.

Sustainability communication: Communicating sustainability is challenging because of its abstract and vague nature and because it is difficult for consumers to recognize and understand sustainability product attributes—and their added value [16]. Some conventional marketing tools, processes, and strategies can assemble to help on this topic with some innovation and modification, with the outcome of moving toward sustainability goals [17]. Having these marketing and communication

strategies well-structured is important for tourism businesses [18] and communication is vital for every sustainable strategy and development. There are two main reasons for that. First, societal discourse is vital to legitimate sustainable development [19]. Secondly, due to its inherent complexity and uncertainty, sustainability entails overcoming specific societal communication [18].

Consequently, communication plays a crucial role in delivering information across the agents [18], hence why communication is fundamental for creating a shared understanding of societal values on sustainability [19]. Additionally, communication in tourism can have consequences in improving sustainability, raising awareness, and educating [20], impacting the tourist's behavior and mindset and the tourist's feeling about the destination (before, during, and after the trip).

The evolution of digital media generated powerfully and impacting new tools for communication, offering interactive visual communication, helping the promotion of complex ideas and relationships, and online networks that have the potential to magnify the dialogue on sustainability, eliminating social barriers and reconnecting knowledge with action [21].

Consumer's environmental awareness-raising. Climate change awareness has increased, and tourists know they can significantly contribute to climate change [22]. However, there is an existing gap between environmental awareness, attitude, and consumer behavior, as the effects of sustainability communication on consumer behavior have inconsistent findings [22]. Sustainable behavior can be a complex topic to analyze because even though consumers are aware of pro-green attitudes and are conscient about its impact, only a minor percentage of people opt for green services when talking about tourism, especially if they have to make any financial sacrifices such as higher prices [23].

However, awareness spreading and motivating consumers to make environmentally friendly decisions continue to be essential for both businesses and consumers. If consumers are aware of the consequences of their purchase decisions, they may be more prudent and conscious about their choices [24]. To increase awareness about the availability of sustainable travel services and products, sustainable communication is a solution to inform consumers and tourists about these offers and how they can meet their needs, simultaneously comply with sustainability criteria, and stimulate pro-sustainable purchases [16].

40.3 Conceptual Framework and Hypotheses

The main goal of this research is to expand the knowledge about sustainable tourism e-communication and how it can impact consumer choices and decisions to have a greener behavior while traveling. Previous literature let us know that this topic was not highly investigated. However, if understanding sustainable e-communication practices increases, it can lead to more sustainable e-communication strategies with specific and generic goals.

Some elements can impact customer perception of the communication scenario and influence consumers' answers to them, such as advertising certification [25, 26] and advertising format [27]. The present study will evaluate the advertising certification and advertising format impact on consumers' awareness-raising and, consequentially on consumers' sustainable behavior in tourism.

Sustainable tourism advertising certification. It is usually challenging for tourists to search for sustainable tourism destinations, accommodations, or activities [26]. Because of this problem, some certification and accreditation programs have risen. Tourism certification is "a voluntary procedure that assesses audits and gives written assurance that a facility, product, process, or service meets specific standards. It awards a marketable logo to those that meet or exceed baseline standards" [28]. In summary, it occurs when a third party validates the conformity of tourism activities, focusing on the three pillars of sustainable tourism: social, economic, and environmental development.

With the validation, comes a marketable logo, seal of approval, or an award to certify the sustainability of the tourism destination [28]. The presence of a logo in an advertisement can give credibility and trustworthiness, and it can improve the quality of the advertisement image [25], providing clarity to visual communication. Having a logo certifying sustainable tourism lets tourists and tourism operators recognize destinations, accommodations, and/or tourism activities that have, or have not had an independent third-party evaluation of their sustainability [26].

The present study will use an EarthCheck certification logo to examine the differences in consumers' reactions to tourism advertisements. Regarding so, the first hypothesis raises:

H1: Consumers' awareness-raising through tourism advertisements is higher if the advertising has a third-party certification.

As consumer awareness-raising will be measured through five dependent variables (trust and credibility, environmentalism, ad relevance, realism, and flow), the following hypothesis derived from

H1.1: Consumers' trust and credibility through tourism advertisements is higher if the advertising has a third-party certification.

H1.2: Consumers' environmentalism increases if the advertising has a third-party certification.

H1.3: Ad relevance through tourism advertisements is higher if the advertising has a third-party certification.

H1.4: Consumers' realism through tourism advertisements is higher if the advertising has a third-party certification.

Tourism advertising format: Online ads can have different goals and, at the same time, proceed with unique features. Bearing this in mind, attitudes toward online advertising can differ depending on its format [29], such as video and image. All advertising formats have strengths and weaknesses when communicating with the consumer [27], and how information is presented influences the choice processes of decision-makers and can change how the consumer makes decisions. In a world where information is everywhere, attention to captions is the key for every advertisement.

Ads are overabundant, consumers [30] are very saturated, new media formats and variants are developed.

Inside mass communication, the video format is growing very fast [31], and it provides opportunities for communication to become more educational and to be used as a tourism management tool [32], increasing the competitive advantage of the businesses that adopt this communication strategy.

All the two advertising formats abovementioned (image and video) can be grouped into two categories based on their dimensions: 1 dimension (1D: image) and 2 dimensions (2D: video) [27]. Then, the second hypothesis is the following:

H2: Consumers' awareness-raising through tourism advertisements certification increases if the advertising format is a video (2D) when compared with an image (1D).

As consumer awareness-raising will be measured through five dependent variables (trust and credibility, environmentalism, ad relevance, realism, and flow), the following hypothesis derived from

H2.1: Consumers' trust and credibility through tourism advertisements certification increases if the advertising format is a video (2D) when compared with an image (1D).

H2.2: Consumers' environmentalism through tourism advertisements certification increases if the advertising format is a video (2D) when compared with an image (1D).

H2.3: Ad relevance through tourism advertisements certification increases if the advertising format is a video (2D) when compared with an image (1D).

H2.4: Consumers' realism through tourism advertisements certification increases if the advertising format is a video (2D) when compared with an image (1D).

H2.5: Consumers' flow through tourism advertisements certification increases if the advertising format is a video (2D) when compared with an image (1D).

40.4 Methods

40.4.1 Research Design

The research methodology for the study was based on identifying sustainable tourism e-communication examples and then using an experimental design to understand the impact and the communication effectiveness of those strategies. Experimental design is the method par excellence that allows for systematically analyzing the effect of a deliberately manipulated variable (independent variable) on the dependent variable [33]. To answer the research questions and achieve the research goals, it is necessary to prove if the communication certification or format causes impacts customer awareness about sustainable tourism.

Experimental design is based on the principle of causality, used to establish cause-effect relationships. Causality happens when the "occurrence of X increases the probability of the occurrence of Y".

While experimenting, the researcher tries to understand if there is any impact on the subjects under observation when manipulating a specific variable. To do that, extraneous variables need to be controlled, and then the researcher manipulates at least one independent/exploratory variable, analyzing the effect of this manipulation on the dependent variables [34].

The variables in a study in the current research are the following:

Independent Variables (IV): Advertising certification (with third-party certification versus without third-party certification) and advertising format (video versus image).

Dependent Variables (DV): Trust and credibility, how credible and authentic an advertisement is believed to be [35] and if the viewer believes that the information presented is truthful [36]; environmentalism, the degree to which a person expresses support for environmental protection through purchases and consumption [37]; ad relevance, if the viewer believes that the information in an ad is truthful [36], if it has informational content [38], and attitudes toward usability that shape intention to use [39]; realism, if a person believes the information presented in an advertisement [40]; and flow, a fully immersed state that people experience when they act with total involvement [41].

Randomized and design control were used to control the extraneous variables. As internal validity is the basis of any experimental research, and to minimize the effects of those threats, the researcher must take into consideration [34]: a random assignment, keep the unknown variables constant, statistical control, and control of the experimental design. Using a laboratory environment intends to have more control over variables and to use a smaller sample in a short time, increasing internal validity even though it limits the sample [34].

As the present study has a 2 (advertising certification: with and without) × 2 (advertising format: image versus video) between-subject experimental design, four experimental conditions were generated, as shown in Table 40.1—Experimental Conditions.

There were four groups: one for image with certification, another for the image without certification, another for video with certification, and another for the video without certification. A minimum of 50 participants per condition was established.

For reasons of appropriation to the type of study, convenience, and costs, the researcher used a non-probabilistic sampling technique, where the probability of

Table 40.1 Experimental conditions

Experimental factors		Advertising certification	
		With certification	Without certification
Advertising format	Image	Certification—Image	No certification—Image
	Video	Certification—Video	No certification—Video

selecting each sampling unit is unknown [42]. Despite reasonable estimates of population characteristics that can be obtained, the results obtained from this sampling technique are not statistically projectable to the general population.

The researcher collected university students' participation to answer the questionnaire on a specific electronic device. Each respondent was asked to view one of the four advertisement scenarios and answer a series of questions through a Google Forms questionnaire regarding their perception of the ads (each response did not take more than 10 min). The scenarios selected are from Tourism of the Azores, one island from Portugal, and the first island in the world to be certified by EarthCheck as a sustainable destination. Scenarios were retrieved from the Instagram page of Sustainable Azores (@sustainable_azores) in early 2022, and authorization to use their scenarios and the certification logo was obtained by e-mail from the person responsible for the communication of Sustainable Azores.

Then, scenarios were adjusted based on the following standards. First, two ads were designed in the same format and descriptions. The textual messages used in all ads remained the same. Second, the image ads were adjusted to add the logo from EarthCheck to one of them. The same was done to the video ads. Third, the music present in video ads was reduced. The video ads had 1 min and 47 s.

40.4.2 Data Collection

One of the instruments used for data collection in the experimental design methodology is the questionnaire, and its design must be carefully planned. To gather responses for the study, the research was conducted in five phases.

In the first phase, qualitative semi-structured interviews were conducted online with a sample of 30 college students to understand their perception of sustainability and sustainable tourism activities. Interviews were conducted with a guide until the point of saturation was reached, and all of them were recorded, as authorized by participants, to support the transcription of the interview.

In the second phase, a sample of sustainable communication strategies was selected conveniently to assemble scenario manipulation.

In the third phase, a questionnaire was made combining different variables, measured with Likert scales.

In the fourth phase, before the circulation of the questionnaire, it was pretested and modified to ensure validity and to understand if the participants perceived the manipulation of the variables. Only minor changes regarding the questionnaire introduction were changed after the pre-testing concluded.

In the fifth phase, final data were collected and quantitatively studied. A structured questionnaire was prepared and distributed through Google forms.

The data collection involved a laboratory experiment using interviews and a questionnaire. The sample used in the study was selected from colleague students in the city of Porto, Portugal. The laboratory experiment was conducted at the University of

Porto for the following reasons. First, collecting data on-site was necessary to guarantee that each participant answered the questionnaire once. Second, the participant should focus on the scene shown in the questionnaire and respond in an environment without distractions. Third, Porto is the second city in Portugal after Lisbon.

The experimental sessions took place in April 2022 at the Faculty of Economy of the University of Porto. The sessions were conducted in a laboratory environment equipped with 10-inch tablets. All participants were told that there were no right or wrong answers and were assured of the confidentiality of their responses [43]. All participants were recruited in a public space, and it was ensured that they could view the ad without any interference. As a result, 253 answers were collected and 43 were excluded from the final analysis due to failures in manipulation check questions, leaving 210 valid questionnaires.

40.4.3 Instrument Development

The questionnaire was built using the adaptation of constructs already tested by other researchers, reducing any problems that may arise from formulating the questions, allowing data comparison, and guaranteeing the study's validity [44]. The number of questions was restricted to the essential to reduce the withdrawal rate of the research and not make the experience too time-consuming [34]. Measurements used a seven-point Likert scale with one as "strongly disagree" and seven as "strongly agree" and 5-points semantic differential scales.

The questionnaire was first drafted in English and then translated into Portuguese. The questionnaire in Portuguese was pretested with 20 Portuguese college students, 5 per each experimental condition. The only criteria used to select qualified participants in the study were to be college students. The measurement development process involves translation and back-translation procedures between Portuguese and English. The authors' bilingual backgrounds facilitated the process [45].

40.4.4 Sample Profile

Given the limitations of resources and time and the size of the population, it was decided to use a sample where the researcher collects data from a small group of members of the target population [33]. In this research it will be used as a sample to determine if advertising certification and/or advertising format has any impact on consumer awareness about sustainable tourism.

The goal is to apply the experiment to a sample of people that travel frequently, that are college students between 18 and 60 years old, to assess if, from the consumer's point of view, the advertising certification and/or the advertising format and the awareness have some cause-effect relationship.

Table 40.2 Sample profile

		Frequency (n = 210)	Percentage (%)
Age	18–25 (Z generation)	184	87.6
	26–41 (Y generation or millennials)	24	11.4
	42–57 (X generation)	2	1
Gender	Male	100	47.6
	Female	110	52.4
Nationality	Portuguese	200	95.2
	Brazilian	10	4.8
Academic degree (last completed)	High school	113	53.8
	Bachelor's degree	79	37.6
	Master's degree	18	8.6
Occupation	Student	166	79.0
	Student-employed	44	21.0
Total		210	100

The assumptions to ensure a correct ANOVA analysis were verified, and the sample homogeneity was proven, using ANOVA tests to confirm if the sample had significant statistical differences between the four test groups. The questions to prove homogeneity were age, academic qualifications, and professional status. Participants were randomly distributed to each group, and the distribution was homogeneous in terms of age, as the ANOVA values were p-value = 0.503 (showing homogeneity between groups) (Table 40.2).

40.4.5 Manipulation Checks

To proceed with the analysis of the collected data, first is necessary to understand if the participants were aware of the manipulations they were exposed to. In this phase, a manipulation check is crucial. It consists in, using several questions, understanding if participants comprehend and reacted correctly toward the variation of the independent variable.

For the manipulation check of ad format, it was measured by "how much static is the content presented?" along a five-point scale, with one as "strongly disagree" and five as "strongly agree". The manipulation check of the ad certification in the advertisement scenarios used the method suggested by [46], and so participants were asked one dichotomy question (yes/no) after watching the advertisement scenario: "existed any logo in the advertisement, beyond 'Visit Azores' logo?"

The ad format manipulation check presents significant homogeneity of variances, and so one-way ANOVA was used since there is only one factor under study [47]. Regarding the ad certification manipulation check, the chi-square test was used, as the measurement was made through a yes/no answer. Since $p \leq 0.05$ ($p < 0.001$), hypothesis H0 is rejected for both ad format and ad certification manipulation checks (the average of the dependent variable has the same value in each group). Therefore, it is possible to conclude that at least two averages are different from each other.

40.4.6 Data Analysis

Principal component analysis is a data reduction technique that does not require the data to follow a normal distribution or that the variables are related. To determine the number of principal components (PC) to be retained, the following methods should be followed [33]: Percentage of variance criterion: This criterion takes into account the percentage of variance extracted by successive components, ensuring that they explain a minimum value of variance, which in the case of Social Sciences is 60%; and latent root (eigenvalue) criterion, where components with an eigenvalue greater than one are retained (Table 40.3).

Considering the results of both tests, the PCA analysis is acceptable (KMO output always ≥ 0.5), and the variables are significantly correlated (in all cases, in Bartlett's sphericity test, p-value < 0.001).

40.4.7 Reliability Analysis

Reliability analysis allows the researcher to assess the internal consistency between the multiple measurements of a variable, i.e., that the items of the scale measure the same construct and are highly intercorrelated [33]. From the analysis, it can be concluded that the scale items have a good intercorrelation. All measures were maintained under each variable since Cronbach's alpha would decrease if one was deleted.

40.4.8 Analysis of Variance (ANOVA)

In the current research, ANOVA analysis was also used. This analysis is often the most used statistical test in experimental design research because it allows the comparison of means in more than two groups or conditions to determine the statistical difference between three or more means [33, 34, 48]. ANOVA is "a procedure for determining how much of the total variability among scores to attribute to various sources of variation and for testing hypotheses concerning some of the sources" [49].

Table 40.3 PCA output

	1	2	3	4	5
PC1|Trust & credibility (α = 0.954)					
QTRUS2_The ad is trustworthy	0.908	0.084	0.200	0.138	0.134
QTRUS1_I trust what this ad has to say	0.902	0.041	0.147	0.137	0.188
QCRED3_This ad is believable	0.899	0.060	0.185	0.162	0.106
QTRUS3_The claims made in this ad are credible	0.829	0.128	0.256	0.141	0.107
QCRED1_This ad is generally trustful	0.784	0.139	0.277	0.191	0.059
QTRUS4_The ad felt authentic	0.764	0.036	0.122	0.307	0.090
PC2|Environmentalism (α = 0.904)					
QENV5_I would describe myself as environmentally responsible	0.055	0.842	0.037	0.049	0.102
QENV4_I am concerned about wasting the resources of our planet	0.040	0.842	0.074	0.103	− 0.086
QENV2_I consider the potential environmental impact of my actions when making many of my decisions	0.079	0.823	0.100	0.038	0.097
QENV1_It is important to me that my habits do not harm the environment	0.068	0.813	0.156	0.084	0.027
QENV3_My purchase habits are affected by my concern for our environment	0.026	0.808	0.051	0.056	0.135
QENV6_I am willing to be inconvenienced to take actions that are more environmentally friendly	0.136	0.741	− 0.050	0.026	0.097
PC3|Ad Relevance (α = 0.848)					
QINFO3_This advertising supplies relevant information	0.155	0.046	0.909	0.008	0.032
QINFO2_This advertising is a convenient source of information	0.217	0.049	0.764	0.098	0.177
QUTIL2_This advertisement contains useful information	0.326	0.140	0.696	0.173	0.152
QCRED2_This ad leaves one feeling accurately informed	0.481	0.128	0.642	0.023	0.017
PC4|Realism (α = 0.886)					
QREAL2_I could imagine an actual tourism destination as described here	0.256	0.091	0.036	0.884	0.097
QREAL3_I believe the tourism destination advertisement could happen in real life	0.174	0.137	0.089	0.883	0.057
QREAL1_I find the advertisement for this tourism destination to be realistic	0.461	0.070	0.148	0.730	0.079
PC5|Flow (α = 0.741)					

(continued)

Table 40.3 (continued)

	1	2	3	4	5
QFLOW3_While I saw the advertising, I felt totally captivated	0.069	0.051	− 0.033	− 0.044	0.824
QFLOW2_While I saw the advertising, nothing seems to matter	0.218	0.160	0.226	0.133	0.788
QFLOW1_While I saw the advertising, time seems to pass by very quickly	0.259	0.166	0.301	0.281	0.631
Eigenvalue	8.242	3.592	1.842	1.493	1.340
Percent of variance	37.462	16.326	8.375	6.786	6.090
Cumulative, percent	37.462	53.788	62.163	68.950	75.040

The null hypothesis (H0) for ANOVA is that the mean (average value of the dependent variable) is the same for all groups, and the alternative hypothesis (H1) is that there is at least one mean that differs from the others [34]. This calculation is done through the analysis of the variance of a given set of data, in between groups logic (where the variance is calculated for each group), then comparing this variance within the own group to see if the group mean is significantly different [33, 34].

To perform ANOVA analysis, the dependent variable should be metric, and the independent variable should be a more categorical (non-metric) variable, which also can be called factors or treatment [34]. In addition to this condition, three statistical assumptions must be satisfied [33, 34, 50].

40.5 Results

The goal of this chapter is to present the results of the effects of the manipulations done in the independent variables regarding the topics under analysis. The techniques used to measure these effects were analysis of variance (one-way ANOVA, as there was only one factor: the groups) to perceive the general difference between groups, and two tests a posteriori (Tukey test and Bonferroni test) to compare the means of more than two groups, and rejecting H0 (that is, p-value < 0.05), means that the pairs of means of the groups under analysis are not equal [47].

Analysis of variance is used to verify whether differences of means of two or more independent groups are statistically significant, where the dependent variables are affected by the independent variable effect [34]. In this research, the intention is to perceive if the variables (advertising certification: with versus without and advertising format: video versus image) had any impact on dependent variables (trust and credibility, environmentalism, ad relevance, realism, and flow).

Table 40.4 Trust and credibility mean per experimental group

Experimental group	N	Mean
1. Image without certification	53	− 0.293
2. Image with certification	53	0.013
3. Video without certification	53	0.117
4. Video with certification	51	0.169
Total	210	

Table 40.5 Trust and credibility ANOVA test

		Sum of squares	df	Mean square	Sig
Trust and credibility	Between groups	6.749	3	2.250	0.079
	Within groups	202.251	206	0.982	
	Total	209.000	209		

40.5.1 Trust & Credibility

By considering Table 40.4, it is possible to conclude that trust and credibility has a higher value when the ad has a certification (M = 0.013) and when the ad is a video (M = 0.169).

ANOVA analysis was done to understand if these differences are statistically significant (the assumptions are guaranteed) (Table 40.5).

Since p > 0.05, it indicates that the differences in trust and credibility mean between groups is not statistically significant for a 0.05 level. However, it is statistically significant for a, 1 level. By doing a multiple comparison test, it was used Tukey and Bonferroni tests. To sum up, from a statistical point of view, trust and credibility do not vary significantly according to the treatment.

40.5.2 Environmentalism

By considering Table 40.6, it is possible to conclude that environmentalism has a higher value when the ad (image) has a certification (M = 0.026) but a lower value when the ad is a video (M = − 0.028).

An ANOVA analysis was done to understand if these differences are statistically significant (the assumptions were met) (Table 40.7).

Since p > 0.05 indicates that the differences in environmentalism mean between groups is not statistically significant.

Table 40.6 Environmentalism mean per experimental group

Experimental group	N	Mean
1. Image without certification	53	0.011
2. Image with certification	53	0.026
3. Video without certification	53	− 0.009
4. Video with certification	51	− 0.028
Total	210	

Table 40.7 Environmentalism ANOVA test

		Sum of squares	df	Mean square	Sig
Environmentalism	Between groups	0.089	3	0.030	0.993
	Within groups	208.911	206	1.014	
	Total	209.000	209		

40.5.3 Ad Relevance

By considering Table 40.8, it is possible to conclude that ad relevance has a lower value when the ad (image) has a certification (M = − 0.187) but a higher value when the ad is a video (M = 0.069).

To understand if these differences are statistically significant, an ANOVA analysis was done (the assumptions were met) (Table 40.9).

Since $p > 0.05$, it indicates that the differences in ad relevance mean between groups is not statistically significant.

Table 40.8 Ad relevance mean per experimental group

Experimental group	N	Mean
1. Image without certification	53	0.221
2. Image with certification	53	− 0.187
3.Video without certification	53	− 0.100
4. Video with certification	51	0.069
Total	210	

Table 40.9 Ad relevance ANOVA test

		Sum of squares	df	Mean square	Sig
Ad Relevance	Between groups	5.206	3	1.735	0.157
	Within groups	203.794	206	0.989	
	Total	209.000	209		

Table 40.10 Realism mean per experimental group

Experimental group	N	Mean
1. Image without certification	53	− 0.128
2. Image with certification	53	0.002
3. Video without certification	53	0.086
4. Video with certification	51	0.042
Total	210	

Table 40.11 Realism ANOVA test

		Sum of squares	df	Mean square	Sig
Realism	Between groups	1.359	3	0.453	0.718
	Within groups	207.641	206	1.008	
	Total	209.000	209		

40.5.4 Realism

By considering Table 40.10, it is possible to conclude that realism has a higher value when the ad (image) has a certification (M = 0.002) and higher if the ad is a video (without certification) (M = 0.086) but a lower value when the ad is a video with certification (M = 0.042).

To understand if these differences are statistically significant, an ANOVA analysis was done (the assumptions are guaranteed) (Table 40.11).

Since $p > 0.05$, it indicates that the differences in realism mean between groups are not statistically significant.

40.5.5 Flow

By considering Table 40.12, it is possible to conclude that flow has a higher value when the ad (image) has a certification (M = 0.082) and higher if the ad is a video (without certification) (M = 0.303), but a lower value when the ad is a video with certification (M = 0.057).

Table 40.12 Flow mean per experimental group

Experimental group	N	Mean
1. Image without certification	53	− 0.439
2. Image with certification	53	0.082
3. Video without certification	53	0.303
4. Video with certification	51	0.057
Total	210	

To understand if these differences are statistically significant, an ANOVA analysis was conducted (the assumptions were met in Table 40.13).

Since $p < 0.05$, it indicates that the differences in the flow mean between groups are statistically significant. By doing a multiple comparison test, Table 40.14 was created. It was used Tukey tests. To sum up, from a statistical point of view, the flow varies significantly according to the treatment.

As seen in Table 40.14, the flow average when the advertising is an image is lower when compared with video advertising means. As claimed by the multiple comparison tests and looking into Tukey tests, the difference between the averages

Table 40.13 Flow ANOVA test

		Sum of squares	df	Mean square	Sig
Flow	Between groups	15.582	3	5.194	0.001
	Within groups	193.418	206	0.939	
	Total	209.000	209		

Table 40.14 Flow multiple comparison tests

Dependent variable	Combinations		Tukey
Flow	Image without certification	Image with certification	≠
		Video without certification	≠
		Video with certification	≠
	Image with certification	Image without certification	≠
		Video without certification	=
		Video with certification	=
	Video without certification	Image without certification	≠
		Image with certification	=
		Video with certification	=
	Video with certification	Image without certification	≠
		Image with certification	=
		Video without certification	=

of image advertising and video advertising averages is statistically significant. While doing posteriori tests, Tukey tests are generally the preferred test for conducting post hoc tests on a one-way ANOVA, H2.5 can be confirmed.

40.6 Discussion

This study's primary purpose was to understand if advertising certification and advertising format impact consumer environmental awareness. Indeed, one studies was carried out to answer the research question and goals: an experimental design research.

As sustainable tourism is becoming a vital differentiation factor that can boost tourism competitiveness [15, 51], interviews were conducted to understand if university students appreciate certification advertising and if they perceive the advertising format differently. Some inconsistencies were found in the interviews analysis. So, the experiment design was carried out by a 2 (certification: with and without) × 2 (advertising format: image versus video) between-subject experimental design, with four experimental conditions and four advertising formats selected from the Azores Tourism Instagram page.

The experiment's results helped to answer the research question (What is the most effective way to communicate a sustainable tourism destination?). The goal was to see if, according to the treatment level associated (image with certification, image without certification, video with certification, and video without certification), there would be significant differences between these measures.

There was no evidence from the research results that the presence of a logo in an advertisement can give credibility and trustworthiness, and it can improve the quality of the advertisement image [25], providing clarity to visual communication. The pandemic context where the research was carried out may have a huge impact on these conclusions and so the literature review was not fully supported by this research because the research conditions were carried out under COVID-19 pandemic context.

On the other hand, the video format provides opportunities for communication to become more educational and to be used as a tourism management tool [32], increasing the competitive advantage of the businesses that adopt this communication strategy. Since hypothesis 2.5 was supported in the study, it can be confirmed that video format is more educational and can positively impact consumer environmental awareness-raising.

Communication is fundamental for every business's success and is the process that can achieve public relations goals, being vital as it is structured and done to inform, convince, motivate, and provide mutual understanding. The concepts of marketing and sustainability may seem incompatible [14], but there is still a need to develop and implement effective strategies for achieving sustainability goals [21].

40.7 Conclusion

This study developed some sustainable tourism advertising effects and consumer environmental awareness-raising. It examined them by advertising certification and advertising format in a field experiment, using five dependent variables: trust and credibility, environmentalism, ad relevance, realism, and flow. The model developed was empirically tested by a 2 (certification: with and without) × 2 (advertising format: image versus video) between-subject experimental design, with four experimental conditions.

The main finding regarding the research question, "What is the most effective way to communicate a sustainable tourism destination?" has proven that video advertising promotes a higher flow in the consumer. So, it leads to more effective communication. Nothing was proven regarding the other variables under study (trust and credibility, environmentalism, ad relevance, and realism) and neither regarding ad certification impact.

However, if the goal of the destination is to build sustainable tourism, then it is mandatory to educate the tourist to be part of the change and to positively impact the transformation needed [52], and communication can have consequences in improving sustainability, raising awareness, and educating [20], impacting the tourist's behavior and mindset and the tourist's feeling about the destination.

To increase awareness about the availability of sustainable travel services and products, sustainable communication is a solution to inform consumers and tourists about these offers and how they can meet their needs, simultaneously comply with sustainability criteria, and stimulate pro-sustainable purchases [16].

40.7.1 Managerial Implications

The present study's findings provide important implications for sustainable tourism advertising in terms of designing effective tourism ads and measuring tourism advertising effects based on consumers' responses to ads. The measurement items established in this study provide a guideline for destinations to understand and evaluate the effectiveness of sustainable tourism advertisements and use innovative marketing strategies to help the growth of a destination's share of the tourism market [53]. It also may encourage organizations to adopt sustainable practices and motivate tourists to buy and behave as sustainably as possible [54].

Furthermore, the findings of this study indicate that an appropriate and effective ad format does not necessarily have to be the newest, most fascinating, most high-tech, or coolest media format. Having or not a certification while promoting the destination is not crucial. Still, if the marketer offers an immersive experience to the consumer, it may lead to an environmental awareness-raising and consequently to a more conscious tourist while in the destination and traveling.

40.7.2 Academic Implications

Although there are several research studies regarding sustainable tourism, few are related to sustainable tourism e-communication. Most of them touch on the innovation of sustainable tourism e-communication or sustainable tourism development metrics. The present study makes several significant contributions to the existing literature. It is among the first to propose and empirically examine the structural model for tourism advertising effects. This research contributed to understand better sustainable tourism advertising (that is still less studied) and how it can impact consumer environmental awareness-raising [52]. As a result, and as some hypotheses under the study were not supported, it can lead to more research on sustainable tourism advertising and its effects and on specific metrics and model creation to measure tourism advertising effects and consumer awareness-raising in tourism.

40.7.3 Limitations and Future Research

This study contains some limitations. The research conclusions are based on a hypothetical scenario like any laboratory experiment, it does not represent real life in all its elements. The self-selection of the samples used may also have contributed to the existence of bias in this study, since it reflects only the perceptions of a specific group of individuals [34]. For causal research, such as this one, convenience samples are not suggested. However, this type of sample is acceptable because this is a pilot study. The sample can be increased, and it can be more varied (and not include only students) to try to increase the ecological validity.

Moreover, communicating sustainability is challenging because of its abstract and vague nature and because it is difficult for consumers to recognize and understand sustainability product attributes—and their added value [16].

Future studies are encouraged to examine if there is any interaction effect between the advertising certification and advertising format. Comparative studies exploring differences in tourism advertising effects between various age groups and more advertising formats are also welcomed and necessary in future research. Third, studying the impact of different traveling purposes and travel goals on consumer environmental awareness would also be necessary.

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Chapter 41
A Systematic Literature Review on Accessible Tourism and Marketing Strategies: Where Do We Stand

João Tiago Magano Lourenço and Raquel Reis Soares

Abstract We are facing times when the accessible tourism topic and market segment are increasing and facing challenges within the tourism industry due to the lack of interest in developing this market. It is also known that people with disabilities are entitled to be able to travel with accessibilities and being considered as an equal part of the market. This study aims to understand how the literature and academic community is scoping these fields of the accessible tourism and accessible tourism marketing and strategic marketing. Through a sample of 109 indexed articles, a descriptive analysis was carried out and the results presented in this study.

Keywords Accessible Tourism · Tourism Marketing · Marketing Strategy

41.1 Introduction

Since we are facing times when the People with Disabilities (PWDs) community is becoming increasingly represented and outspoken in society, and the number of PWDs traveling around the world is increasing every year [1, 2], it became necessary to conduct a Systematic Literature Review (SLR), scoping the subjects of accessible tourism and tourism marketing strategies, to understand how the literature is scoping the promotion of traveling among PWDs.

In terms of numbers and statistics, there are over a billion people who live or experience some form of disability, and the World Health Organization (WHO) expects this number to rise due to the increasing average age of the world population [3]. The American Disability Association defines a disability as "any condition of the body

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or mind (impairment) that makes it more difficult for the person with the condition to do certain activities and interact with the world around them" [4].

Looking into Eurostat [5] data, it is not possible to state yet the exact number of people with disabilities in the European Union (EU) and specifically in Portugal, but it is possible to estimate that in 2015, about 42 million people had at least one disability, which represents 12.6% of the overall population in Europe. In Portugal, this number was estimated in 597 thousand having some form of disability, which represented 8.7% of the Portuguese population.

Statistically, within the EU, accessible tourism represented 783 million trips in 2012, and, according to GFK Belgium [6], the numbers were expected to grow to about 862 million trips per year by 2020.

In 2006, the United Nations Convention on the Rights of People with Disabilities, recognized the same and equal rights between non-disabled and PWDs within leisure, recreation, and tourism [7]. However, it must be contingent upon the priorities of governments and states to provide services and resources to PWDs, and to ensure that the private entities offering facilities and services open to the public, must comply with the accessibility requirements. The UN is then pushing destination promotion organizations managers to ensure that "all persons, regardless of their physical or cognitive needs, are able to use and enjoy the available amenities in an equitable and sustainable manner" [8].

With the high and recent interest in studying the topic of the accessible [1, 2, 7, 9, 10], the academic community is turning toward the topic, scoping the accessible tourism and related topics, attempting to explore, and addressing the issues in the accessible tourism. However, accessibility it is know that the accessible tourism market is still neglected, despite this being highly loyal and with a high market value target group [1, 2, 11]. PWDs are already recognized in the tourism industry and their access to the venues and services are becoming topic of discussion, but this industry lacks the perspective and role of PWDs getting recognized and involved in the process of decision and promotion [7, 12]. There is also mention of barriers when trying to promote products for PWDs [13].

Promoting and advertising is essential and crucial when it is needed to empower the interests of PWDs when they want to plan and visit tourist destinations [2, 7, 9]. Though, there are recent studies scoping the inclusion of PWDs in tourism promotional materials and the accessibility of tourism information to PWDs and those studies are covering different areas of the world, such as Europe, United States, and Australia.

According to Gondos and Nárai [1], the accessibility concept may be defined as a group of policies adopted in accordance with the law of each country, to ensure the people with disabilities the free and total access to all public access places. The United Nations Convention on the Rights of Persons with Disabilities [8] also recognizes that it is essential to the consumer with disabilities, the total access and participation in the society, and the complete access to the private market. That is explicit in Article 9, which states that it is the role of the states to ensure that the private entities offering facilities and services open to the public, must comply with the accessibility requirements.

The European Union (EU), the state members and the brands based in their territories are failing when they do not recognize the people with disabilities and equal participants of the market [14]. However, it is already proved the western denial to accessible tourism, despite the growing critical tourism literature [2].

Since the literature shows that the accessible tourism is becoming a topic of high interest in society [1, 2, 13, 15], this study aims to understand how the academic community is approaching the existing literature relating tourism marketing strategies and the accessible tourism concepts. Also, to date, as far as it is known, any studies have been carried out in the past few years, focusing on these two specific topics.

This research is performed based on a SLR, on a conceptual basis and with a collection of academic articles indexed in the Web of Science, following the PRISMA Protocol to ensure the integrity of the data and structure, and then analyzed using the NVivo Software.

The study is divided into five major sections, namely abstract, introduction, materials and methods, results, and discussion and conclusion, where the research limitations and suggestions for future research are also mentioned.

41.2 Materials and Methods

The methodology selected for this research was the SLR [16]. This methodology allows researchers to develop a perspective on the existing literature and knowledge and aims to state what is already explored and is missing in studies [17–19]. This type of review was selected due to some authors mentioning the lack of accuracy associated with the traditional literature review, the subjectivity of the authors, but also develops the existing perspective on the existing knowledge and aims to show what is already explored and is lacking on the existing studies [17–19]. Another advantage of the SLR is how effective it is in the process, extracting relevant research articles to the final report and mentioning descriptive analysis on important metrics [18–21].

41.2.1 Research Design

To conduct this study, a relevant literature research design and data collection strategy were outlined. The keywords selected were “Marketing Strategies”, “Marketing”, “Hospitality”, “Accessible Tourism”, “Accessibilities”, and “Customers with disabilities”. These keywords reflect the main topics of this study and the most important words defining the research. The criteria included peer reviewed journal articles published in English and Portuguese only. To assist with the process of a SLR, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flowchart [22] and the three steps (Planning the review, Conducting the review;

Reporting and dissemination) associated to the basic SLR [21] were both adopted as the basis of selection criteria and research development [23]. The focus was the existing literature on Marketing Strategies in the Hospitality Industry, with scope on people with disabilities. There was no considered time span, considering all the articles published up to the date of the articles collection. To ensure quality assessment and selection of papers, this search was conducted based on peer reviewed journal articles. Duplicate records were screened, and the relevance of the remaining articles for the study was also screened to maintain the constant quality.

The database selected was ISI Web of Science—Current Contents Connect, with scope on Social & Behavioral Sciences, one of the largest indexed impact factor journals databases.

Only the Marketing Strategies, Marketing, Customers with Disabilities, Accessibilities, Tourism, Hospitality terms should be used while searching for articles. Only Tourism and Hospitality Management, Management and Marketing related articles must be considered. All the studies will be exported to Endnote 20 sorted by main topic. After a title and keywords analysis, only those containing the terms mentioned above, are topic related and containing the keywords (that were defined as search terms as well) were considered for NVivo 12 content analysis and coding. This analysis and coding are based on patterns of words, keywords in abstracts and the creation of node categories to develop further analysis.

Every step of the research, selection and eligibility criteria were recorded to ensure the replicability of this study in future research, as it was also recorded on the PRISMA flowchart and checklist. These documents confirm that all the items are present on the final report and the number of articles collected, screened, and finally considered for analysis are always noted and no data is missing.

After collecting all the articles using the steps described previously, 1624 articles were found. After screening the presence of the previously described search topics in the title and keywords sections, 1479 articles were sought for retrieval, but only 467 were found assessed for eligibility after abstract and main topic screening.

After excluding not related articles and those that were not possible to find the full text documents, only 109 were sought for retrieval and accepted for further coding and analysis.

After importing the final articles to Nvivo 12, queries and graphic analysis were performed.

41.3 Results

Analyzing the distribution of papers per year, with respect to the tourism marketing, accessible tourism, and marketing strategy related papers, it is possible to see an increasing tendency in the last decade. It is possible to notice a substantial increase in the number of papers published, mainly since 2017 (see Fig. 41.1).

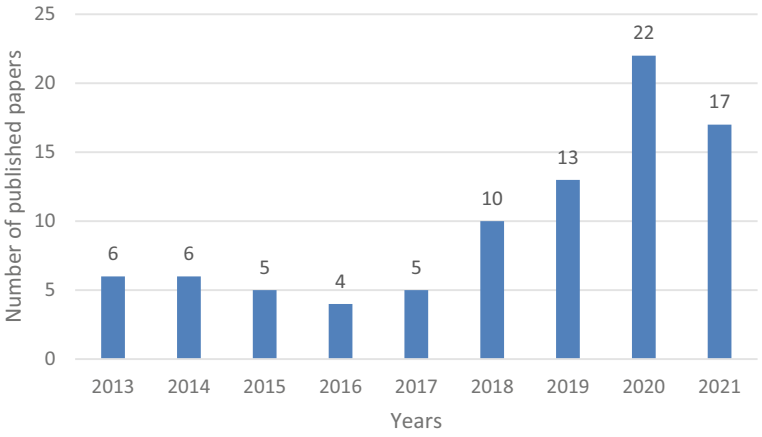


Fig. 41.1 Number of published papers per publication year

Due to the lack of relevant numbers and data from 2002 to 2012, in some analysis, only data from 2013 to 2021 was presented in the figures. Although, we can highlight a drop in the number of papers published in 2021, going back to numbers near 2019.

Regarding the journals per year, it comes with a similar tendency as Fig. 41.1. There is a clear tendency of journals publishing in these fields. In 2020 and 2021, the total number of journals that published papers in the accessible tourism and tourism marketing was 24 (see Fig. 41.2).

Looking in detail at the distribution of papers per year shown in Fig. 41.1 and to the journals per publication year in Fig. 41.2, it shows that the fields of accessible tourism and tourism marketing are yet to be explored and there is a specialization related to those topics. With most impact on these numbers, there are journals of high relevance, such as the Sustainability, Tourism Management, International Journal of

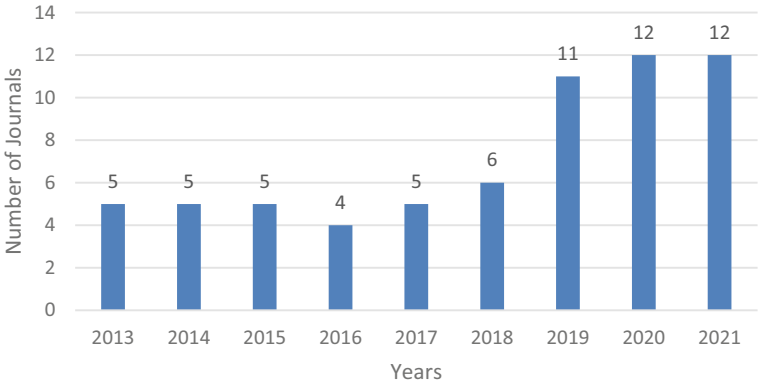


Fig. 41.2 Number of published journals per year

Table 41.1 Top 5 published journals

Journal	Percentage of publications (%)
Sustainability	11
Tourism Management	8
International Journal of Contemporary Hospitality Management	6
International Journal of Hospitality Management	5
Current Issues in Tourism	4

Hospitality Management, Current Issues in Tourism, and the International Journal of Contemporary Hospitality Management, as shown in Table 41.1.

Considering the top 5 journals with most publications, it is possible to understand the numbers on Fig. 41.2, with those journals representing 35% of the overall work sample.

It is possible to identify the interest of exploring the main topics of this study. Figure 41.3 shows an increasing number of single authors publishing in Accessible Tourism and Tourism Strategic Marketing. Since 2010 there is a variation until 2017, but since 2018, the number of single authors publishing in these areas is increasing, with a maximum of 68 registered authors publishing in 2020.

Regarding the main topics approached by the authors, we did a classification by main topic and scope. The final topics were tourism marketing, tourism and hospitality management, literature review, strategic marketing, and accessible tourism. The tourism marketing and strategic marketing topics were distinguished to understand how many papers approached the strategic marketing topic, since this is one of the main topics of this study.

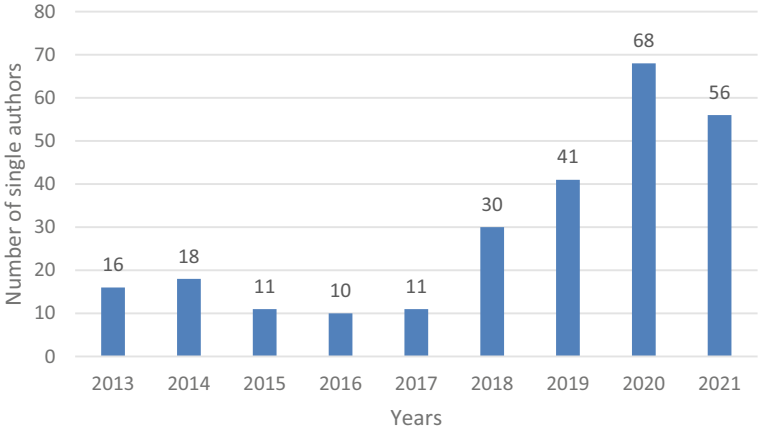


Fig. 41.3 Number of single authors per year

Looking into Fig. 41.4, it is possible to conclude that the two main topics of these work samples were accessible tourism and tourism marketing. Accessible tourism was identified as the main scope in 59 papers, and tourism marketing in 26 papers. However, the strategic marketing (most of the papers were related with tourism strategic marketing) only was approached in 4 papers in our sample, becoming the topic with the lowest number of papers.

Accessible tourism has been a topic with increasing interest, as it has been more important, and a topic of discussion in society. The big wave of publications started in 2017 and its peak was in 2020, with 14 papers published (Fig. 41.5).

Regarding the tourism marketing papers, it is possible to conclude that there has been an even distribution of publications through the years, despite that the regular publication of papers has only started in 2013, and the years with the most publications were just in 2020 and 2021 (Fig. 41.6).

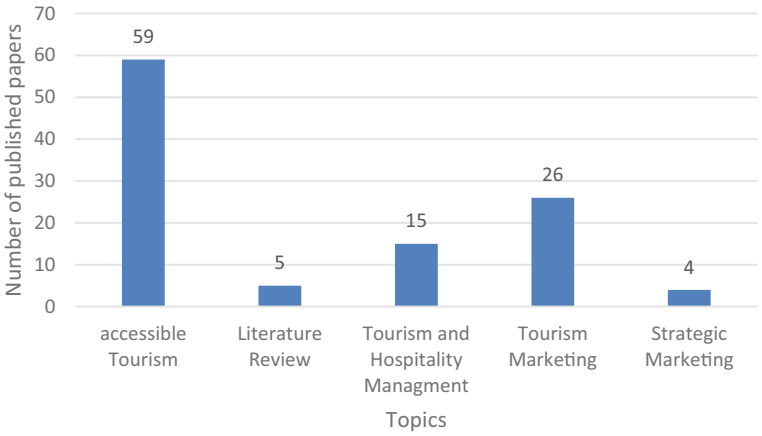


Fig. 41.4 Number of published papers by topic

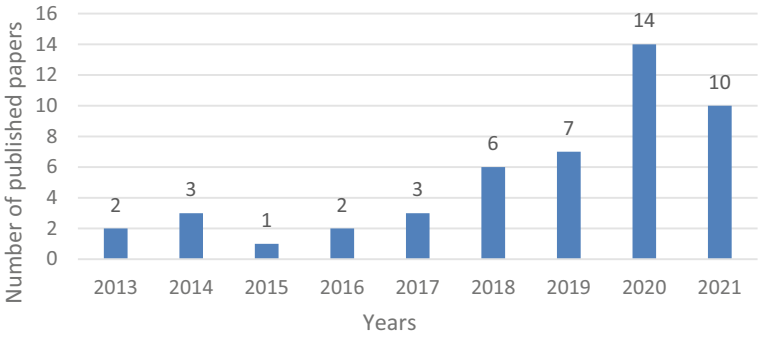


Fig. 41.5 Number of published papers in Accessible Tourism

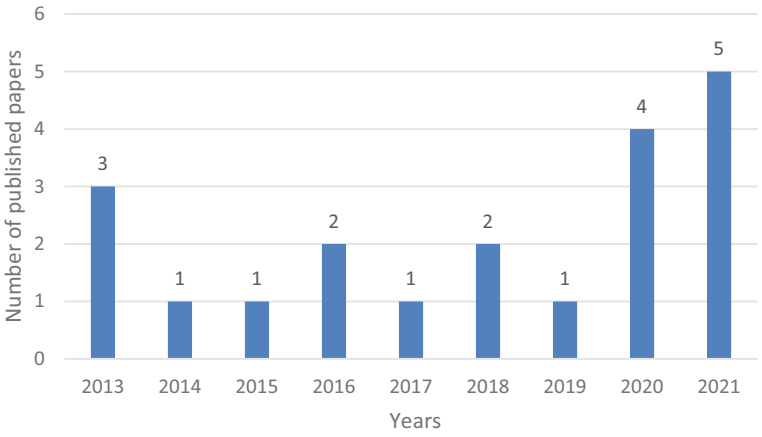


Fig. 41.6 Number of published papers in tourism marketing

The purpose of this study is to review literature in the accessible tourism and tourism strategic marketing, but few papers scoping the tourism and hospitality management field were also identified, with references to the accessible tourism and the behavior toward people with disabilities. It is a field yet to be explored, as it lacks studies in several years, but it has increased its publications in 2019 and 2020 (see Fig. 41.7).

The last topic identified as the main scope of our study papers samples, and one of the main topics of this study, is the strategic marketing, which includes strategic marketing literature and tourism strategic marketing studies. However, as it is possible to observe on Fig. 41.8, only four studies in our sample were identified as relevant

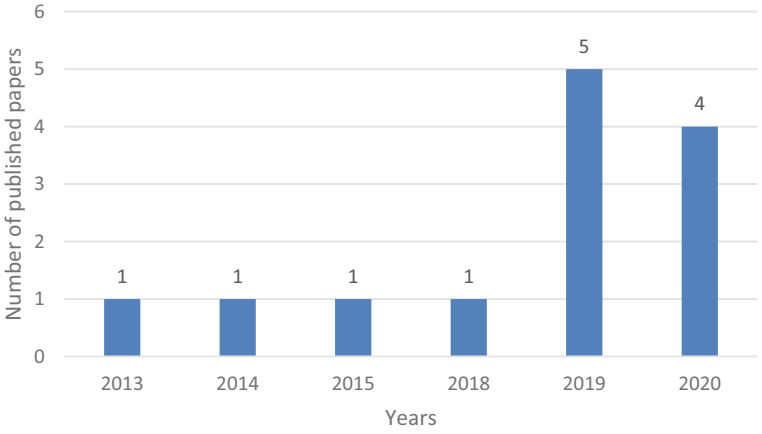


Fig. 41.7 Number of published papers in hospitality and tourism management

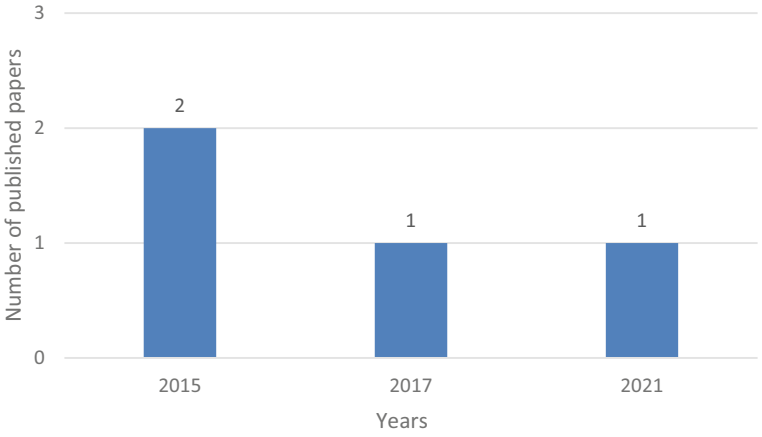


Fig. 41.8 Number of published papers in strategic marketing

in the strategic marketing field. There were two publications in 2015 and only one in 2017 and 2021.

It was found that many papers in our sample related to marketing, including digital marketing toward people with disabilities, didn't have any relation to the strategic marketing field, and were experimental studies.

Finally, a word cloud was generated (Fig. 41.9) from the keywords and abstracts present on the analyzed papers. It was found that the marketing and the strategic marketing words are not the most important words in this cloud, however, there are mentions to people with disabilities and the accessible tourism. It is interesting to point that the most emergent themes are related to the main topics of this study, but there is a lack of mention to the marketing fields in the main words group, which confirms the predicted gap that originated this SLR that the accessible tourism marketing and the accessible tourism strategic marketing are fields yet to be explored.

41.4 Discussion and Conclusion

This paper contributes significantly to understand how the academic community is scoping the topics of marketing strategy, accessible tourism, and tourism marketing. Results demonstrate and confirm that the fields of accessible tourism and tourism marketing are becoming more explored over the years and confirm and support previous studies [7, 10]. By narrowing the scope of our topic to only articles related to marketing strategies, accessible tourism, and tourism marketing, but also to PWDs, it was possible to verify a limited number of published papers and it is important to mention that the inclusion of PWDs within the tourism industry should start when the process of offering services and opportunities also starts.



Fig. 41.9 Most emergent topics word cloud

One of the limitations of this study, besides the nature of the study itself, was the very specific subject and the fields of the topics. Also, several studies were excluded due to the lack of relation with the scope of this research, although there are studies approaching the topics of this study.

This study also welcomes future literature reviews and research, with special focus on meta-analysis, to analyze the development of the research in these fields, suggesting the need for development and studies in the tourism strategic marketing field, scoping PWDs.

Future studies conducting empirical research, relating Tourism and Hospitality Marketing Strategies and the Accessible Tourism are welcome. There is also space and opportunity to conduct consumer behavior experimental and relational studies relating these two major topics.

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Chapter 42
Operationalizing Business Intelligence for Local Level Tourism Destination Performance



Andris Klepers and Ilgvars Ābols

Abstract There is a tough competition among various local tourism Destination Management Organizations (DMO) as destination developers to attract visitors and resources. Despite smart tourism concept development and appreciation of its importance, tourism specialists working in the local tourism DMOs throughout various countries have encountered problems to ground the business intelligence to the practical level of their scale and needs. There are various technological advances and forms of data analytics used by national DMOs, but digital gap on a local level having competitive advantage from it is a common issue. How to manage and turn data into insights for tourism development and make it operational? This framework combines the structure of geographic information system (GIS) database management, business analytics, tourism development performance management, and data visualization to guide the local DMO tourism specialist in drawing knowledge from the various related data. A case study from a local DMOs in Latvia is conducted to demonstrate the practical validity of the proposed business intelligence framework to manage destinations more effectively and toward sustainability.

Keywords Tourism Destination · Marketing · GIS Database

42.1 Introduction

There are different technological advances applied into the daily actions of national level tourism destination management organizations, yet the local level tourism Destination Management Organizations (DMOs) are far from optimal agenda of using technologies and set of processes that convert raw data into meaningful information. These management actions covered by 'business intelligence' include obtaining and structuring various data on tourism performance used for planning, marketing

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or monitoring local tourism destination to do future actions more efficiently and supporting fact-based decision making using historical data rather than assumptions and gut feeling. Problem is caused partly by digital gap initiated by lack of knowledge, resources or capacity, which is sometimes influenced by stereotypes that only large DMO can afford similar business intelligence data basis for their development purposes. As tourism developments are closely related to time and space, geographic information system (GIS) data base may be useful decreasing part of that gap in a well-structured way also ensuring the involvement and participation of the stakeholders, especially entrepreneurs.

Objective of this research is to demonstrate the GIS-based business intelligence options for the public sector local level DMO management and marketing actions based on their strategic development and daily operational needs.

42.2 Materials and Methods

42.2.1 Digital Transformation of Local Destination Management to Enhance Competitiveness

As there is a tough competition among various local tourism DMO to attract visitors within the extended understanding of DMOs as 'destination developers' [15] researchers and developers have worked constantly with these issues. Despite smart tourism concept development and appreciation of its importance, tourism specialists working in the local tourism DMOs throughout various countries have encountered problems to ground the business intelligence to the practical level of their scale and make it operational. That includes as Vajirakachorn and Chongwatpol [18] generalized 'managing and turning data into insights for tourism' or more detailed: accumulation of data characterizing tourism development, connection and interpretation of various data sources, the ability to fit it into a more comprehensive context, although ensuring of organizational memory or succession, handing over work and records to other colleagues on a regular basis. Integrating collaborative data in data-driven business intelligence system brings an opportunity to foster the decision making process toward improving tourism competitiveness [6] what is important for all scales of destinations.

Depending on the size and financial resources available local tourism DMO could be divided into DMOs with full territorial and product related tasks and kind of local visitor bureaus with limited tasks [3]. Local tourism DMO has undergone a transformation of several key functions in recent decades, e.g., function to serve incoming tourists face-to-face with useful information in designed tourism information centers as one of the local level tourism destination governance pillars [1] has digitalized widely and contemporary DMO include orchestrating digital transformation across the sector [13] working from the back office mainly. Technologically intelligent DMOs may enhance and sustain their long-term competitiveness in the

marketplace and overcome one of the major challenges faced by many destinations, namely, effective management of diverse industry stakeholders [10, 17]. As Volgger and Pechlaner [19] emphasis about a linkage between DMO success and destination success that DMOs are required to act as network managers actively fostering collaboration between destination stakeholders what becomes a key to ensuring a destination's competitiveness. But there is a lack of meaningful operational tools to fulfill that regularly.

Destination management as a way of developing tourism destinations through 'digital transformation' has been linked to the concept of smart tourism destinations as essential for a DMO to become more effective in terms of knowledge creation and sharing, as well as enhanced tourist experiences [5]. Technological infrastructures to create a digital environment (i.e., ecosystem) that could be used to raise competitiveness of a destination is part of this process [2]. Business intelligence and analytics have been applied in many fields across tourism sectors until recent highlighting either data base technological assets [11], thematic areas (e.g., local festivals by Vajirakachorn and Chongwatpol [18]), selected metrics for destinations, e.g., tourist trajectory data [21]. Even more since development of computerized reservation systems in the 1980s, large and comprehensive databases are available for various types of tourism transactions related to customers booking patterns and consumption behavior, however similar solutions on local tourism DMOs are rather exception yet.

Business intelligence with comprehensive data analytics should enables competitiveness of the local DMO supporting following functions [4]:

1. Internal stakeholder relation (any form of interaction among stakeholders, including communication, partnerships (other than marketing), collaboration, stakeholder buy-in, visibility within the community, community buy-in, and government relations);
2. Operational activities (marketing, management, product development, policy making, service provision, etc.);
3. Resources (funding issues);
4. Performance measurements (factors that illustrate the DMO has, or will increase, the performance of the destination, or determinants of internal performance of the DMO).

42.2.2 Geographical Perspective for the Business Intelligence Data Base

Data characterizing tourism destination performance is information that could be summarized and structured in a different forms including texts, tables, charts, pictures, and maps among them. None of the mentioned is sufficient enough to satisfy needs of quick perception and decision making process based on analytics alone. Specifics of the local scale tourism destination highlights the notions of tourism, recreation, and leisure and their spatial interaction as they are regarded with the

'consumption of the same places' [12] and have economic or environmental impact. Carr [7] argues that many forms of tourist behavior are extensions of established behaviors in leisure environment of our daily lives and hence rather than conceiving of leisure and tourism as polar opposites, it is more meaningful to visualize the different forms of engagement with leisure and tourism as being arranged along a continuum. Tourism is an intensely geographic phenomenon and the spaces and places in which tourism occurs are usually fundamental to the tourist experience [20]. Spatial approach has another advantage on how the data of business intelligence are applied stressing the need for planning. Tourism planning is one of the strategic outcomes that ensures the integration of tourism alongside other economic sectors, direction and control of physical patterns of development, conservation of scare or important resources, active promotion and marketing of destinations, creation of relations between tourists and local community or planning of thematic complex tourism products along the destination. Further developments including mapping approach in combination with various data sources and visual adjustments have followed, e.g., ESRI ArcGIS StoryMaps [8].

42.2.3 Method

Longitudinal research method has been used to collect data from four local tourism DMO (administrative municipality level or tourism cluster network). In all four cases authors were involved in elaboration of mid-term tourism destination strategies for them proposing future developments, thematic actions and monitoring of key-performance indicators. The earliest strategies have been started in 2012, latest in 2017. In all cases strategies were updated or elaborated repeatedly after period of five or six years allowing to assess the same sample for identical measures. Research design included longitudinal data collection on retrospective panel design (sample is established and asked to provide data on past behavior with respect to identical measures) [14, 16]. Data were collected on the monitoring platforms, how DMO specialists have collected and structured data related to key-performance indicators, what technological advances they have implemented. In-depth interviews were performed with the managers for better understanding of the process of strategy implication, the need for business intelligence solutions, resources available to incorporate it in their daily agenda, thematic functions where they need solutions for to raise competitiveness. Practices of other (28) local tourism DMO has been analyzed based on their development strategies and technological advances used for monitoring purpose of the destination performance over time.

42.3 Results and Discussion

Characteristics of the GIS-based business intelligence platform in correspondence of the needs of local tourism DMO:

- easy to operate and not resource intensive due to limited capacity of DMO;
- complementary and interactive to add and update data on a regular basis;
- instrumental to involve entrepreneurs and other stakeholders;
- self-exploratory that works intuitively without long and complex instructions;
- accumulative with option to add historic data about key-performance indicators;
- automotive in some degree with possibility to upload certain type of raw data that are structured in visual and spatial information;
- contextual to overview local destination performance in regional or national frame or to be able make comparisons with other destinations.

Operationalizing business intelligence for local tourism DMO performance within the GIS-based framework include several advantages:

- spatial order and structure converting various raw data into meaningful information that drives more efficient tourism development, transform data into actionable map-based visual intelligence and knowledge;
- visualized maps in combination with charts are easy to perceive and has a significant impact on DMOs strategic, tactical, and operational business decisions supporting fact-based decision making using historical data rather than assumptions and gut feeling;
- similar than other solutions tools platform should perform data analysis and create reports, summaries, dashboards, maps, graphs, and charts to provide DMO specialists with detailed intelligence about the nature of the tourism development in their area or contextually.

Part of the solution include data transformation into the charts along the main four spheres (see Fig. 42.1): economic impact, social impact, environmental impact, and DMO governance.

Key-performance indicators around the four thematic areas are organized according the selected criteria from ETIS—European Tourism Indicators System for sustainable destination management [9]. There are different options to change the scale of the functional destination adapting the key-performance indicators for selected area, not only fixed administration borders.

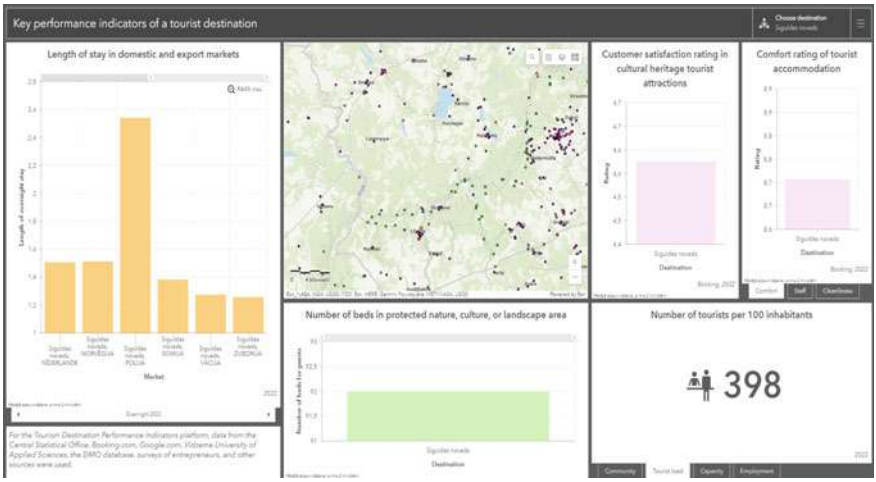


Fig. 42.1 Example from the map and chart dashboard with key-performance indicators characteristic for governance, economic, environmental, and social impact. *Source* ViA HESPI, 2022

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Part IX
Virtual and Augmented Reality in Marketing

Chapter 43
Virtual Reality as a Learning Mechanism: Experiences in Marketing

Carlos Ramos-Galarza, Mónica Bolaños-Pasquel, and Jorge Cruz-Cárdenas

Abstract Virtual reality or VR is the simulation of a real or imaginary environment, which can be experienced as an abstraction of the real environment, which in turn allows the user to interact through a technological device within that simulation. Likewise, the user has the ability to modify the surrounding system by means of motion sensors, which will allow him/her to feel, and perceive as he or she is immersed in virtuality. Thanks to VR, sensorial perception is amplified, allowing to enhance our experiences of the real world, so that VR provides us with safe space of learning. Because of it, there has been seen necessary to review the scope of VR in marketing education, addressing that technology advances present excellent tools useful for the training of better professionals, as well as being support into rehabilitation processes, such as in learning difficulties at all marketing educational levels.

Keywords Learning · Teaching · Technological innovations · Virtuality · Virtual reality

43.1 Introduction

In recent decades, technological progress has marked generation after generation, the scope of humans in their creativity, innovative, and dissemination of information on scientific, and entertainment, where also the devices used for it have been transformed and improved with modern innovation for our comfort, and according

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to our purchasing power. When we hear the concept of "virtual reality" or VR, automatically we consider it belongs to a time after the year 2000; although, the concept itself was born in the year 1965, when Ivan Sutherland, considered as one of the pioneers in computer science, published an article entitled The Ultimate Display, where he wrote the first sketches of the term [1]. However, it is known that in the late 1950s, Morton Heiling designed the first virtual multisensory experience, developing an equipment called "Sensorama," which had a similar appearance to those of the videogame's consoles, which combined audio, vibration, and wind [2]. In 1966, Sutherland created the first virtual reality helmet viewer, which he called "The sword of Damocles," because it was a device which support system was pending on the ceiling, it is said that, with this creation, Sutherland invented almost all the technology around virtual reality, being the first step for future inventions [2].

After Sutherland's advances, from 1967 until nowadays, there has been developed a series of creations that simulate reality, which have had a great impact not only on technology lovers, also on high-magnitude companies such as NASA. However, ¿what is the virtual reality?, it is a simulation of a real or imaginary environment that can be experienced on three dimensions: the first is immersion, which is ability to abstract the real environment where the user of the system is; secondly, is the presence, which allows the user to interact within the virtual reality, meaning that, he or she can be inside virtuality by means like motion sensors, gloves, special seats, among others; the third dimension refers to interactivity, which allows actions in the system that modifies the virtual reality, and the user can obtain answers through his or her senses [2].

There is a classification given by the type of the virtual reality system used, the difference between these lies in how immersed the user is, for example, in the first type are desktop VR systems; these systems are found in advanced desktop applications, and they include 3D images that can be observed without the need for special equipment [3]. For the second type, it was found the simulation booth, these systems are similar to desktop systems, but are developed in a booth, such as flight simulators. The third type is the augmented reality, where user can use the real world but through glasses that complement images, this can be seen in movies with futuristic scenes. Belonging to the fourth type, we find VR in second person (unencumbered systems), in these systems head-mounted display (HMD) or virtual reality helmet) are already used. In the fifth type, telepresence systems are used to perform remote tasks, such as bomb disposal equipment and robotic surgeries. The sixth type makes use of immersive systems, where all known devices are used to perform an action [3].

Thanks to the classification of VR, it is possible to modify the classic image we had when speaking about "virtual reality," represented by a person wearing a helmet while interacting with a computer, in fact, we can now see VR goes further than that, it is a way to amplify or replace one or more senses. Now that we know in greater depth the dimensions that VR has in the world, we can approach it as a learning process at different marketing educational levels, since it will be demonstrated below that VR is not only used and exploded in the area of games and leisure, but it can be a

quality tool used by teachers in teaching–learning process, where an adaptation to the changing conditions in the processes of absorption of knowledge is manifested.

43.2 Application of Virtual Reality in the Learning Process

When the perception of the senses is amplified, some of the limitations that human body has can be overcome, in one way or another, the senses are sharpened, we can see quicker or shiner, we hear sounds that in reality we are not used to in a frequency and intensity that we do not experience, we can touch objects with micro or macroscopic dimensions, meaning that, we can improve our experiences of the real world [4]. Therefore, the ability and information received by our senses about something new, through VR, will potentiate the ability to store new learning. As next, some of the sciences in which virtual reality has generated a modification in the process of learning are mentioned.

43.2.1 Virtual Reality and Educational Technology

43.2.1.1 Virtual Reality and Mathematical Learning

The inclusion of new technology, as a marketing educational resource, means offering students new possibilities of expression and judgment. It has been observed that several people show difficulties when it comes to mathematical learning, since it is normal that when proposing a task for a group of students, not everyone has the same ability to carry it out, that is why VR comes to support this group of students who need a different and innovative method at the time of learning. To this end, we showed that in the XVII Congress of Teaching and Learning Mathematics [5], the use of the *CoSpaces* tool, which aims to visually enhance its graphical environment using visual programming by blocks, since it uses the Blocky app, which allows programming different actions in the elements of the scenario in an easy and attractive way [5].

43.2.1.2 Virtual Reality and Physics Learning

Likewise learning in mathematics, within the field of physics, the answer to the low academic performance in the subject, arises from the difficulties that students find when presenting physical objects and situations that allow them to understand and comprehend a problem [6]. Added to this, some students do not manage to abstract the conceptuality of physics when there is a concrete example and to generate a complete learning. For example, in Ecuador, according to the test called INEVAL, in 2018, 40% of the students obtained an insufficient grade in this subject, 50% have managed to obtain an elemental level, and the rest of the percentage have distributed

into satisfactory and excellent levels [7]. This country is one of the many in the world with similar data, where it is observed that situations of learning failures are not far among classrooms around the world.

For example, at the Juarez Autonomous University an investigation of the application of augmented reality software to teach physics was carried out [8]. For this purpose, a pretest was applied to group A of physics II in the laboratory to know their learning rate before using the software application. After using the VR, the same test was applied again to compare the results. These demonstrated that there was a significant change, with an increase in percentages and the absence of negative ranges in the post-software test [8].

43.2.1.3 Virtual Reality and Natural Sciences Learning

Natural Sciences education can be divided into approaches by its object of study, such as biology, chemistry, and morphology, it has been shown that for a greater abstraction of the terms and a greater interpretation of the obtained information received, a learning construction is needed that is not memoristic and with the only goal of approving the subject, students should be able of manage their learning, and, at the beginning to provide a logical explanation about principles or laws in their own words. This teaching–learning process path would be marked by a practical, didactic, and experiential education [9]. For example, in Quito – Ecuador, at the Central University of Ecuador, a guide for the use of the Mozaik 3D platform for immersive and non-immersive virtual reality was developed as a strategy for academic reinforcement in the teaching–learning process of Development Biology, where it was concluded that students who used this application showed an improvement in their assimilation and acquisition of knowledge [10].

43.2.1.4 Virtual Reality and Medicine Learning

The need for a change in the way of learning still being a necessity not just for children and adolescents, but also for future professionals. Cultural changes, the incorporation of new and better technologies have forced to physicians, nurses or any other health professional to question the old teaching methods, from this perspective, lectures in their current conception, in example, teacher with passive students receiving information, evidence the shortcomings at the time of exercising the profession [11]. This is why new training spaces of teaching–learning with new technologies and new methodologies would build the changes of educational paradigms toward the medicine of the twenty-first century. Nowadays, it has been observed simulations of the reality such as tools for change; modern technology makes possible to unite robotic equipment and virtual reality or simply the creation of scenarios that reproduce real medical situations [11]. Thanks to this, it is possible to create a software that provides to a human doll every cardiac, vascular, and pulmonary functions, which, at the same time, allows teachers to create complete clinical cases for the student to

solve and generate a diagnosis, it counts with the difficulty required and reduces the risk of medical malpractice in the future [11].

43.2.1.5 Virtual Reality and Musical Education

The so-called hard sciences have manifested the need for the creation of tools that provide technological support to teach and learn the material, but the so-called seventh art is not far behind. Music has been identified over the years as a profession, as a hobby, and even as a psychotherapeutic method; therefore, the creation of musical didactic material would allow students to generate autonomy when learning, as well as would make it easier and to retain knowledge in a better way, for those students who not seem to learn with the traditional teaching method. Musical education becomes essential in the first years of life, not just because it motivates and encourages discipline toward a determined instrument, but also because it helps in socialization when the playing in a group [12].

For example, an investigation executed in Colombia reported that didactic material with augmented reality was created and applied to an experimental group, with the purpose of determining if there was any difference between learning with VR and the traditional teaching method. Finally, it was proven that VR is a supporting tool in class that motivated students' learning and boosted collaboration, cooperation, autonomous work, and socialization on the instrument, in the experimental group [12].

43.2.1.6 Virtual Reality and Marketing Education

Marketing education allows you to apply basic marketing knowledge. This process encompasses actions to capture the attention of the target audience of a specific business. Marketing is a science that allows satisfying needs in a target market with profit. With marketing, gaps in the market and the possibilities to satisfy the needs of human beings are identified.

In this field, virtual reality presents interesting options so that students can apply their knowledge of interaction with clients in safe and controlled spaces through virtual reality. For example, accessing a sale of a product in a company, applying communication techniques with a client, analyzing their nonverbal language in the negotiation process, among others.

Having safe and controlled spaces is vital for learning marketing, since, with virtual reality glasses, the instructor can manipulate the variables that the student faces. For example, you can modify the ethnicity of the person with whom you interact, raise or lower the volume of a dialogue or change the emotion of one of the individuals with whom you negotiate. In this way, when the marketing student approaches individuals in real life, she is able to do it in a better way and with the respective preparation to successfully solve the challenge she faces.

43.3 Conclusions

The role that technology plays in our society reaches also the way of the teaching–learning process, as it has been discussed above, it is valuable since it boosts students' cognitive skills, as well as to develop new ones. Worldwide education would go into the future with the implementation of technology in pro of the development of professionals, since now, the access to high-quality technology such as VR tools, could not be reachable for everyone. Although, if it is highly evidenced the importance of the usage of VR, it can motivate countries around the world to knock down the barriers of Internet accessibility and bring technology to everyone, including them into the new education era. At the same time, some of the tools that are already in the market can be improved and given through other devices such as cellphones, intelligent televisions, videogames, and among others.

Finally, as has been observed in this article, virtual reality is not only beneficial for traditional science educational processes, but can also be applied in novel contexts such as marketing, where students find safe and controlled environments, in order to continue training.

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Chapter 44
Virtual Tours of Museums to Promote Tourism



Omar Cóndor-Herrera, Carlos Ramos-Galarza, and Mónica Bolaños-Pasquel

Abstract Museums represent a collection of ancient and modern knowledge which must be protected, disseminated, and transmitted in the best viable way. Digital development and technology in recent years have made it possible to transform the way of interacting with museums through virtual tours (Palmieri et al in Springer Series in Design and Innovation, pp 71–82, 2023 [1]), which gained strength in times of pandemic, the products generated for virtual tours range from physical reproductions/faithful virtual images of historical artifacts to digital libraries that can be used by experts and others, in addition to 360º technology which allows a 360° viewing angle to be covered in two axes. That is, we can see everything around the point where it was made the photo or video. In this article, the virtual tours offered by some museums are analyzed, as well as the use of these tours as a tourism marketing strategy, giving the user the opportunity to interact with the place they plan to visit in a new way (Cóndor-Herrera and Ramos-Galarza in Marketing and smart technologies. Smart innovation, systems and technologies, pp 443–449, 2022 [2]).

Keywords Digital museums · Tourism · Marketing · Virtual reality · Virtual tours

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44.1 Introduction

Virtual visits to cultural heritage sites such as museums have increased significantly due to the coronavirus pandemic and restrictions related to face-to-face visits to historical cultural sites. Many people visit these sites to get acquainted with the culture of the past, researchers to access original and primary documents, etc. [3]. Similarly, as digitization has transformed the way of interacting with reality, different museums are creating interactive AR experiences to digitally enhance their collection and increase participation of the audience [4, 5]. Therefore, different museums around the world are choosing to implement this type of tours, as is the case of the Brera astronomical museum located in Milan. Which through the MARSS project has set itself the objective of designing and developing a new digital journey within the museum to allow distinct categories of visitors to enjoy the exhibition in an attractive and interactive way [6].

On the other hand, we have the permanent collection of the Teloglion Fine Arts Foundation which includes important works of art of modern Greek and European art, constituting one of the most important in Greece [7], the Montreal Museum of Fine Arts (MMFA) brings together small groups of older adults for weekly guided tours facilitated by trained guides [8], the Pinacoteca Brera museum (Fig. 44.1).



Fig. 44.1 Virtual visit of the Pinacoteca Brera Museum

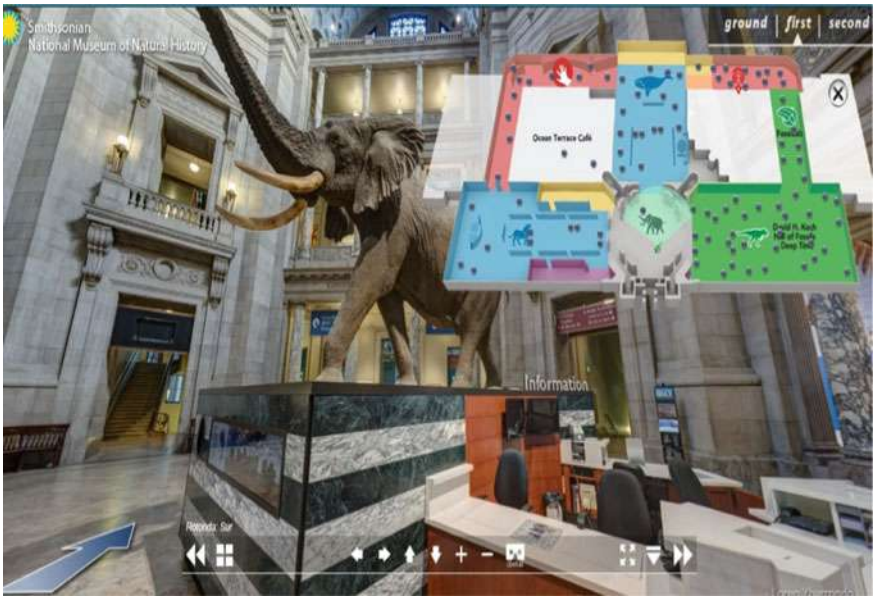


Fig. 44.2 Smithsonian Museum of Natural History of the United States

Similarly, the British Museum in the United Kingdom and the Smithsonian Museum of Natural History in the United States (Fig. 44.2) to cite a few examples.

There are various models of virtual tours, the environmental model is performed as a virtual tour and is designed to simulate immovable archaeological site environments and experience the effect of immersive virtual reality. The thematic model suggests that the theme context predominates over archaeological artifacts and finally the collection model is intended primarily for the scientific and academic community, while the environmental and thematic models are designed for the public [9].

Drawing from the information technology literature and a selection of current initiatives in cyberspace, they provide an analytical framework for identifying emerging models regarding access to and use of digital collections and for assessing the challenges faced by digital collections. Museums in their role as providers of reliable information [10].

In the same way, from the point of view of tourism marketing, it is proposed to use virtual tours as a tool that allows promoting tourism by promoting these places in a novel way, since virtual tours allow people the opportunity to digitally know and interact with places that plan to visit physically in the future, since virtual visits can provide information to the user about the place they want to visit or show something striking that captures the viewer's attention, helping them to decide whether to visit one place or another.

44.2 Teams for the Creation of 360° Proposals in Tourism

Virtual tours are based on 360° photographs, in order to create both 360° photographs and videos it is necessary to have specific equipment for this type of work, in this case a 360 camera, which is a device that can take photos and videos from of two wide-angle lenses, placed one behind the other, in this way, when a shot is taken with the 360 camera, it manages to capture the front part with one lens, and the rear part with the other lens, as they are wide lenses angular, they not only capture the front or rear image, but also capture the floor and ceiling, as well as the sides in Fig. 44.3 we can see an example of a camera with 360 technology [2].

When the photo has been taken through the two lenses of the 360 cameras, an image file is obtained with the two round photos: the front and the back. [16]. It is at this moment, when a process of joining the front photo and the back photo is conducted, to achieve a single image. This process is called Stitching and means "Sewn".

In addition to the cameras to create virtual tours, there are platforms such as "Matterport" which allows the user to create digital tours as they are called digital twins, the environments are photographed to create the tours in their entirety from the 360° camera, camera of Matterport or from the mobile application, this platform works with an artificial intelligence system called "Cortex" which transforms the captures into an interactive 3D model in Fig. 44.4 you can see the process of creating the 3D model based on the 360° photographs.

Cortex can identify objects within rooms, combine all the captures and reconstruct your space in an immersive virtual tour. When the Cortex system has finished processing the 3D model, the user can adjust the tour according to their needs, for example, it can be edited, added, modify, and include notes in the space you want,



Fig. 44.3 Samsung gear 360 camera



Fig. 44.4 Digitization process of the 3D model for a virtual visit

create videos and guided tours, add labels to the model among others, finally when the 3D model is ready it can be shared for viewing on web pages, social networks, by e-mail [17].

44.3 Virtual Tours with 360° Technology

At present, technology allows us to rethink the way in which we interact with reality within this field, 360° technology for images or videos is the most representative since it allows us to cover a 360° viewing angle in two axes (X, Y) at the time of capturing an image which, when displayed on a screen, provides the user with a creative experience in relation to image and audio, creating a new audiovisual language [2].

One of the advantages of the 360° experience is that it allows viewers to view the productions over and over again, allowing them to distinguish different points of view of the place on each occasion [11], this technology has been applied to different areas such as business and institutional [12] along with the 360° application, the so-called 360° tours have also been created [13], which are digital solutions that allow the creation of experiences of interactive virtual tours of properties or places of interest which allows exploring in depth visual environments in an interactive, simple, and effective way [14].

The tours are based on images that become panoramic views, which allow a complete vision of a space where the user experiences the sensation of a real environment, through movement control within the area, supported by a pointer or computer keys. Depending on the museum, on the screen you will find arrow icons, a selection of museum plants, icons to zoom in to move around the tour [15], see Fig. 44.3.

44.3.1 Museums that Offer Virtual Tours

Next, in Table 44.1, the reader is presented with a list of museums that offer virtual tours so that they can familiarize themselves with them, among which the Van Gogh Museum stands out (Fig. 44.6).

In Fig. 44.6 you can view an extract from the virtual tour of the Van Gogh Museum.

Table 44.1 Museums with virtual tour

Museum	Link virtual tour	Characteristics of the route
Numismatic Museum of Quito (Fig. 44.5)	https://numismatico.bce.fin.ec/index.php/panorama-360/quito.html	The tour presents museums of two cities Quito and Cuenca In the toolbar for the visit, you will find: An autoplay access to the museum view Presents the option of the plan that allows you to see a plan of the museum in 3d digitized Allows access to a floor selector to access a specific floor Measurement tool to obtain exact measurements of places that are required Image panel to scroll to specific places 360 view option with the mouse

(continued)

Table 44.1 (continued)

Museum	Link virtual tour	Characteristics of the route
Brera Pinacoteca Museum (Fig. 44..1)	https://pinacotecabrera.org/virtualtour/start.html	For the tour of the museum, we have the following tools Written description of the museum Plan of the museum in top view to access different points and floors of it Zoom tools in the different scenes Navigation arrows (left, right, up, down) within the scene and mouse navigation Arrows to move from scene to scene. Animation pause button
Smithsonian American Museum of Natural History (Fig. 44.2)	https://naturalhistory2.si.edu/vt3/NMNH/z_tour-022.html	For the tour of the museum, we have the following tools Plan of the museum in top view to access different points and floors of it Zoom tools in the different scenes Navigation arrows (left, right, up, down) within the scene and mouse navigation Arrows to move from scene to scene. Animation pause button. Tour to use with virtual reality glasses in vain mode
Louvre Museum	https://petitegalerie.louvre.fr/visite-virtuelle/saison6/	In the toolbar for the visit, you will find: Presents the option of the plan that allows you to see a plan of the museum in 3D digitized Image panel to scroll to specific places 360 view option with the mouse. Navigation arrows (left, right, up, down) within the scene and mouse navigation

(continued)

Table 44.1 (continued)

Museum	Link virtual tour	Characteristics of the route
Van Gogh Museum (Fig. 44.6)	https://artsandculture.google.com/streetview/van-gogh-museum-groundfloor/2QHwyv_Y6gueAw?hl=en&sv_lng=4.881046786523673&sv_lat=52.35838412991535&sv_h=345.67521299524884&sv_p=3.5406667480348517&sv_pid=MKMJk8yf0lEzHxPymORW_A&sv_z=1	In the virtual visit in this museum, we can count on different tools for the visit Image panel to scroll to specific places 360 view option with the mouse. Navigation arrows (left, right, up, down) within the scene and mouse navigation
Vatican Museum	https://www.museivaticani.va/content/museivaticani/es/collezioni/musei/cappella-sistina/tour-virtuale.html	In this tour the user can find the following tools Zoom tools in the different scenes Navigation arrows (left, right, up, down) within the scene and mouse navigation Arrows to move from scene to scene. Animation pause button. Tour to use with virtual reality glasses

44.4 Methodology

The present work is a theoretical review study which focused on virtual tours offered by museums today, for these six museums were selected from which the characteristics of the tours they offered were analyzed, in the same way it is pointed out that the data collected. They are obtained from the museum websites as well as from searches in different databases.

44.5 Conclusions

The virtual tours offered by some museums around the world is a great tool to promote tourism marketing as it allows these places to be promoted, allowing the user to have a first approach to what museums offer as tourist sites, people can visualize the places in advance and then plan your visit physically, so it is important that the virtual tours offered by museums provide users with all the necessary information that is needed.



Fig. 44.5 View mobility icons virtual tour Numismatic Museum of Quito

The tours are based on images that become panoramic views, which allow a complete view of a space where the user experiences the sensation of a real environment by interacting virtually with the elements offered by the virtual tour such as images, digitized documents, 3D objects.

In future research, it is of interest to researchers to analyze the perspective of users when using virtual tours of museums and other tourist places and to measure the impact that the application of this technology has on tourism.



Fig. 44.6 Virtual tour of the Van Gogh Museum

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Chapter 45
Review for Augmented Reality Shopping Application for Mobile Systems



Carlos Alves, José Machado, and José Luís Reis

Abstract The evolution of e-commerce has, in recent times, made a significant advance largely due to the forced digital transformation and to Sars-cov-2. Thus, augmented reality (*AR*) technology is increasingly being adopted by companies either to increase brand value or to improve the shopping experience for their consumers. This work aims to present a comparative study between some shopping applications using AR, augmented reality shopping applications (*ARSAs*), which are carried out in stores or online. The applications were studied in articles in Open Access format and the focus was to understand what their conclusions were as well as the problems and trends of future research toward this type of technologies.

Keywords Augmented reality · E-commerce · Mobile apps · Shopping apps

45.1 Introduction

In recent years, AR technology has undergone a lot of evolution, both in terms of user experience and in terms of effectiveness in mapping surfaces to place objects [1]. The consequence of the evolution of this technology is that it is being adopted exponentially in e-commerce systems, either in product solutions in virtual testing, or in placing products in a given space, also in filters for social networks. Augmented reality shopping applications (ARSAs) are growing, as they were initially done using the computer, a good example of this was the possibility of testing RayBan sunglasses using the webcam [2]. However, now, this is done using the smartphone, whether it's

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Android or iOS or even directly through the phone's browser and without the need for a bookmark [3]. Relative to traditional methods, the increment of the Lidar sensor in some mobile devices improves the efficiency in the use of this type of technologies in these products [4–6]. Thus, it is important to understand the evolution of these applications and how they are able to satisfy consumer needs, whether in terms of ease of use, purchase confidence or consumer satisfaction. It may also be important to identify the interest of companies in adopting this type of technologies. For this, the actual study aims to identify some existing applications that have been studied in the last 5 years, whether these are prototypes or are on the market. If it is possible to verify how they are evolving, and to verify what studies exist, where this type of applications is analyzed in detail.

45.2 Methodology and Selection of Articles

An exploratory methodology was developed for this study. First, the PRISMA1 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) methodology was adopted for the selection of papers. This methodology was chosen essentially because it is generally accepted by the scientific community, namely in the area of computer science. To this end, the actions carried out were, in the first place, to select the keywords that best suit the research in question. Then the creation of the string for the query in the databases, more precisely in SCOPUS and finally to characterize and reduce the sample with a more rigorous criteria and analyze and discuss the results in question.

The literature search for PRISMA was prepared on August 30, 2022 in the SCOPUS database and the keywords that were used for this investigation are:

- Augmented Reality
- Shopping Applications
- E-Commerce

Below is presented the first search keyword:

```
( KEY ( augmented reality ) AND KEY ( shopping applications ) OR KEY
( e-commerce ) )
```

These keywords were selected because, compared to other options we had, they were the ones that presented the most relevant results.

In summary, below, the selected exclusion criteria are presented:

EC1 Duplicate papers.
EC2 Has not been produced in the last 5 years (from 2018).
EC3 Not freely accessible.
EC4 Have not been peer-reviewed.
EC5 Do not focus on the variables studied or is out of context.

This resulted in a total of 90 documents to which an exclusion criteria presented above was applied. The first criteria [EC1] was to eliminate all for all duplicate papers. The second exclusion criteria [EC2] was to present the articles published in the last five years, which resulted in a total of 54 documents. The third exclusion criteria [EC3] was to limit the articles to open access only. This resulted in a total of 9 documents. Two more exclusion criteria were applied [EC4] (articles that have not yet been reviewed) and [EC5] articles that did not focus on the subject studied. This process resulted in 9 documents to verify the applications that they analyzed. Figure 45.1 represents the PRISMA elaborated for this work.

The final research keyword of this article is presented below:

```
( KEY ( augmented AND reality ) AND KEY ( shopping AND applications )
OR KEY ( e-commerce ) ) AND ( LIMIT-TO ( PUBYEAR , 2022 ) OR LIMIT-TO (
PUBYEAR , 2021 ) OR LIMIT-TO ( PUB-YEAR , 2020 ) OR LIMIT-TO ( PUBYEAR
, 2019 ) OR LIMIT-TO ( PUBYEAR , 2018 ) ) AND ( LIMIT-TO ( LANGUAGE ,
"English" ) ) AND ( LIMIT-TO ( OA , "all" ) )
```

The main objective with this PRISMA was to verify if these articles analyze and approach an application that already exists in the market and public or if they were just introducing a new application proposal. After analyzing all the articles, it was found that the studies did not address, for the most part, applications in the market, but proposals for applications.

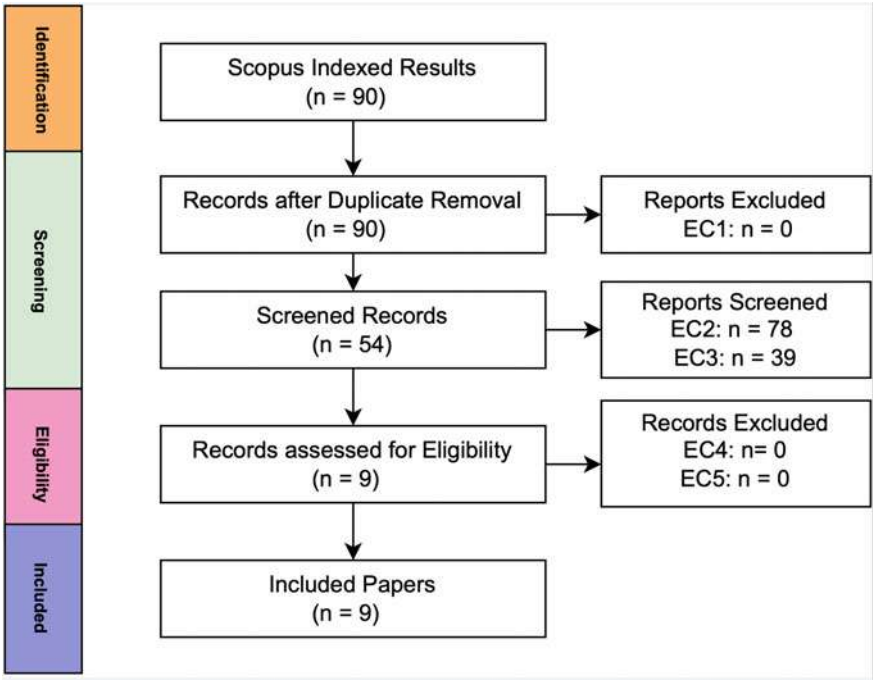


Fig. 45.1 PRISMA diagram of exclusion criteria. Alves al

That said, and to find the existing applications on the market, and public, a search was made in Apple App Store, to try to find applications created by industries. Both the ranking of downloads and the recommendation of similar APPs and will be shown in a comparative table below.

45.3 Discussion of Results

In this section, an analysis of the papers resulting from PRISMA will be presented, in order to understand what they cover and what their results are. Next, an analysis of the applications found in the App Store will be presented, in order to understand how they have evolved over time.

45.3.1 Analysis of the Resulting Articles of PRISMA

Machine Learning and Augmented Reality. Cruz et al. [7] propose in their article an AR application in order to improve the shopping experience using current machine learning and AR techniques. This application is not for e-commerce but for shopping in the physical store. The application was designed for mobile devices and the use of this application was done as follows: The user took a photo of where he was in the store and then the application detected where he was and gave him the direction to go to the store. The item he was looking for, as shown in Fig. 45.2. The mobile application was developed in Unity3D and tested on Android and iOS phones. These are called CNN's networks because they are able to classify an image and categorize them. Experiments were carried out and the conclusions were that machine learning techniques are quite heavy to be executed on a smartphone and therefore an Internet connection is crucial for the application to function. Another limitation of this technology is that if the images were altered from the shelf, the system would have to be retrained with new images.



Fig. 45.2 Figure of directions information on a commercial surface using AR. Cruz et al. [7]

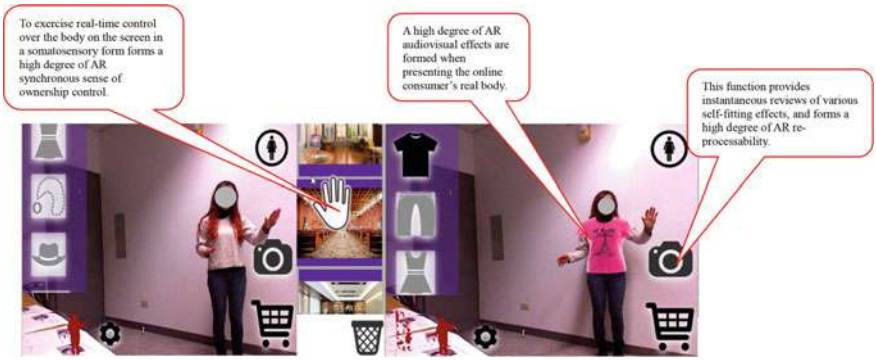


Fig. 45.3 Demonstration figure of a Try-on application using AR. Huang et al. [8]

Fashion. The study carried out by Huang et al. [8] aims to demonstrate that it shows how awareness in the acquisition of fashion products (clothing) affects the consumer's online experience with the use of AR in the fashion retail sector. The study consisted in creating an application with the Try-on technology, so that the consumer can test the clothes without leaving home. For this they used a system based on XBox's Kinectic using a computer, and people tested the purchase, they could even take a photo of the product as well as they could take a photo to store the clothes they wanted to purchase as well as a button to activate or disable music, which allowed products to have background music depending on what type of product it was. As a result, users with low body surveillance use the AR modality to make the online testing process more harmonious and at the same time, this study concludes that the impact of consumer fashion awareness affects the AR consumer experience. Figure 45.3 demonstrates how this Try-on application was used for the study.

Moroz [9] has created an electronic fitting room Virtual Fitting Room (VFR) capable, through a photo of the user, of implementing AR technology on the monitor itself, whether on the computer or smartphone. The results obtained demonstrate that it is quite difficult to use this technology in the way it was designed, from the space between the user and the cell phone or smartphone webcam. Even users were also unable to adjust the size of the photo uploaded to the platform. Even so, users found it advantageous to use a 3D model, as shown in Fig. 45.4, to overlay the desired clothing for those who wish to make an online purchase.

Industry. In the work of the authors Ponis et al. [10], the adoption of AR technology in gamification was addressed for those who are preparing warehouse stocks. This application being developed is to be used in Head Mounted Displays (HMD's) in order to make this person's work in terms of the gamification system identical to Pokemon Go. The authors concluded that they have to validate their solution empirically in order to prove the acceptance of this type of technologies by the workers of an industry.



Fig. 45.4 3D Model Prototype. Moroz [9]

Retail. FoodGo was an application developed by Abao et al. [11] capable of improving the purchase of products through the technology of Situated Analytics (SA) that combines the technology of AR and Visual Analysis in order to improve the understanding of some object by a user, either by the information it constitutes, or by its physical characteristics. Thus, this application was developed for Android with the purpose of helping the user to buy a certain product at the supermarket. Figure 45.5 shows the application interface and how the information is presented in AR. In this way, and in order to use this application, the user has to point the cell phone camera at the bar code and the information about that product will appear in an enlarged way. The core of the application was to help users to choose a healthier way of choosing a product. It was concluded that FoodGo was an application that effectively helped consumers in this regard and as an improvement it would be interesting to create a tutorial for using the application and inserting certain user health conditions.

Another application is approached by the authors Kumar and Murugavel [12], it also presents a shopping assistant inside the commercial spaces, but instead of using the SA technology, it uses the GPS resource because it is a technology, according to the authors, which increase precision in space, unlike the technology used by the authors Cruz et al. [7] in their study. This application works as a way to capture information from shelves and product information is designed in a user-defined way. However, Kumar and Murugavel [12] proposes to include the use of advertising in the application suggesting similar products. The authors conclude that these applications must balance the use of automation and privacy to match the needs of retailers and consumers.

Similar to these authors Lee et al. [14] wanted to test an application that also gave information about products in an augmented form, such as Abao et al. [11] and like



Fig. 45.5 Food Go final prototype. Abao et al. [11]

Kumar and Murugavel [12]. However, Lee et al. [14] had already identified some problems in the recognition of the packaging images because they, unlike Kumar and Murugavel [12] did not use the barcode to read the applications. So, in order to verify which of the technologies would be the most suitable for reading this type of products, they made tests with several frameworks, namely Vuforia, ARCore, and MAXST where the image recognition was more easily done through the application they used the Vuforia. Figure 45.6 demonstrates how this experiment was carried out by the authors.

Riar et al. [13] carried out a study in order to understand the consumer of online shopping applications using AR technology, where they mention that large companies already have their own applications especially to what happened in the pandemic period where people could not leave home where they mention that these technologies are still not clear regarding the purchase and sale of products, and the privacy risks of the users themselves. As a result, according to the authors [13] one of the main advantages of AR in online shopping applications is to present users with similar or even more exclusive product experiences and information than in physical stores. With this, the authors [13] also mention that it is still unclear whether or not this type of factors influence the adoption of this technology for purchase by users, using the smartphone, to buy furniture, clothes, accessories, and make-up.

However, in order to conclude this small analysis, a study carried out by Bluhm and Rudolph [15] concluded that for applications using AR, in a store context, Eye



Fig. 45.6 Figure of AR information on products in three positions. Lee et al. [14]

Tracking technology can be used in the context of interaction for the creation of new products and new services.

45.3.2 Comparison of Applications

Another way to compare the applications was to carry out a search on the App Store of Apple Portugal, as well as on google, when they were referenced by authors they did not appear in the Apple Store. This was done in order to find existing online shopping applications. These applications were searched on an Apple iPhone X with version 14.4.2 and on a Computer with Google Chrome on August 30, 2022. The search term used was AR. Table 45.1 presents the results of this research as well as the applications identified by the other authors mentioned in this article.

45.4 Conclusions

This study analyzed application studies as well as existing applications on the market. These applications were prototypes or already available on the market for download. It can be seen that with regard to the investigation of this type of applications for shopping in shopping malls, there is still much to be analyzed, such as the ease of use and security, as well as the product recommendation mechanisms, using machine learning or to artificial intelligence. Another conclusion is that in Apple's application store there is no specific section for AR applications, which could make it easier for users to download and use them. There is clearly an evolution toward the market

level as of applications that even though some retailers may be resistant to adopting this technology, this, as can be analyzed in some articles analyzed in this work, AR has gained significant ground for with user engagement with the brand as well as with the product.

It should be noted that in Sect. 45.3.2, all the applications described have some similarities, namely the fact that they are free and markerless. The fact that the same application is sometimes not used on all operating systems may be questionable and should be taken into account by developers of this type of technologies.

Table 45.1 Comparative table of online shopping applications using *AR*

Name	AppStore description or article description platform	Platform	Number of versions	Type	Languages	Supported devices	Price	Cited By author
IKEA Place	IKEA Place lets you virtually place true-to-scale 3D models in your very own space. Combining the latest AR technology and IKEA's smart home solutions you can experience IKEA like never before	iOS, Android	Actual Version is 5.8.0 on iOS	Markerless	English, Croatian, Czech, Danish, Dutch, Finnish, French, German, Hungarian, Italian, Japanese, Korean, Malay, Norwegian Bokm˚al, Polish, Portuguese, Romanian, Russian, Serbian, Simplified Chinese, Slovak, Spanish, Swedish, Thai, Traditional Chinese, Turkish	iPhone iOS 12.2 or later. iPad iPadOS 12.2 or later. iPod touch iOS 12.2 or later	Free	[8, 13]

(continued)

Table 45.1 (continued)

Name	AppStore description or article description platform	Platform	Number of versions	Type	Languages	Supported devices	Price	Cited By author
The Home Depot	As you continue to work on your summer projects, we are hard at work with bug fixes and performance improvements to keep things running smoothly. Houzz is the No. 1 app for improving and designing your home	iOS	Actual Version is 7.9.0 on iOS	Markerless	English	iPhone iOS 13.0 or later. iPad iPadOS 13.0 or later. iPod touch iOS 13.0 or later	Free	
Houzz	Whether you're building, remodeling or decorating, Houzz has you covered	iOS	Actual Version is 22.9.5 on iOS	Markerless	English, Danish, French, German, Italian, Japanese, Russian, Spanish, Swedish	iOS 14.0 or later. iPad iPadOS 14.0 or later. iPod touch iOS 14.0 or later	Free	
Walmart AR	–	iOS, Android	–	Markerless	–	–		[13]
Amazon AR View	–	iOS, Android	–	Markerless	–	–		[13]

45.4.1 Limitations of the Research

Regarding the methodology, the fact that the research was limited to open access articles may have limited some results, but a continuity of this work can be carried out in order to improve these same researches. As part of the search for applications in the Apple application store, this study referred to applications that are published on the Portuguese App Store page, which limits the result in other applications that may exist in other countries.

45.4.2 Future Research

Creating a cross between AR, machine learning, and artificial intelligence technologies can be an asset for e-commerce applications or even physical store purchases, for product suggestion or even to improve ease of use and the user experience of using these applications. A more detailed analysis of this type of applications could be advantageous for the scientific contribution to other researchers.

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Chapter 46
Is There a Market for Digital Travel? Travellers' Views on Digital Travel and Willingness to Pay



Ingvar Tjostheim and John A. Waterworth

Abstract Before the COVID-19 pandemic, digital alternatives to office-work, classroom teaching, business meetings, and leisure activities, etc. were seen by most as a supplement to, not a replacement for, meeting people face-to-face. With the experiences many have had these last two years, including travel restrictions, vacationers' views of digital travel might be expected to have changed. This study is based on surveys of views on digital travel in the summers of 2021 and 2022. We presented vacationers with descriptions of digital travel products and activities, followed by questions about willingness to pay for these. We identified a small segment of vacationers who see digital travel as a substitute for physical travel, and a significant group of vacationers who see the digital travel experience as a pre-taste of actual travel. The vacationers were asked for comparisons of their willingness to pay for digital services with ticket prices that a tourist would normally pay at a destination. Although we could identify a market for digital travel products, it remains to be seen whether players in the travel industry can offer products and services that are attractive enough to raise significant revenue. There is not necessarily a high correlation between intention to pay and actual willingness to make payments, but the study indicates that there is an emergent market that businesses in the travel economy can potentially utilize.

Keywords Vacation travel · Digital travel products · Willingness to pay · Future travel

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46.1 Introduction

Over the last two years we have seen several restrictions on physical meetings and travel, but will this result in changes in behaviour and attitudes towards the practicality and acceptability of replacing physical encounters with digital ones? Many studies have shown that travel is important for people. Virtual tourism has been studied for more than 20 years [1], but many questions remain unanswered. In this study we were interested in whether digital travel is something that vacationers are considering. Will it become a supplement to and/or a substitute for physical travel, and is there a willingness to pay for digital travel products? A key aspect of this is the extent to which the digital experience is perceived as similar to or different from the face-to-face experience at the destination.

In this paper we report on findings from two studies targeted towards vacationers. The data were collected in a situation with travel restrictions in 2021. We replicated the study in 2022 when there were very few or no travel restrictions. We recruited the vacations through a survey panel in Norway. The 2021 study was an opt-in survey with in total 204 vacationers who accepted the invitation to give their opinion on digital travel products and services. The findings from the 2021 study are discussed elsewhere [2]. In 2022, participants were randomly selected based on demographic characteristics so as to get a national representative sample of Norwegian travellers.

Our main research question was: is it possible to identify a market for digital travel products and willingness to pay for these products?

46.2 Profile of the Participants in Two Travel Surveys

The first study in 2021 was an opt-in study. It served as pilot for the study in 2022. To help characterize our participants in the two studies, we first present the profile of the participants in comparison to a large scale Norwegian national representative survey—see Table 46.1.

In comparison to the national survey, the travel surveys had a higher percentage of participants in the 50–69 age group—see Table 46.1. Overall, the 50+ group has more time for travel, longer holidays, and their financial situation is often better than those of the younger groups.

The level of education of the participants in the travel surveys was also not very different from the national survey—see Table 46.2. In general, it is easier to recruit survey participants from the higher educational groups, as is reflected in all three educational profiles.

There were some minor gender differences, but overall, the differences between the national survey and the travel survey participants were small, which suggests that our results from both of our two studies should have some generalisability.

Table 46.1 Gender and the age profile of the participants in the 2 studies

Age	16–29 (%)	30–49 (%)	50–69 (%)
A national survey 2021 ($N = 1630$)	24	45	32
Male ($N = 794$)	20	48	32
Female ($N = 836$)	27	42	32
The travel survey 2021 ($N = 204$)	17	38	45
Male ($N = 102$)	14	38	48
Female ($N = 102$)	21	37	42
The travel survey 2022 ($N = 632$)	18	37	45
Male ($N = 295$)	18	30	53
Female ($N = 337$)	18	43	39

Table 46.2 Educational profile of the participants

	Primary or secondary education (%)	1st degree (bachelor) (%)	Higher degree (master or higher) (%)
A national survey 2021 ($N = 1630$)	51	25	24
Male ($N = 794$)	55	22	23
Female ($N = 836$)	48	28	25
The travel survey 2021 (N = 204)	53	26	22
Male ($N = 102$)	51	24	18
Female ($N = 102$)	54	26	28
The travel survey 2022 (N = 632)	46	26	27
Male ($N = 295$)	48	26	25
Female ($N = 337$)	44	26	29

46.3 Digital Products and Activities—The Travellers' Point of View

In the introduction to our questionnaire, we explained what we meant by digital travel, digital travel products and applications. The introduction was as follows:

> The term virtual tourism is by some used to describe a digital visit, a digital experience of what the museums and tourist attractions has to offer. … For the next questions we distinguish between these three: digital presentations or applications for museums or tourist attractions, for activities for tourist, and for guided tours.

There are examples of travel applications that aim to create a feeling of being there, to provide a substitute for travel, but a vacation is in many cases about getting away from where you live, not just visiting a specific place. We hypothesized that a

digital visit to museum or attraction is for many not a substitute for a vacation, but is nevertheless a good example of a digital travel product. In addition to the text in the introduction we made a video from Forza Horizon 5 from Mexico, a game that was launched in the fall of 2021.

Before asking the vacationers to view the 2 min video, we used a quote from the morning news from the Norwegian national broadcaster, NRK. In the news storey, the journalist talked about his tourist experience in the game: "I felt like I was visiting, Mexico, in a kind of vacation."

The video presented sights in Mexico. To illustrate the level of accuracy, the video had actual picture of places and buildings next to digital version of the places and buildings in the game. There have been reviews of the game focusing on the attention to details and how accurately the environment with buildings has been replicated in the game [3].

Figures 46.1, 46.2 and 46.3 give an impression of the level of realistic detail presented in the game. Figure 46.3 shows a comparison of the real Heroica Mulegé compared to the digital version in the game (Fig. 46.4).

In the survey we distinguished between digital presentations and the experience a user can have by using a digital application. We asked about digital presentations, such as advertisements, and then about the digital experience itself—whether it is or can be similar to the in situ experience. We asked three separate sets of questions, the first about museums, the second about tourist attractions and the third about guided tours.

The role of many travel and tourism companies is to get people to travel, to get them to book trips and then travel to the destination. Therefore, advertising and marketing are core activities for these businesses. We used the word "pre-taste" (of the experience) to indicate that although the digital application has content that gives information to the user, the presentation is mainly intended to let the person experience what it is like to visit the place. A pre-taste is not a means to an end; the purpose is to create an interest and/or to influence a person to book a trip. However, the effect



Fig. 46.1 The virtual Plaza de la Paz



Fig. 46.2 The virtual Teatro Juarez



Fig. 46.3 The virtual Parque Municipal de Beisbol Jose Acguilar y Maya

can be stronger. Telepresence, the feeling of being there in a virtual environment, is sometimes evoked [4]. In their review article, Beck et al. [5] write (p. 598); *Study results suggest that VR, regardless of whether it is non-, semi- or fully immersive, is capable of positively influencing the individual motivation to actually visit a place.* We have discussed this aspect previously [6].

Table 46.3, based on findings from the 2022, shows the percentages of travellers who view the digital alternative as a pre-taste or as a substitute for the physical travel product. Table 46.4 presents a summary of travellers' views of the digital experience compared to an in situ experience.

Tables 46.3 and 46.4 show that the majority of travellers **do not** view digital travel as a substitute for a visit nor as an alternative to the in situ experience. However, our data indicate that there is a group of travellers who see a digital presentation and/or the experience in the digital place as a substitute for, or as similar to, the in situ experience.For games and many types of entertainment it does not make sense to



Fig. 46.4 Heroica Mulegé—the real versus the virtual. Forza Horizon 5

Table 46.3 Travel products for marketing purposes, a pre-taste for or as a substitute for as an alternative to the in situ experience

Travellers that view digital products as an alternative to physical travel				
	Marketing (%)	A pre-taste for (%)	A substitute for (%)	Other (%)
A digital presentation of a museum or an attraction ($N = 632$)	33	53	5	8
A digital presentation of an activity ($N = 632$)	41	48	3	9
A digital presentation of a guided tour ($N = 632$)	44	38	8	11

Table 46.4 Traveller's views of the experience of using a digital application compared to an in situ experience?

Approximately the same as the in situ experience (%)	The same as the in situ experience (%)	Other (%)	Approximately the same as the in situ experience (%)
The experience, a visit to a museum or an attraction ($N = 632$)	29	12	59
The experience, an activity ($N = 632$)	26	7	67
The experience, a guided tour ($N = 632$)	30	11	59

ask whether the digital experience is a substitute for the non-digital experience. The goal is the experience itself. In comparison, many businesses in tourism and travel industry offer products and services to people who actually travel, that come to the destination. If something can be a substitute, the implication is that the person will not travel—not necessarily every time, but sometimes. The question of the experience itself can be interpreted in a similar manner. There is not one single answer to whether the experience is the goal in itself or it serves as a form of advertisement—it can be both.

46.4 Willingness to Pay

Willingness to pay (WTP) is used as a variable in many tourism studies. It is important to notice that WTP reflects intentions and not actual payment behaviour [7]. For products and services that will be or can offered in the future, we cannot study actual payment behaviour.

The questions about willingness to pay were asked in relation to visits to digital museums and tourist attractions, for concerts or theatre tickets and for a digital alternative to avoid queues. Table 46.5 shows the percentages of people who answer yes–no to seeing the digital travel product as either marketing, as a pre-taste or as a substitute for the physical alternative at the destination.

When someone answered that a digital alternative can be a substitute for the in situ experience this might be expected to correlate with a high willingness to pay. But

Table 46.5 A digital **presentation** and willingness to pay

The names of the column: marketing, a pre-taste, a substitute for, refer to Table 46.3, a digital museum, a tourist attraction, or an activity

	Answered marketing Yes–no (%)	Answered a pre-taste Yes–no (%)	Answered a substitute Yes–no (%)	Ans other Yes–no (%)
Are you willing to pay for a ticket to a digital museum or an attraction at the destination? ($N = 627$)	6–94	15–85	24–76	8–92
Are you willing to pay for tickets to a digital concert or theatre show at the destination? ($N = 627$)	15–85	28–72	27–73	9–92
Are you willing to pay for a digital alternative to avoid queues ($N = 627$)	13–87	19–81	20–80	11–89

Table 46.6 A digital **experience** and willingness to pay

When a digital experience is approximately the same, similar to or other (not any of these two), and willingness to pay. The names of the column: approximately the same, the same as the in situ, or other—refer to Table 46.4

	Answered approx. the same as the in situ Yes–no (%)	Answered the same as the in situ Yes–no (%)	Answered other Yes–no (%)
Are you willing to pay for a ticket to a digital museum or an attraction at the destination? ($N = 627$)	23–77	22–78	5–95
Are you willing to pay for tickets to a digital concert or theatre show at the destination? ($N = 627$)	32–68	28–72	16–84
Are you willing to pay for a digital alternative to avoid queues ($N = 627$)	34–66	35–65	11–89

Table 46.5 shows that this is not the case for the majority—for all groups the "no" answer dominates. However, for approximately 25% of the travellers in the pre-taste and substitute group there seems to be willingness to pay.

For those that viewed the digital experience as "similar to" the physical experience at the destination, approximately 30% were willing to pay for the digital alternative presented—see Table 46.6. Of all travellers, 40% indicated that they had a willingness to pay for digital travel products.

46.4.1 How Much Are Digital Travellers Willing to Pay?

Questions about willingness to pay can be general or specific. At a destination, a ticket to a museum has a price. It is concrete and we therefore asked the travellers to state their willingness to pay with as reference what they must pay at the destination. The two groups in Table 46.6 that answered the experience "is the same" or "approximately the same" represent 20% of the travellers. In Table 46.7 they are named "future digital travellers." The questions in this section were only asked to the travellers that indicated a willingness to pay, in total 40% of all that participated in the study.

The first observation is that quite few, only 15% (13% + 2%), are willing to pay 50% or more. Secondly, the travellers that we named the future digital travellers have a higher willingness to pay, at 24% (19% + 5%)—see Table 46.7. If we assume that an in situ visit to the destination in most cases is the goal, it should not come as a surprise that willingness to pay is lower.

Who are these future digital travellers? Table 46.8 presents results for three demographic characteristics. We did not find a gender difference, but there were differences

Table 46.7 Willingness to pay—a comparison with actual ticket prices

In comparison the ticket price for museums, tourist attractions, concerts or theatre events, in percentage how much are you willing to pay?			
	Travellers that do not see the digital experience as comparable to the in situ experience $N = 505$	Future digital travellers $N = 126$	All (both groups) $N = 631$
Approx. 10% of the ticket price	32	21	28
Approx. 25% of the ticket price	34	36	34
Are approx. 50% of the ticket price	10	19	13
About the same, or the same as the ticket price	1	5	2
Don't know	24	18	22

Table 46.8 Demographic characteristics of future digital travellers

	The future digital travellers ($N = 127$) (%)	All ($N = 632$) (%)
Gender: male–female	46–54	47–53
Age-groups: 18–29, 30–49, 50–69	24–37–39	16–37–47
Primary education—bachelor degree—higher education/master degree	57–21–21	43–28–28

in age and educational profile. The results suggest that the potential for future digital travel is somewhat higher among the younger age group. It is not those with higher education that seem most interested, as might be expected, but amongst those with only primary education.

46.5 Concluding Remarks

Digital technologies are expected to play an increasing role in travel planning and in products and services offered by companies in the travel and tourism industry. Predictions about the future are not necessarily accurate, however, our study emphasized how our participants judged digital travel based on specific questions about museums, attractions, and guided tours, as well as a digital visit to Mexico in a game. We also found some evidence of willingness to pay for digital travel applications and experiences in the future.

The tourism industry uses different media-channels in order to attract visitors to a destination. A tourist may not be satisfied with a virtual substitute for a physical visit, but the virtual experience might increase their desire to visit the actual place. For many, looking at a tourist site or products by using a digital application has this as the key motivation.

Digital alternatives are not necessarily welcomed, even though they seem likely to become more common due to the long-term impact of the COVID-19 pandemic. Virtual tourism is discussed in the article "Would you enjoy virtual travel?" [8]. The authors list several relevant factors for understanding motivations to engage in digital travel, including vacation design, quality of the experience, travel convenience, cost, and destination attractiveness. What applied to judgments of the attractiveness of digital travel taken during the pandemic will not necessarily apply if and when all travel restrictions are removed in the future. Personal characteristics of potential digital travellers are also important [8].

In the future, with improving and more affordable immersive technology, more convincing digital travel is likely to become more common, given the drawbacks of physical travel such as fossil fuel use, the risk of contracting and spreading diseases, and cost. But even digital travels that closely simulate aspects of physical travel are unlikely to be an alternative or the first choice for most of vacationers for their main holiday. Nevertheless, we envisage that for at least a segment of vacationers, digital travel will increasingly become a substitute for physical travels to places and events, not just an add-on or pre-taste of them. At the present time digital travel seems to have relevance for only a small segment of travellers. Our study indicates that likely future digital travellers can in principle be identified based on their personal characteristics.

As well as more work on the impact of design qualities, experiential aspects, and of destination features of digital travels, future studies addressing longer-term changes in attitudes to digital travel, as well as those that look in more detail at the personal characteristics of would-be travellers are needed. In answer to the question posed in our title, there **is** a market for digital travel, at least as a supplement to physical travel and in some circumstances as a replacement. Willingness to pay for such travel depends on the attractiveness of the offer, the situation at the time as regards physical travel, and is also influenced by the personal characteristics of the individual traveller.

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Chapter 47
Virtual Reality in E-commerce: Brief Review of Current State

Oscar R. Toasa, Yadira Semblantes, David Martínez, Paúl Baldeón, and Renato M. Toasa

Abstract Social media and existing platforms on the Internet are resources that have improved the level of exposure of brands, products, and services; small and large companies have used these resources to the point of becoming monotonous over the years at the time of entering the digital market. This inconvenience, added to the excessive number of social profiles, the mismanagement of these platforms and the great technological advancement forces different companies to use new alternatives to innovate the process of buying and selling products or services. Virtual reality (VR) has become the tool to be used to grant a unique experience at the moment of interaction between consumers and suppliers. In this sense, this work proposes a review of the current state of the inclusion of VR in e-commerce, it has been identified that virtual reality is a resource that allows a close approximation to reality in which users have the possibility of having a unique experience with a product or service in a fast, modern, and safe way.

Keywords Virtual reality · E-commerce · Review · Businesses · Technology

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47.1 Introduction

The digital era has been contributing with multiple tools that help to satisfy the customer's requirements, so that the consumer's experience with the product/service is more interactive, virtual reality (VR) has become one of these resources with which e-commerce can be done in a different way.

VR, being a simulation of an environment originated by a computer, generates in the user the sensation of being able to interact with the environment recreated by the VR in real time [1], the use of this technology contributes to people opting for innovative e-commerce instead of traditional forms of procurement. There are numerous benefits to using these modern buying and selling processes, in which companies and consumers seek to save time, prices, and other resources; a key factor for the use of virtual reality is that people have the possibility of being in apparent real contact with the product or service they wish to purchase. A factor to consider is that VR is relatively new and requires a considerable investment, both for those who implement it and for those who want to use it.

Competition in the market forces businesses to innovate continuously and seek new alternatives that captivate consumers to purchase the goods produced; the strategies and means used to achieve the objectives must be in line with the target audience that have been defined in advance, so that the brand is well positioned and the products/services are differentiated from the rest of the competition [2]. It is important to properly use the budget to allocate resources in digital advertising and capture the attention of the majority of users who can become potential customers and also build loyalty among consumers associated directly or indirectly to the companies, it is important to establish a differentiating image of the product, so that the customer identifies it and feels attracted through the images [3].

With the increasing use of Virtual Reality [4] and its commercial uses, customers have the possibility to search for products/services as if they were visiting a physical store, so that they can inspect them, consult information and subsequently purchase them. VR is a technology that benefits the customer experience with a unique environment and possibilities that cannot be found anywhere else for online shopping.

The potential of these immersive technologies creates high expectations for accelerating e-commerce in the short or medium term, both in Business to Consumer (B2C) and Business to Business (B2B) environments, creating new business models due to the innovative experiences that the customer can develop in the virtual world.

Virtual reality is a medium that can be used in the marketing world, offering an interactive exhibition of the products and services that are available in the market; the competitive demands between companies force them to adapt to technological advances and use them as tools to increase sales or position their brand. Technological advances have been responsible for the appearance of alternatives to improve the buying and selling processes, as is the case of virtual stores, which had to face obstacles in their origins until they were accepted by customers to develop multiple benefits in the work of the company [5] the authors mention that: "Although virtual stores

can become a very profitable business, there are still some gaps and disadvantages that a project developer or entrepreneur will have to face (…)".

Brands are looking for strategies and media that allow them to reach the minds of consumers, so that the modern experiences developed for the exposure of products/services go beyond what is traditionally offered; the use of VR in a short period of time will corner the digital market with its variety of applications.

In this sense, this paper proposes a review of the current status of the relationship between virtual reality and aspects of e-commerce, thus the paper is organized as follows: Sect. 47.2 presents the background, with related works, Sect. 47.3 presents a brief discussion of what was identified in the review and finally the conclusions are detailed in Sect. 47.4.

47.2 Background

47.2.1 Related Works

This research work is of a documentary type, documentary research is a process based on the search, retrieval, analysis, critique, and interpretation of secondary data, i.e., data obtained and recorded by other researchers in documentary sources: Printed, audiovisual or electronic, also in scientific databases such as Scopus, ScienceDirect, mdpi, scielo [6]. In this context, the following is a list of relevant works identified on the subject proposed in this research, answering the questions: What has been investigated? Who has investigated it? What remains to be investigated?

Initially in [7], it is mentioned that: "Technology developers have made possible not only goods and services adapted to each customer segment, but also facilitate their direct participation in the design and changes that take place in such products by deciding almost simultaneously with the producer the characteristics and attributes of the good". Currently society has been evolving in all aspects over the years, these changes have caused humanity to acquire new knowledge to use them for their own benefit and that of the community, so that many needs are covered quickly, easily and safely; technology plays an important role in providing alternatives to improve user experiences. Entrepreneurs and companies together with technology have taken advantage of the Internet as a potential and extensive means to communicate and make available to users a large number of products and services to be purchased through different platforms whether these are physical or virtual, these users to be persuaded by the brands become potential customers who in addition to being responsible for purchases, provide useful information for future advertising campaigns and development of products/services that meet a high percentage of acceptance and consumption of the community.

VR occupies considerable economic resources, both for those who establish it and for those who consume it, since the simulation and operation of virtual environments is not an easy task, these experiences are possible thanks to devices that are essential

to be part of these virtual worlds; in [8] the authors mention: "This environment is contemplated by the user through a device known as virtual reality glasses or helmet. This may be accompanied by other devices, such as gloves or special suits, which allow greater interaction with the environment as well as the perception of different stimuli that intensify the sensation of reality", once these technological devices have been acquired, a prudent time should be spared to understand and use these mechanisms.

The alternatives to acquire products and services immediately are wide; nowadays factors such as distance and time are reduced by using technological resources that improve the customer's experience. As the years have gone by, companies and businesses have implemented another option in addition to their stores and physical establishments: E-commerce, which allows to offer merchandise to people through the Internet, in [9] the authors say: "This method of buying and selling over the Internet allows managers to enter the new era of commerce so that they can cross borders, improving and streamlining their processes and in effect grow in the marketplace".

When it comes to satisfying customer needs quickly and safely, online stores have contributed to shortening the time and distance gaps between consumers and products, since using the Internet as a means of e-commerce allows the customer or user to purchase the product or service he wants and can get it at any time [10].

47.2.2 Current Situation of VR in E-commerce

The immense amount of information available on the Internet has also been an important ally to consolidate ideas and solidify companies that adapt to an increasingly technological world. Currently a relatively new resource continues to grow and develop in the market to capture the attention of all users due to the unique experiences that can be achieved: Virtual reality, the virtual environments that can be created give rise to countless alternatives in which users can experience fantastic moments and situations but that can only live with the immersion in these worlds because in real life they are somewhat utopian to achieve, in [11] states that "These virtual reality environments offer experiences that transport the user to a special dimension", these virtual environments have become a resource that few companies use to publicize their products or services, since in the first instance a considerable investment is needed to exploit the benefits that virtual reality offers; the interaction between the virtual world and the users is unique, since they offer fantastic experiences close to reality without the need to move or make great efforts.

The virtual world opens a range of possibilities to present products and services from a different perspective than the conventional, in which through technological devices customers have an interaction closer to reality, recreating scenarios that stimulate emotions and enhance the customer experience, this technology interpreted as an ecosystem or digital environment gives the possibility to achieve sensations and physical and emotional reactions that resemble those experienced in real life [7].

Over the years, physical stores have been gradually replaced by virtual stores or businesses, these were established more noticeably during the COVID-19 pandemic, which caused many requirements to be covered using the Internet as a means of communication between producers and consumers; with these alternatives available in the market, competition between companies becomes more common when converting the virtual world into a wide battlefield.

The great acceptance of virtual reality has generated that a large percentage of companies pay attention to this innovative business model to get new customers, users play an important role when using these platforms as they will throw later data that will serve to improve future experiences between consumer and virtual environment, in the article: Application of metaverses and virtual reality in education, in [12] the work details that: "the participation of people in virtual reality platforms is essential to obtain detailed information on a topic, to interact with content, users, and communities in any latitude of the planet".

The partial or total immersion of people in virtual environments allows an endless number of possibilities for companies to exploit this medium and expand anywhere in the world, this innovative alternative to exhibit products and services are a major factor for the new generations who prefer speed, comfort, and above all to live new experiences [13]. In the short or medium term, everyone's eyes will be on virtual worlds as a dynamic, entertaining medium capable of dominating the market, since a large percentage of transactions and sales processes will take place in these spaces.

With the vast amount of information and facilities provided by the Internet, virtually everyone can exploit virtual reality to start a business or consolidate the image of their brand to achieve their objectives, which are usually to increase the sale of their products or services.

Virtual reality is expanding in different fields and is becoming useful to face and recreate problematic situations that in the future, with the experience acquired in these virtual worlds, will reduce the margin of error in decisions that must be taken in the real world [14]. The scenarios created with this technology offer many possibilities and environments that fit the requirements of users seeking to satisfy their needs, both for Business to Consumer (B2C) and Business to Business (B2B) environments, having defined their ideal customer, digital marketing strategies, and tactics will be developed based on consumers or companies to get customers or strategic partners that allow them to achieve objectives set, these two environments complement each other because in one way or another the two are needed, in [15] refers to a clear example: "(…) a restaurant that has acquired a good reputation, which would be the B2C company, there will be an increase in demand from this restaurant to a company that provides it with products, which would act as a B2B business".

Companies that use traditional media such as physical stores have found it necessary to take advantage of virtual resources to improve exposure and demand for their products and services; in order to reach new customers in the current Z generation, it is important to implement different strategies to attract the attention of these users, since they were born and have grown up under new concepts corresponding to the digital world and require fast and modern solutions to meet their needs, in [16] it is

mentioned that: “Nowadays, the adolescent collective is “digital native”, that is, they are individuals who have been born and raised with technology”. Virtual reality is currently being used in several fields, among them education, health, sports, and video game development. The entertainment industry has made great efforts because the concept, themes, and environments that are handled in virtual worlds offer different experiences to the conventional ones, where characters, scenarios, and incredible actions are possible thanks to this type of technology.

The strategy used so far to capture attention and encourage customers to make the purchase continues to be advertising, this has evolved like the rest; traditional media such as radio and television have been replaced mostly by advertising campaigns aimed at social media such as Facebook, Instagram or YouTube, which have greater reach with less investment, for this reason there is a great possibility that users who have received the ad make referrals to customers who are finally evaluating making the purchase, in [17], “the consumer is exposed in his daily activity to a multitude of advertising messages through various channels and platforms. Among all these channels, the opinion of a friend, acquaintance, family member, colleague plays a key role in the purchase decision making process”. With virtual reality on the rise, efforts are directed toward structured advertising in virtual environments that capture the attention of users; real-time interaction between brands and users will be the main driver that encourages the purchase of products and services.

As evidenced in this brief literature review, companies have in virtual reality one of the main tools to compete in the national and global market, and it is also an alternative to grow in a relatively new market.

47.3 Discussion

Virtual reality is a fictitious environment created by technology which offers users unique experiences that apparently can only be surpassed by reality itself. In the virtual world there are many possibilities for companies to interact with users in such a way that they can convert them into potential customers and consumers of their products or services.

When the technological devices that make VR possible are used, the communication of users with the virtual environment allows data to be obtained during the interaction that will be used to make improvements and the information obtained will help companies to acquire a closer appreciation of people’s interests. Currently, generation Z is the generation that relates more with this type of technological environments since they can join, create and explore these virtual scenarios with any type of users such as family and friends.

The real and virtual world can be related and coincide in several aspects, in this case the economic factor generated by supply and demand is one of the most important, this because in addition to being able to offer real products, it is also developing trade with virtual goods that the customer can purchase in such a way that the economy has also moved to the virtual world, Roblox, an online video game company mentions

on its official website that: "It is building a virtual economy driven by a community of creators and users". Any creator can make a living with digital and physical goods and services. The opportunity to explore this fictitious space allows new ideas to emerge by virtue of satisfying user needs and making available new products that are useful in the virtual environment.

With technological advances there is a minimum percentage to differentiate between the real and the virtual, which is why established companies with high economic power can generate connections and invest resources to attract and retain customers who will use VR as a regular means of interaction; Nike is another company that has staff and resources to provide its customers with a unique experience with virtual reality, in [18] it is mentioned that: "Nike's virtual reality experience makes viewers feel like Neymar juggling soccer with Nike shoes".

The new generations have developed different buying habits in relation to people who were attracted by traditional advertising on radio and television, the latter prefer to enjoy the experience and the process of buying and selling in physical stores, the opposite happens with Generation Z as their preferences and habits are more related to the digital world which causes them to perceive things in a different way than the traditional, in the workplace, and they have a different way of buying and selling, in [19], it is mentioned that: "Young people belonging to generation Z have been raised in a volatile, uncertain and constantly changing environment. With countless technological advances that generate an important impact on the way they perceive reality, social relationships, work and education".

Being a relatively new technology, the acquisition of virtual reality devices is somewhat high, either for the user or for the company or business that implements it; in addition to having to make a considerable investment to have a proper experience in the virtual world, it is also necessary to spend time experimenting and learning how VR works, to the point that you can experiment, select, take initiatives, make mistakes, and try everything necessary to develop skills and abilities that are necessary to decide and act appropriately in future real situations [20].

47.4 Conclusions

Virtual reality is a fictitious environment created by technology that can be entered only with appropriate devices (virtual reality glasses or helmet, gloves, special suits, among others); the virtual world is a relatively new territory in which companies and industries are allocating resources to take advantage of this resource as a means of interaction between consumers and products/services.

The virtual world offers unique experiences to users, which is why companies allocate an important space in their discussions to establish parameters and invest resources to exploit this medium, which is more familiar to generation Z because these users were born and raised in an environment surrounded by technology. This generation is looking for virtual stores to offer new experiences based on their proximity to reality and whose response is fast and secure.

This work allows to understand the benefits that can be developed based on the proper exploitation of virtual reality, in which customers are in charge of interacting with brands by purchasing products or services and providing data that serve in the structure of a better future experience. To continue developing the potential of VR in the electronic market, it will be necessary to allocate more human resources and invest in the development of goods that can be used both physically and in the virtual world.

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Chapter 48
Mobile Educational Resources in the Teaching–Learning Process of Inorganic Chemistry Nomenclature



Janio Jadán-Guerrero, Pamela Novillo-León, and Carlos Ramos-Galarza

Abstract The starting point of the present research work is the lack of interest shown by students of high school in learning inorganic chemical nomenclature, mainly due to the rote learning of the contents. From this scenario, the main objective is to analyze how mobile learning application can help students in the learning of inorganic chemical nomenclature, supporting the idea that mobile educational resources effectively influence students' learning. The research assumes a qualitative-quantitative approach applying objective tests to the study population composed of 27 students in the experimental group and 24 in the control group. The results of the pretest objective tests compared with those of the posttests show a positive change in the academic performance of the students after the application of a set of didactic strategies that integrate active methodologies with mobile applications. Additionally, students are interviewed to know the level of academic satisfaction achieved after the use of mobile applications for their learning. The research concludes that students are more motivated to learn, they strengthen cooperative learning because they learn socially, they begin to make better use of mobile devices especially at home to improve their autonomous learning, they find a practical sense to the knowledge they acquire in each class, in short they are the essence of the teaching–learning process.

Keywords Mobile educational resources · Mobile learning · Active methodologies · Inorganic chemistry nomenclature · Didactic strategies · Teaching strategies

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48.1 Introduction

The research work aims to analyze the influence of mobile learning on the teaching–learning process of inorganic chemical nomenclature in high school students. Mobile learning is any learning activity that utilizes a mobile device, usually a smartphone or tablet. Mobile learning seeks to utilize the capabilities of mobile devices to make educational resources available to students wherever they are. This ubiquity allows for the creation of new types of learning experiences that help students engage with course content and the world. Nowadays, mobile learning and wearable technologies contribute to constructivist learning or constructivism, which holds that the student builds knowledge based on the environment around him. In addition, it takes into account previously acquired knowledge, with the main objective of achieving a process of adaptation to make it dynamic, participatory, and interactive [1].

The interaction is important because chemistry, especially inorganic chemistry, presents a complexity due mainly to rote learning of content. This effect is produced because the learning activities include contents that have no meaning for the student, they are not related to aspects of their environment. It is important to emphasize that it is the mechanical and repetitive memorization that generates in the students a learning process only for the moment of evaluation, preventing them from achieving a significant learning process [2].

Another of the causes that contribute to the problem is the traditional teaching with which teachers conduct the process, that is, they transmit the knowledge of the contents of the curriculum, without considering the way in which each student learns; they lose attention in class and specifically in the learning of inorganic chemical nomenclature, which does not allow them to recognize the rules for the formulation of compounds. [3].

The loss of interest in learning inorganic chemical nomenclature causes students to consider it as a difficult topic to learn. In this regard, this is a topic that is considered fundamental for the development of the contents of the subject of Chemistry in higher courses; the difficulty that students have in identifying the symbols of the chemical elements and their respective oxidation numbers constitutes an obstacle for the recognition of the types of compounds. The verification of these causes and their corresponding effects allows the use of mobile educational resources for students to participate efficiently in the teaching–learning process, relating, combining and transforming their knowledge [4].

According to the above, the question that leads the development of the research is: How do mobile educational resources influence the teaching–learning process of inorganic chemistry nomenclature in high school students?

Nowadays, students must play a leading role in the construction of their own knowledge. In the didactic field, the strategies that are part of the innovative proposal maintain a close relationship with active teaching methodologies, which constitute the navigation chart of the educational process that stimulates students to achieve significant learning. In the educational technological field, the mobile resources seek

to stimulate the interest of students so that learning is personalized according to their needs, without spatial and temporal barriers, and above all, autonomous.

The next section introduces some related works. Section 48.3 describes the research method used, the participants, the apps used, and the procedure applied. Section 48.4 presents the discussion of the results. Finally, Sect. 48.5 presents the conclusions and future work.

48.2 Background

In Ecuador, a study related to the use of educational mobile applications in the teaching of inorganic chemistry nomenclature was identified, whose main objective was to establish the relationship of educational mobile applications in the teaching of inorganic chemistry nomenclature. The research was based on a qualitative and quantitative approach, with a socioeducational modality, through interviews to teachers and experts, as well as surveys to second-year high school students as participants in the problem. After the analysis of the results obtained, it was concluded that the relationship between mobile applications and the teaching of inorganic chemical nomenclature is close and contributes to the motivation of students to maintain interest in the teaching–learning process [5].

A similar research on mobile learning as an innovative strategy in the learning of inorganic chemistry integrates Apps as a teaching strategy in the area of inorganic chemistry and established the relationship that exists between the use of technology and the school performance of tenth grade students. The research originated from the assumption that students do not achieve basic school performance, and therefore it is important to use applications for mobile devices that motivate them in the acquisition of knowledge. The approach of this study was descriptive, with a quantitative method and correlational design. It concluded that the integration of information and communication technologies (ICT) in the educational process makes students' learning not monotonous, on the contrary it gave them the possibility to learn at their own pace considering their particularities, procedures that in a traditional education are not attended to [6].

On the other hand, the inclusion of playful strategies in the learning of inorganic chemical nomenclature also contributes to learning from repetition and error. It is important to integrate active methodologies that encourage the development of skills and abilities to achieve meaningful learning. In this context, a study was conducted with first semester students of the Pedagogy in Experimental Sciences, Chemistry and Biology of a University of Ecuador, it was quantitative and quasi-experimental in nature. The conclusions of the study accepted the hypothesis that the incorporation of playful strategies to the teaching–learning process of inorganic chemical nomenclature allows improving academic performance; as well as the possibility that the experience can be applied to other subjects that represent a challenge for students using ICT [7]. A second study describes the design of a digital escape room for the teaching of chemistry, the objective of this study focused on proposing escape

rooms to strengthen the teaching of chemistry in high school. For the design of the escape room, a baseline was elaborated through an interview with three teachers of the chemistry area; as well as a survey to 178 students. As a result of the exploratory research, there is evidence of the need for teachers and students to implement playful methodologies, which would allow inferring that the escape rooms are a novel and attractive strategy for the teaching of chemistry [8].

This background reveals that in Ecuador the teaching–learning process obeys a traditional model based on rote and repetitive teaching strategies and resources, preventing students from achieving basic school performance. Given this situation, it is important to motivate teachers to integrate ICT into the educational process; in this way, the particularities of each student should be considered, so that learning is not monotonous, but on the contrary, providing the opportunity for them to learn at their own pace.

The following section describes the proposed methodology based on previous experiences and with the intention of creating new pedagogical strategies to strengthen skills in the learning process of inorganic chemistry nomenclature.

48.3 Method

The research design follows a quasi-experimental methodology involving a control group and an experimental group [9]. The study was carried out at the Chambo School located in the Chambo canton of the province of Chimborazo, Ecuador, an institution with 710 students that offers education at the basic general education and high school levels. For the selection of the sample, it was necessary to start with the students who were studying chemistry at the time of this study. A course was selected that had two parallels, parallel A, which would be the control group, was formed by 24 students, while parallel B would be the experimental group formed by 27 students. Figure 48.1 summarizes the process followed for the diagnostics, planning, intervention and evaluation of the two groups.

In the first phase of the research, a diagnosis of the teaching–learning process of inorganic chemical nomenclature was carried out with the purpose of gathering information about the situation prior to the beginning of the experience in the use of mobile educational resources. For this purpose, an initial diagnostic test was applied to the students of both the experimental group and the control group.

The second phase was the didactic planning, based on the results of the diagnosis, for which an educational strategy was designed through activities that include the use of mobile educational resources for each of the planned units. Table 48.1 gives the apps used in the intervention.

It is important to consider that mobile learning innovation does not consist of the use of devices and applications during the teaching–learning process, innovation occurs when analyzing how these resources are applied to generate meaningful learning [10].

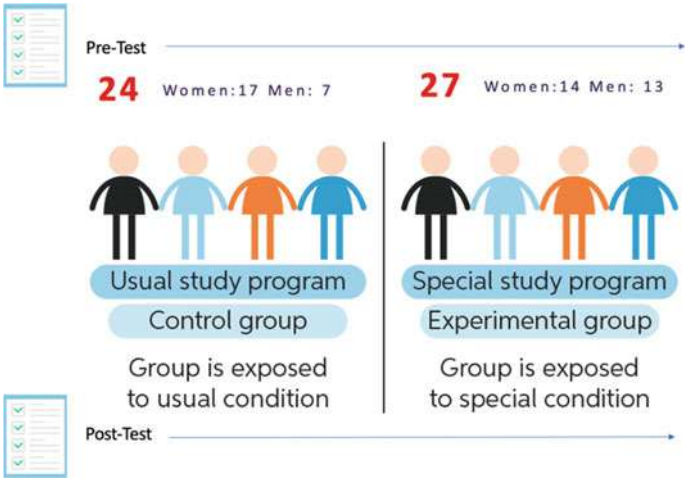


Fig. 48.1 Design of the research

Subsequently, in the third phase, the intervention in the teaching–learning process was carried out; for this purpose, the traditional method was applied to the control group, while the developed strategy was applied to the experimental group.

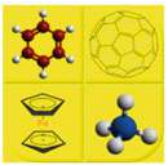
The fourth phase corresponds to the evaluation of the impact of the innovative proposal through the posttest that allows determining the different levels of learning of inorganic chemical nomenclature reached mainly by the students of the experimental group. Additionally, for the validation of the results obtained, the students of the experimental group who master or reach the required learning are interviewed to know their degree of satisfaction when using mobile educational resources.

48.4 Results

In the control group in the quantitative scale of learning shows that of the twenty-four (24) students in the control group, two (2) reach the required learning which corresponds to 8%, nineteen (19) students are close to reaching the required learning which corresponds to 79%, and three (3) students do not reach the required learning which corresponds to 13%.

The results obtained for the female gender show that of the seventeen (17) students, two (2) reach the required learning which corresponds to 12%, fourteen (14) students are close to reaching the required learning which corresponds to 82%, and one (1) student does not reach the required learning which corresponds to 5.88%. Para el género masculino, los resultados obtenidos muestran que de siete (7) estudiantes, cinco (5) estudiantes están cerca de lograr el aprendizaje requerido que corresponde

Table 48.1 Applications for developing strategies in the teaching of chemistry

App	Description	Logo
RAppChemistry	It allows you to learn the chemical elements in a fun way. Through augmented reality you can learn the atomic structure of all the elements in 3D	
Chemical substances	It facilitates learning through playful strategies of more than 300 chemical substances that are studied in chemistry classes	
Elements	It makes it possible to learn the names and symbols of the 118 chemical elements of the periodic table, atomic masses, and electronic configurations	
Table of valences	It helps to learn the oxidation states of the elements of the periodic table, their symbols, and nomenclature. It is ideal for the formulation of chemical compounds	
Inorganic formulation	It promotes the learning of inorganic chemical formulation in an easy way. By writing the chemical compound, the formulation is obtained in different nomenclatures	

al 71%, y dos (2) estudiantes no alcanzan el aprendizaje requerido que corresponde al 29%.

On the other hand, the results obtained from the application of the pretest objective test instrument to the students of the experimental group demonstrate in the quantitative learning scale that of the twenty-seven (27) students of the experimental group, three (3) students reach the required learning that corresponds to 11%, twenty (20) students are close to reaching the required learning that corresponds to 74%, and four (4) students do not reach the required learning that corresponds to 15%.

The results obtained by the female gender show that of the fourteen (14) students, two (2) reach the required learning that corresponds to 14%, eleven (11) students are close to reaching the learning required that correspond to 79%, and one (1) student does not reach the required learning that corresponds to 7%. For the male gender, the results obtained show that of thirteen (13) students, one (1) student reaches the required learning that corresponds to 8%, nine (9) students are close to reaching the learning required that correspond to 69%, and three (3) students do not reach the required learning that correspond to 23%.

The results obtained from the application of the objective posttest instrument to the students of the control group show in the quantitative learning scale that of the twenty-four (24) students, thirteen (13) students reach the required learning that corresponds to 54%, eight (8) students are close to reaching the required learning that corresponds to 33%, and three (3) students do not reach the required learning that corresponds to 13%.

The results obtained by the female gender show that of the seventeen (17) students, eleven (11) students reach the required learning that corresponds to 65%, five (5) students are close to reaching the required learning that corresponds to 29%, and one (1) student does not reach the required learning that corresponds to 6%. For the male gender, the results obtained show that of seven (7) students, two (2) students reach the required learning that corresponds to 29%, three (3) students are close to reaching the required learning that correspond to 43%, and two (2) students do not reach the required learning that correspond to 29%.

Comparing the results obtained in the application of the instruments, it can be seen that eleven (11) students, nine (9) of the female gender and two (2) of the male gender, who were close to achieving the required learning, during the development of the process of teaching–learning without the use of mobile educational resources, manage to achieve the required learning. On the other hand, the same three (3) students, one (1) of the female gender and two (2) of the male gender, remained without reaching the required learning, evidencing that, by not using an innovative didactic strategy, the students cannot overcome their learning difficulties.

On the other hand, the results obtained from the application of the objective posttest instrument to the students of the experimental group show that of the twenty-seven (27) students of the experimental group, two (2) students master the required learning corresponding to 8%, seventeen (17) students reach the required learning corresponding to 63%, six (6) students are close to achieving the required learning corresponding to 22%, and two (2) students do not reach the required learning that corresponds to 7%.

The results obtained by the female gender, show that of the fourteen (14) students, one (1) student masters the required learning that corresponds to 8%, ten (10) students reach the required learning that correspond to 71%, two (2) students are close to achieving the required learning corresponding to 14%, and one (1) student does not reach the required learning corresponding to 7%.

For the male gender, the results obtained show that of thirteen (13) students, one (1) student masters the required learning that corresponds to 8%, seven (7) students reach the required learning that corresponds to 54%, four (4) students are close to

achieving the required learning that corresponds to 31%, and one (1) student does not reach the required learning that corresponds to 8%.

Contrasting the results obtained in the application of the instruments, it can be evidenced that after executing the intervention phase through the didactic strategies that integrate mobile educational resources in the teaching–learning process of the inorganic chemical nomenclature, two (2) students manage to master the required learning, one (1) of the female gender and one (1) of the male gender. Similarly, sixteen (16) students who were about to achieve the required learning, nine (9) of the female gender and seven (7) of the male gender, manage to achieve the required learning after the intervention phase. However, there are still six (6) students who are close to achieving the required learning, and two (2) students who do not reach the required learning, mainly due to the fact that they have not been able to develop their emotional competencies due to problems they are going through at home and have influenced the teaching–learning process.

48.5 Conclusions

The main objective of this research was essentially to carry out an analysis of the influence of mobile educational resources in the teaching–learning process of inorganic chemical nomenclature in first-year students of the Chambo High School. It is important to mention that the objective has been achieved through the application of quantitative and qualitative instruments that have allowed the generation of a study scenario to gather the conclusions set out below.

Regarding the diagnosis of the teaching–learning process of inorganic chemical nomenclature, the result obtained when applying an objective test of previous knowledge, determines that more than half of the students in the experimental group are about to achieve the required learning. This situation is mainly produced by the methodology applied in the teaching–learning process, which is passive and has a focus on how the teacher can transmit knowledge, without giving it a purpose. Considering this background, the consequence derives in a loss of interest in learning the contents because motivating and challenging activities were not developed.

In view of the students' disinterest, an innovative proposal is designed that involves the use of mobile educational resources for the teaching of inorganic chemistry nomenclature. The proposal consists of a set of didactic strategies focused on the application of active teaching methodologies and the use of mobile applications as a complement to the students' learning. After the intervention phase, in which the proposal is put into practice, the results are notorious; students are more motivated to learn, they enhance cooperative learning because they learn socially, they begin to make better use of mobile devices especially at home to improve their autonomous learning, they find practical sense to the knowledge they acquire in each class, specifically, they are the essence of the teaching–learning process and corroborates with the results of other studies, where mobile resources have been used to facilitate the learning of hard sciences [11].

Finally, once the existing change in the academic performance of the students has been demonstrated, the evaluation of the academic satisfaction achieved in the teaching–learning process is evident. Above all, it happened because of the use of mobile applications, and this may become a contribution to learning inorganic chemical nomenclature. Being satisfied academically motivates the search for new "apps" according to their learning needs not only for the subject of Chemistry but also for other subjects. With the complete development of the research work, it is concluded that mobile educational resources effectively influence the teaching–learning process of inorganic chemical nomenclature in first-year students of Chambo High School.

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Chapter 49
Augmented Reality Application for the Clothing Consumer in an Emergency Context

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Abstract All the changes that the COVID-19 pandemic produced in human beings have yet not been quantified. People acquired new commercial habits which are reflected in a new and different lifestyle. Therefore, in this manuscript, the ethnographic method to obtain quantitative and qualitative data from 122 participants is conducted. The proposed methodology allows the presentation of information on the clothing garments preferred during a confinement period. This information was used to develop an augmented reality (AR) application where certain details and the three-dimensional garment is shown. Blender was used to develop the garment and Unity was the selected software to develop the application. In addition, modules such as AR Foundation, ARCore XR Plug-in, and DOTween were also used to create the augmented reality environment for Android smartphones. Statistical analysis reveals the relationship between the economic situation vs. the consumer behavior. It highlights the usage of comfortable and informal clothes with neutral colors such as white, black, gray, and brown. To validate this proposal, the corresponding tests were performed on 111 smartphones of the initial participants. Subsequently, through the usability SUS test, the operation of the application was verified obtaining 84.46/100 as a total score. Finally, this manuscript contributes to the definition of the consumer's psychographic profile during and after being confined.

Keywords Augmented reality · Clothing consumer · COVID-19 · E-commerce

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49.1 Introduction

By the end of 2019 in China, one of the pandemics that has produced the greatest changes and effects on human beings began. The virus known as SARS-CoV-2 is the cause of COVID-19 disease. It has been spread all around the globe during the last two years [1]. This disease has led to the collapse of health systems, resulting in a high number of deaths. Specialists and the World Health Organization (WHO) presented a variety of suggestions and protocols to follow to reduce infections. Governments and authorities adapted all the biosafety measures and started action plans according to their realities. Constant hand-washing, disinfection of transport and workplaces, and the mandatory use of face masks were the main biosecurity measures. However, the partial or total confinement of citizens was the strictest action that changed everyone's way of life. Most establishments were closed; restaurants, stores, and organizations were forced to change the face-to-face mode of work to a virtual one. Only public health services were open to assist the huge number of infected people.

The term teleworking, a flexible way of performing work activities without the need for the employee's physical presence, became popular. It can be done on a part-time or full-time basis, according to the conditions defined between the employer and his subordinate. The use of technological devices merged with innovative platforms that allow real-time interaction, was the main requirement for this modality to be carried out properly [2]. With this, human interaction was reduced while communications were performed through a computer or smartphone [3]. Moreover, this abrupt change compared with the past, caused people to downplay the importance of personal care and the use of clothing and accessories [4]. The basic principle of dressing up is to cover the body and protect it from weather conditions and environmental issues. However, it also has a communicative function, where clothing is part of the body language and therefore of social interaction. Even the way of dressing up in the COVID-19 context is part of human beings' communication in an emergency situation.

The use of face masks has been a means of protection for health staff, but then its usage was generalized for the entire population. Now, it is a part of our clothing since it became mandatory in almost all countries during these years. Without human beings realizing it, this biosafety measure has been incorporated as a new clothing item. On the other hand, it modifies the face structure because the visible features are fewer and the general appearance might change. There are many face mask types with multiple designs, materials, and sizes that could influence the ergonomics of the user. However, other people chose safety instead of comfortable or fashion by using one-piece biosecurity suits. It includes hair tied back, long sleeves, and avoiding accessories such as bracelets or rings. All these new trends motivated changes in important textile sectors, thus, in commerce. Now customers do not want to touch clothing or accessories that were previously handled by others, as this could be a method of contagion.

49.1.1 Literature Review

However, trading security for the "fun of shopping" is a solution that will not be sustainable in the long term [5]. New electronic services were introduced to reduce the human need to test products physically. As a proposal for social interaction, for example, voice assistants have been implemented to guide people during their purchases as described by Rautela and Agrawal [6]. McDonald's has included robots in the kitchen and also as waiters, replacing some of its employees for biosecurity. Even 2D holograms can be implemented as a platform to maximize the experience of potential buyers. While in [7], the design of a virtual store that allows the purchase and sale of women's clothing and accessories is proposed. As an alternative, augmented reality (AR) allows customers to get additional product information using their smartphones. An Adidas store in London enabled virtual options using AR, asking its consumers to activate their cell phone cameras and scan certain tags. It triggers a series of products and additional information that can be enjoyed and shared on social networks [8].

Ekmeil et al. [9] affirm that augmented reality environments are a technological variant that has empowered marketing and e-commerce, during the COVID-19 pandemic. However, there is a lot of ground to explore and cover about it. In [10] the use of this technology for selling products in commercial stores has been shown, it allows an improved interaction between the product and client. On the other hand, in the tourism field, the user experience is completely enhanced as shown in [11, 12]. Immersive marketing is becoming more and more important in the Asian continent as appreciated in [13]. Nowadays, the term smart store which uses immersive environments was born to directly influence the business environment.

Social contact and mass access to stores must be controlled. Despite the reduction of restrictions and biosecurity measures, the feeling of crowding continues to produce fear and discomfort. As described by Silvestri [14], extended reality environments (virtual and augmented reality) are presented as a technological variant that has offered important marketing benefits in the context of COVID-19. Therefore, this manuscript describes the use of augmented reality for the development of an application that improves the experience of clothing consumers. Considering the need to reduce physical contact, this technology allows the customer to obtain more information about a product without the need to interact with a store employee. It only requires the use of a mid-range smartphone, which acquisition has become generalized in recent years. To validate its use, the necessary experimental tests were carried out and the respective usability test is presented.

This document is composed of four sections including the introduction in Sect. 49.1. Section 49.2 describes the methodology used and Sect. 49.3 the results. Section 49.4 presents discussions and conclusions.

49.2 Materials and Methods

There are a lot of methodologies that are proposed for the development and design of products from classic to contemporary. This work employed the user-centered methodology that emphasizes the importance of beginning with a user study to develop any system [15]. This methodological process starts with the user analysis, its comprehension, description, and interpretation. The context of this research is determined by virtuality, since all the participants work remotely from home. The main topic refers to clothing patterns adopted by post-pandemic users and how to merge them into the e-commerce world [16, 17].

49.2.1 Data Collection Techniques

At first instance, the ethnographic method was used; it includes the interview and observation techniques and a survey was coupled as a quantitative tool. In this way, the inductive process typical of qualitative research is replaced by a mixed design, a more realistic view of the social system described.

Interview. This qualitative technique allows the information exchange with the interviewed part to understand his main feelings. Considering the pandemic and telework, interviews were conducted remotely through video calls and social networks. Recordings and notes were obtained prior full consent of the individual interviewed.

Observation. This qualitative technique is used to obtain as much information as possible about a phenomenon where it takes place with the least likely intrusion. The user's environment, age, genre, clothing, marital status, and family environment among others were analyzed. It is highly recommended the use of all senses, however, in the context of this research, the interviewer focused on looking at the clothing and accessories the individuals wore. For data collection, observation sheets were created that include screenshots of the meetings held.

Survey. As part of this technique, we designed a template that comes up with specific information about the clothing preferences of the person. In addition, demographic questions were incorporated to obtain even more quantitative data. In the context of the pandemic, teleworking, and telestudying modality, the self-administered survey is used in absence of the interviewer. This survey was completed virtually through Google Forms.

49.2.2 Sample

The type of sample selected for data collection is non-probabilistic, typically applied in research with a more qualitative approach. As part of the ethnographic focus

disposed, samples were defined in two ways: (i) By chains and (ii) With volunteer participants. On the one hand, for the chain sample (or snowball) key participants were identified who then recommended others to expand the number of people in the sample. On the other hand, a huge number of people were invited and those who would accept were designated as part of the sample also known as self-selected.

49.2.3 Participants

The study was conducted with people of productive age, meaning between 25 and 65 years old. A non-probabilistic sample of 122 participants was selected. It was mostly integrated by young adults between 25 and 40 years old. These individuals decided to be part of the study voluntarily. Table 49.1 summarizes the sociodemographic variables of the participants.

The majority oscillates in a range between 25 and 40 years old, where males have a greater proportion (55.73%). 50% of the participants have a monthly income between $1400 and $2800 USD, followed by 20.49% between $400 and $1399 USD; it involves a high and medium socioeconomic level, respectively. This group (young

Table 49.1 Demographic characteristics of the study population

Variable	Range	Frequency	Percentage (%)
Age	25–40 years old	66	54.10
	41–50 years old	30	24.59
	51 years old or above	26	21.31
Genre	Female	68	55.73
	Male	54	44.27
Civil Status	Married	65	53.28
	Single	46	37.70
	Divorced	10	8.20
	Widowed	1	0.82
	De facto union	0	0
Ethnic identity	Mixed-blood	110	90.16
	Indigenous	7	5.74
	Afro-Ecuadorian	3	2.46
	White	2	1.64
Monthly Income	$400–$1400	25	20.49
	$1401–$2800	61	50.00
	$2801–$3500	21	17.22
	$3500 and above	15	12.29

adults) is mostly considered mixed-blood, although there is also the presence of indigenous, afro-Ecuadorian, and white people.

49.2.4 Application Design

Technical Requirements. Two main elements were used to create the application: (1) a mid to high-end smartphone that ensures the correct execution of the application and, at the same time, its processor is 100% compatible with Google AR. Thus, the specifications of the smartphone were: 1440 × 3120 px AMOLED 90 Hz screen, Snapdragon 855 processor fully compatible with Google AR. 12 GB of RAM and rear cameras array of 48Mpx f/1.6 OIS + EIS + 8 Mpx tele f/2.4 OIS + ultra-wide-angle f/2.2 117°, and (2) a computer that allows the development of the application without slowdowns, for this reason, the specifications of the PC used were: Windows 10 Pro/64 bits, 16 GB of RAM, an Intel Core i7 10th generation processor and for easily move 3D graphics, an NVIDIA RTX 2060 6 GB video card.

Software. The Unity multiplatform graphics engine was selected because it allows the development of AR applications by installing modules within the software [18]. The link to Visual Studio makes it a versatile tool for writing scripts that will be combined with Google's AR Core modules to bring alive the application. The version of Unity with which the app was developed is 2021.3.4f1.

The following packages were installed for AR development: (1) AR Foundation which contains the interface that allows AR development, however, it does not include any AR feature for its operation, so more modules must be added according to the need (2) ARCore XR Plug-in that allows AR operation in Unity, it contains several subsystems such as camera, depth, session, planes, anchors, and face and image tracking, among others (3) DOTween which is an object-oriented engine compatible with C#. Figure 49.1 presents the general scheme for the creation of the application using Unity.

Functioning. The application helps the consumer choose his next item of clothing through three-dimensional visualization of the available items. For a better and faster

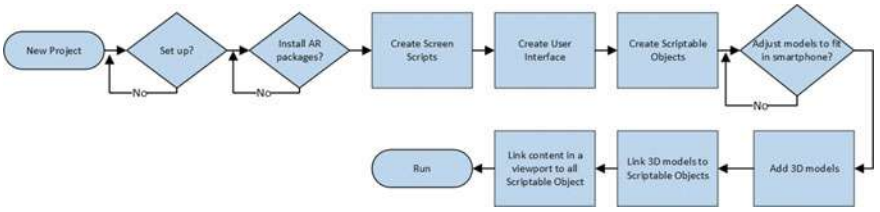


Fig. 49.1 General flowchart about the creation of the app

selection of avant-garde garments according to a range of age and gender, the application performs a preliminary analysis of the user through two simple questions. This information allows the application to show a more selected group of garments for the consumer, therefore, he could save time and, in turn, increase the purchase amount due to the ease of selecting garments encompassed according to the aforementioned criteria. However, in case the user wants to review the entire available catalog, the application has a ribbon where a new category can be chosen. The "all categories" button will take the user to a new window where he can see a list of options with all the categories and garments available in the store.

Additionally, the user can choose one or more clothing items and add them to a shopping cart that can be confirmed later. In the shopping cart, the chosen garments are shown with the unit and total cost of the selection. Finally, once both the number of selected garments and the total purchase value have been confirmed, the seller will receive a notification through the application to contact the consumer and thus proceed to close the sale, leaving only the payment and delivery method of the garments pending.

Operation. After downloading the application—when opening it for the first time—you must accept the permissions required to use it and then, log in to the application to provide the seller with your contact information if a purchase is made. Every time the application is run, the user is asked two questions: (1) the age range, which presents as options the values of 18–25, 25–35, 35–45, and over 45 years old and (2) the gender of the consumer that can only be selected between man or woman.

The main screen of the application will show the camera open with a central button that, if touched, shows a ribbon with the categories of all the available clothes. When selecting a garment, the AR scripts are executed internally to proceed to read the points of the plane that are observed in the camera image and thus project the model of the garment in 3D on the aforementioned plane. The consumer will be able to visualize, turn, zoom in or out of the garment to observe it in detail. Meanwhile, the garment is displayed together with an information box that exposes the material, type, color, group, and style where the garment was classified as shown in Fig. 49.2. If the consumer agrees, he can press the check icon to confirm and add the item to the shopping cart. Otherwise, he must select the trash can icon to remove the garment and select another one. The process is repeated until the user completes his selection and proceeds to the shopping cart.

The shopping cart section is a new window that appears after pressing the shopping cart button directly from the garment selection. This section shows a flat summary of the user's selections. In addition, it contains buttons that allow the user to remove any unwanted garment or confirm the purchase using the "confirm" button. Once confirmed, a pop-up window opens notifying the customer of his purchase confirmation and, shortly after, the seller will contact him to agree on the payment and delivery method for his purchase. At the end of the use of the application, it automatically returns to its main screen with the camera running and the central button.

Clothing Design. Blender was used for the clothing design; it is fully compatible with Unity. Blender is a 3D illustration software that allows the decomposition of 2D



Fig. 49.2 Men's hoodie shown in AR

images to then convert them into 3D. It uses multiple geometric figures' mesh where squares, triangles, rectangles, and circles are the most used; it can also decompose the image in three-dimensional figures such as cylinders, cubes, etc. Clothing garments were designed considering the obtained premise in this research which includes avoiding combined colors and stamps. Clothing garments must be imported to Unity to be used in the application (Fig. 49.3).

49.3 Results

For this study development, there were two evaluation periods. The first one was conducted in January 2021 and the next one in May 2022 (considered as a post-pandemic period). Results are detailed as follows.

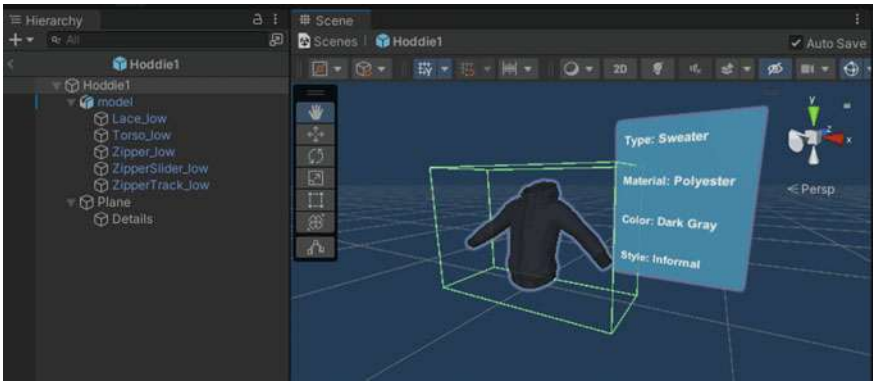


Fig. 49.3 Garment exported to Unity to be managed in AR

49.3.1 Surveys

In the first instance, the survey presented in Table 49.2 is analyzed. It contains only dichotomous questions. The biosecurity measures and certain consumer habits that were relevant during COVID-19 and their subsequent behavior can be appreciated. As part of health recommendations spread by WHO, social distancing is one of the most important measures to reduce the number of infections. According to this information, a high number of participants still care and worry about this disease. Regarding purchases, there is a preference for boutiques in shopping centers and the use of home delivery.

In addition, other multiple-choice questions were asked to learn more details associated with the above. 79.51% maintain their preference for making purchases physically, even when social networks take center stage: WhatsApp (47.54%) and

Table 49.2 Results from the dichotomous questions of the survey

	Item	Pandemic		Post-pandemic	
Biosecurity measures	Alcohol usage	115	94.26%	69	56.56%
	Constant hand-washing	109	89.34%	33	27.05%
	Mask usage	121	99.18%	110	90.16%
	Change of clothing when getting home	112	91.80%	61	50.00%
	Worry about infections	104	85.25%	64	52.46%
Consumer habits	Store or shopping centers purchases	79	64.75%	93	76.23%
	Home delivery	85	69.67%	91	74.59%
	Online shopping/social networks	81	66.39%	64	52.46%

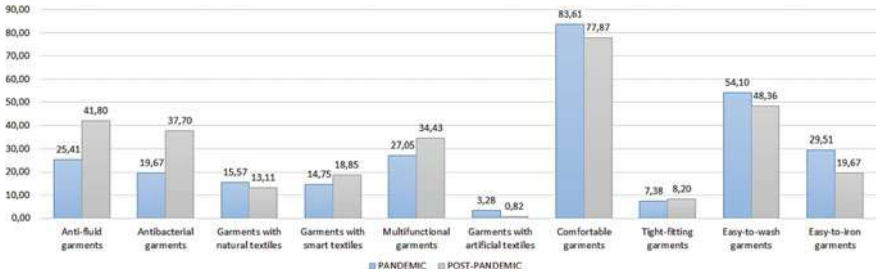


Fig. 49.4 Clothing preferences in pandemic and post-pandemic periods

Facebook (14.75%). From the economic point of view, 59.02% of the participants consider that prices have been maintained, 32.79% that they have risen, and only 8.20% that they have decreased. While 84.43% prefer to make their purchases based on quality, 69.67% on price, 49.18% on aesthetics, and 18.03% on sustainability.

Despite the reduction of prohibitions, the post-pandemic consumer still maintains respect for biosecurity measures, although to a lesser extent. It also shows interest in the use of garments that have anti-fluid (13.11%), antibacterial (8.20%), and repellent (4.92%) characteristics. They were also asked about their preferences regarding the use of clothing, footwear, and accessories. Regarding clothing, in the first period, 86.07% showed a preference for upper garments over lower garments. During the second evaluation period, this was reduced to 78.69%, maintaining this condition slightly and especially in the male sex.

Additionally, a statistical analysis that allows defining if inherent conditions of the sample influence individuals' behavior was carried out. There is no significant inference between sociodemographic features such as age, civil status, and, ethnic type vs. the available variables in the survey. However, it must be taken into account that socioeconomic level is an important variable to consider, since 79.51% of the sample belongs to a high socioeconomic level. The inference was found between purchasing behavior and the monthly income of the participants. Therefore, 73.77% of the participants prefer purchasing in shopping centers or recognized stores, leaving apart popular places.

Figure 49.4 shows the expected changes of the consumer in the pandemic and post-pandemic context. According to the data, users in confinement prefer comfortable and easy-carry and easy-washing clothing garments. In the future, the industry tends to focus on multifunctional clothing with smart technologies that include anti-fluid and antibacterial textiles.

49.3.2 Observation and Interviews

The observation was carried out during the informal interviews with the participants, through the Zoom platform. The data was recorded on a file, where the type of clothing

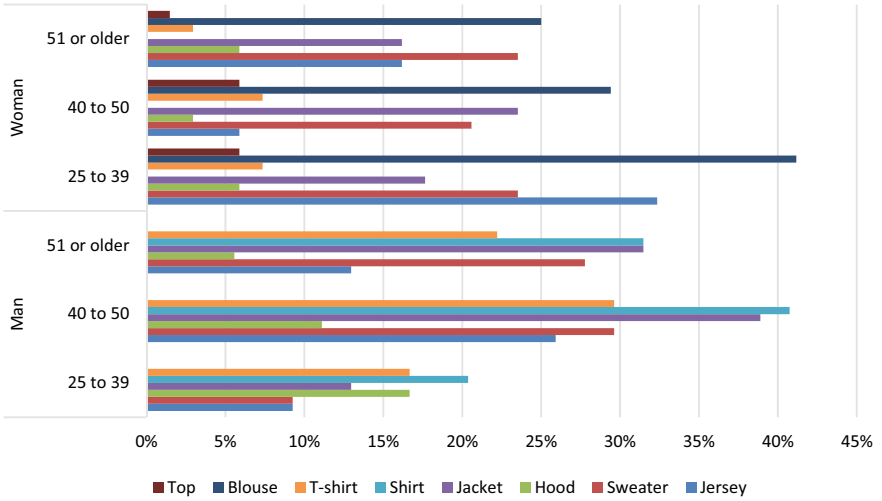


Fig. 49.5 Clothing preferences in pandemic and post-pandemic periods

(psychographics) was recorded. To provide a greater context, other important aspects were recorded, such as the characteristics of the physical space and the attitude that is perceived. It should be clarified that the description only includes the characteristics of the upper garments since it is the type of clothing that could be seen. Figure 49.5 shows the information collected only in the first evaluation period (2021), where a stratification by genre and age groups was made to identify the most commonly used clothing in a confinement condition.

Casual clothing is articulated with formal one, a characteristic that individuals call semiformal (athleisure). On the other hand, casual clothing is combined with the active-wear universe in which comfort prevails. In lesser incidences, the garments are presented with details or prints. Regarding the chromatic, the use of the black tone predominates, followed by white, beige, and/or brown tones, in addition to neutral gray tones. In a much lower incidence, garments are presented in color combinations.

Although the objective of the interviews was to be able to analyze the way the participants dressed in their natural environment, questions of a social nature were also asked. Topics about their lifestyle, social activities, new habits, state of mind, and teleworking, among others were discussed. The increase in leisure activities and therefore the use of sports, comfortable and semiformal garments stands out. Online commerce has become popular since the consumer got used to this type of simpler transactions. According to interviews, participants choose comfort over elegance. Similarly, for the return to 100% face-to-face activities, the use of clothing with a basic level of protection against fluids, viruses, and bacteria stands out.



Fig. 49.6 **a** Real model of the garment. **b** 3D model designed to be used with AR

49.3.3 Experimental and Usability Test

Voluntarily, the 122 participants were invited again to be part of the application's running tests. However, 11 people were excluded; 8 were because their phones were unable to run the application and the rest were for personal reasons. At the beginning of the test, some insecurity was noted in the participants, but it was reduced when the respective socialization was carried out. The exercise lasted between 5 and 10 min during which they were able to explore the various functionalities.

As shown in Fig. 49.6, users were able to verify that the real model of the garment has a high percentage of similarity to the designed 3D model; this allows them to trust the app and start using it as they please.

To validate the performance of this proposal, a questionnaire based on the SUS test, developed by Brooke [19], has been implemented. The evaluation is carried out on a scale of 1–5, however, the questions must be evaluated in two groups. In the first group, made up of odd questions from 1 to 10, 1 should be subtracted from the score obtained. For the even questions, the value obtained by the participants is subtracted from 5. In the end, you have to add up all values and the result should be doubled; this result is the score obtained in the test. The value will be in a range from 0 to 100 and the higher it is, the better the acceptance of the application. The scores are shown in Table 49.3.

The result of 84.46% reveals that the application works properly and provides a user-friendly experience. A positive evaluation was also obtained in the use of the application; users feel confident in using it. Certain functionalities still present irregularities; this is why, at the end of the manuscript, proposals for improvement are made for a better user experience.

Table 49.3 Summary of SUS test results

No.	Question	Score	Result
1	I think I would like to use this system frequently	3.97	2.97
2	I find this system unnecessarily complex	1.35	3.65
3	I think the system is easy to use	3.89	2.89
4	I think you would need technical support to make use of the system	1.49	3.51
5	I find the various functions of the system quite well integrated	4.11	3.11
6	I have found too much inconsistency in this system	1.51	3.49
7	I think most people would learn to make use of the system quickly	4.43	3.43
8	I found the system quite uncomfortable to use	1.24	3.76
9	I have felt very safe using the system	4.49	3.49
10	I would need to learn a lot of things before I can manage the system	1.51	3.49
	Subtotal		33.78
	Total (%)		84.46

49.4 Discussion

Humanity is facing a harsh pandemic that has claimed several lives for more than two years. This study was carried out while the COVID-19 pandemic was not yet over due to the appearance of new variants and increase in infections. This research presents information, defined through observation, on the user's clothing preferences during a period of confinement. When there is a state of emergency, which could occur in the future due to the appearance of new viruses or diseases, it is common for human beings to isolate themselves at home or in a safe place. Face-to-face activities are replaced by other synchronous and asynchronous ones remotely performed. Furthermore, it generates social changes, including the way of dressing and personal aesthetics [20]. Following Ajzen's theory, it is known that individual and collective motivational factors can influence the level and type of consumption.

As mentioned by Vakulenko et al. [21], the growing technological development must be taken advantage of to improve service and decision-making. In the past, companies focused on meeting needs only, but nowadays they also seek to promote consumer comfort. Shetty and Pai [22] describe that COVID-19 changed certain consumer trends and increased the use of technological tools. Users acquired new electronic devices with greater features that ease the development of their activities remotely. This agrees with the results of the survey, where 79.51% of the participants prefer to carry out their commercial transactions online. Limiting face-to-face activities contributes to social distancing and therefore reduces the chances of contagion. Biosecurity measures are kept, although data shows a considerable reduction this year.

Despite the reduction in the severity of biosecurity measures, 74.59% prefer to keep shopping online or through social networks. This is another reason to continue developing virtual tools, considering that customers are no longer satisfied with

seeing the products, but also want to feel truly immersive experiences. Communication through social networks and home delivery are other parameters that users got used to and that were considered in the development of the application. Our application shows the consumer a three-dimensional catalog, where they can appreciate the clothing garments that are offered in the store. It means, the person could avoid his visit to the physical store, where he must touch the products and interact with other people and also with the store's staff exposing himself to contagion.

The consumer in a state of confinement prefers the use of comfortable garments that are easy to wash. Through observation, a lot of informality and simplicity in aesthetics were identified, with monochrome garments and no prints. When it comes to colors, dark, light, and brown stand out; also, as gray tones but to a lesser extent. Clothes that combine colors are not very popular, except in specific situations such as social meetings.

When considering the possible post-pandemic consumer, surveys suggest that a greater emphasis should be placed on the development of textiles with a dual function. The main objective of clothes is to cover the body and protect it against weather conditions. Nevertheless, the need for a higher level of protection has arisen, therefore, the use of smart textiles that take advantage of the development of both technology and synthetic materials is proposed. Garments could also be developed with anti-fluid and antibacterial fabrics. However, since this information comes from a survey, it cannot be generalized and it could be limited to this group. It also may vary depending on economic and social factors.

Following the user-based methodology, a statistical approach was considered to cover the aspects that most influence the consumer, including demographics. Bernardi [23] highlights the importance of knowing the public to which the product is directed to cover all their needs and expectations. Both interviews and observation only allowed the visualization of the upper garments, which is typical in video call meetings. Hence, it could be seen that 93% of the male participants wore a shirt. Its use was more commonly seen in men between 40 and 50 years old (41%). Shirts were accompanied by jackets, which represent 39% of the same age group. 96% of women wore casual-style blouses for the workplace; where 41% corresponds to women between 25 to 39 years old. In the same aging group, only 6% of women wore formal-style tops; likewise, only 1% of women over 51 use them. The use of these upper garments is linked to the weather conditions and the working day mood. To counteract the cold weather, warm and functional clothing is worn. Women prefer, from different clothing options, sweaters (68%) or jackets (40%) with materials that retain heat. On the other hand, only 17% of men between 25 and 39 years old wore hoods, and 11% of men between 40 and 50 years old also agrees with this style. This represents a low use of this type of clothing, which is considered to carry out physical activities, and not precisely for a work environment.

49.5 Conclusions

Technology is supporting e-commerce and provides plenty of options that have been implemented in the last decades. Based on the literature review, it was possible to highlight the development of voice assistants [6], virtual assistants, and service robots [24]. However, as [25] mentions, digital evolution requires that users' behavior be understood. Although a direct comparison with the works already cited cannot be conducted, it is clear that all of them are innovative proposals that seek to promote better commerce through the satisfaction of the user. In addition, it was evident that the adoption of biosafety measures directly influenced clothing. For instance, the use of the face mask, which is now considered part of the outfit.

From a practical point of view, the information obtained provides important suggestions that can be used by developers of applications focused on the textile and fashion sector. The usability test showed a very good acceptance (84.46%), which validates this proposal. At the same time, the respective feedback was obtained, which will allow important changes to be made for a new version. Given that this pandemic is still in force, no general conclusions can be drawn, which is considered to be the main limitation. Still, it is tangible evidence of the technological changes in today's e-commerce. This manuscript can provide relevant support to the current literature and provide useful information that can be used in future research.

The main limitation is based on the reproduction of the material's feeling of which the garment is made; as this is an unsolvable issue within the reach of these developers, it is proposed to improve the description of the garment's material so that consumers can get to know and even feel the material through a garment close to them.

One of the most valuable standards for the digital fashion consumer is having access to data regardless of location. This can happen by purchasing products across multiple multiscreen devices or achieving a multichannel shopping experience. Therefore, the authors of this study propose to make a second version of the application that includes more functionalities. In addition, the tests should be carried out on a larger sample, including more cultural and lifestyle parameters that can give better feedback on the preferred design of both the application and clothing design.

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Chapter 50
Development of a Model for the Construction of Corporate Manuals with QR Codes



Carlos Borja-Galeas, Hugo Arias-Flores, and Mario Piedra

Abstract The creation of a brand manual that includes QR triggers makes it possible to unify and update the traditional editorial design with new technologies. The present study exposes a construction model of these corporate identity manuals and all the processes that must be carried out to obtain positive results in their application. The unit of analysis of this research was developed with three brand manuals from companies in the city of Quito, to which augmented reality QR triggers were included, which allowed access to complementary audiovisual material that helps the suppliers of these companies to use and apply the mark appropriately.

Keywords Editorial design · Augmented reality · QR · Corporate identity manuals · Brand manuals

50.1 Introduction

The creation of the brand manual for a company contemplates a process of several steps, without which its final approval and use could not be achieved. There are several paths for its development, for this research a model for the elaboration of corporate manuals is presented that includes QR triggers with augmented reality, which complement the content exposed in the editorial document. The design of these corporate identity manuals aims to make the use of the brand viable in the

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different graphic elements in which it must be applied, where the user experience plays a fundamental role.

Traditional editorial design has been adapted to the new composition of digital media, where it is necessary to integrate audiovisual multimedia elements that were unthinkable a few years ago. The participation of the reader as an external observer who only receives information through texts and images, now has new scenarios in which he can actively participate and decide what will come to his hands [1].

The use of new technologies such as augmented reality, in the development of corporate identity manuals, allows the recipient to have a greater number of explanatory elements of the contents that are handled in the editorial product, and as it is a document that delimits the use of the brand in the different possible uses, allows the participation of the perceivers in an active way.

The term active participation of the perceivers implies a direct connection of the users, an empathy that allows this interaction [2]. This concept is not new, there are several authors who speak of this methodology. Therefore, the user experience that is sought to capture, by understanding the way in which the brand should be presented, generates a unique user experience.

To develop a corporate identity manual, includes the design of the company's brand according to a whole process of research, sketching and approval of it. The conceptualization of the company and its value proposition must be embodied in a graphic element that represents it and transmits that concept to the perceiver who assumes it as its essence, with which it will be able to generate that unique and permanent connection if its image and actions show consistency.

This article presents a bibliographical analysis regarding the design of corporate identity manuals, augmented reality and the different methods that are used for the elaboration of editorial products. The second section presents the methods used to develop the proposal. In the third section, the generated model with which the investigation will be carried out will be presented. In the fourth section, the proposed model will be compared with those existing in the market, exposing the advantages and deficiencies of the same at the moment of achieving a result. And finally, conclusions and future work related to the theme of designing corporate identity manuals with AR triggers will be presented.

50.2 Methods and Materials

To prepare a corporate identity manual, it begins with the need to capture the essence of a company in a graphic. The conceptualization of this unique idea follows some fundamental steps, which are elaborated by graphic designers with a lot of imagination and creativity. For the generation of this iconic element, an in-depth investigation was structured on the type of product or service offered by the company, and features of form, color and typography were defined as essential elements to be taken into account.

The different graphic elements generate shapes in the marks that must be analyzed, these are essentially classified as circular, rectangular and triangular. Therefore, the morphology of the brand will be framed in one of them [3].

The graphic survey of similar companies allows us to understand which graphic elements and colors are the most used, which typography has the best connection with the type of business [4]. These conceptual elements of the design take as a landing tool the heuristic matrix that has two axes for its construction [5]. On the "*X*" axis, there are words that define the company's value proposition. These words with abstract characteristics should not be misaligned from the value proposition. On the "*Y*" axis, words are located that will allow the ideas of the "*X*" axis to be represented. The words that must be represented are: symbols, color, people, animals, nature, objects; these elements must be illustrated.

Designing graphics with the least number of strokes, relating the "*X*" axis to the "*Y*" axis, allows obtaining sketches that convey concepts of the value proposition. With these images, 2 or 3 graphics are merged to obtain the first sketches, which will be presented to the client for approval.

Norberto Chaves and Raúl Belluccia define 14 parameters that must be taken into account for the creation of the corporate brand [6], in them the most representative are to have graphic quality, typological adjustment, stylistic correction, versatility, validity, reproducibility, legibility, intelligibility and pregnancy.

Once the logo is approved, the design that the corporate identity manual will have is structured, which must comply with basic composition standards [7]. The use of grids is essential to achieve a coherent and harmonic layout [8]. There are several ways to structure and organize the different pages [9], all based on principles of design and layout [10].

The manual has two main sections: the first presents the path followed to obtain the brand, geometry, typography, colors used, permitted uses, minimum sizes, etc. and in the second section the application of the brand is presented in different products where it will appear, such as: letterheads, folders, business cards, uniforms, roll ups, signs, billboards, vehicles, web pages, social networks, among others.

This editorial work is complemented by the placement of QR codes on the pages, which lead to multimedia files located on the web server of each company, from which audiovisual material is broadcast that complements the information presented in the document.

50.3 Proposed Model

At this point of the investigation, the audiovisual content linked to a QR code was generated, which will be on each page of the corporate manual, with the aim of informing in detail how the brand should be used in some media, both in print and digital media, to facilitate the user in charge of generating both digital and printed advertising and can have a clearer vision of the company's requirements.

Once the corporate manual has been developed with its respective items, which explain the construction of the brand, legibility sizes, correct and incorrect uses, company stationery, applications, among others; audiovisual resources that reinforce these points were generated.

First, each manual was reviewed in order to have a clearer vision of the brand and thus determine the animations, rhythm of the melody that will accompany the audiovisual resources, based on the graphic lines. Once these parameters were determined, a storyboard was developed to plan the structure of the audiovisual resource. This document defines the visual narration of all the elements that make up the animation, and the description and duration of each element staged are also included, as can be seen in Fig. 50.1.

From the previous process, it was determined that the "trablú" brand wants to convey freedom and elegance to women. Taking this aspect into account, the animation of the logo was proposed in a storyboard. First, the wings of the butterfly are formed, once formed, the flower is born with soft animations to reinforce the connotation of the brand. Also, in the storyboard the direction and how the elements of the animation are formed are raised.

In addition to the preparation of the storyboard, a graphic line was defined that served as a background for the animations, taking into account the different connotative proposals of each brand. With all this material, the animation is started in After Effects, replicating everything raised in the previous step.

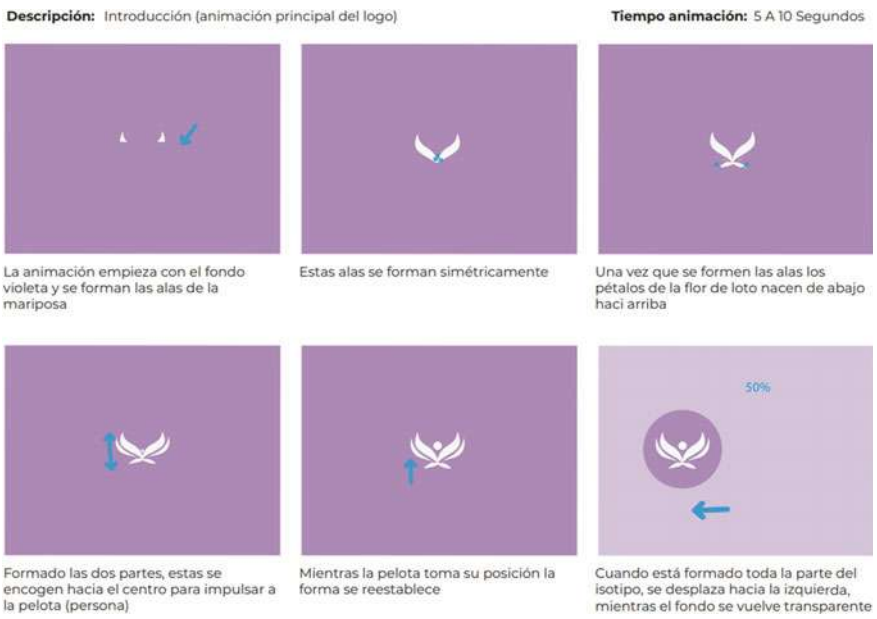


Fig. 50.1 Graph showing the different graphic elements that were used, the direction and type of animation that was used and the duration

Also, in some items of the corporate manual, the use of the brand in real media is proposed, such as: billboards, mugs, uniforms, among other applications, for which footage of the elements that are proposed in the manual were sought, to perform integrations with video and branding. For this process, several tools that After Effects provides were used so that the integration is natural. In this program, complex compositions were made, such as tracks, chromas, tools, 3D environments. Additionally, programs such as Adobe Photoshop and Adobe Illustrator were used to generate images and with the help of the 3D tools of After Effects the images were animated, with the aim of giving a subtle movement, showing the correct application of the logo in the different supports proposed in the corporate manual.

In some sections of the corporate manual, the meaning of the logo, the history of the formation of the enterprise, mission, vision are explained. These elements were developed with the owners and managers of the brands, through a video-recorded interview, with the purpose of complementing the information presented in the manual. These films were made in a photography studio with a green chroma key and then, in post-production, a virtual stage was placed, which was designed taking into account the concepts and characteristics of each brand. It was also filmed outdoors, taking advantage of a garden that was used for the brand Sumaco mushrooms whose proposal is to sell organic products, conserving nature. Finally, it was recorded in a real location, in the Cybermusic store with two types of shots, one open and the other closed so that the two types of shots can be combined in editing.

After taking the shots, post-production worked on correcting the color of all the materials, as can be seen in Fig. 50.2, and later the chroma key was removed, as can be seen in Fig. 50.3. The programs used were After Effects and Nuke, which were chosen depending on the complexity of the shot, because the lighting equipment used for filming was basic, requiring a more complex process for this activity. Then the virtual stages were placed.



Fig. 50.2 Frame of the filming made is presented, in which a green cloth is observed in the background that is used to make the chroma. Video lighting and color is revised



Fig. 50.3 Image showing the application of chroma on the green background of the previous image, where images related to the information indicated by the exhibitor appear

Finally, locutions of the contents exposed in each item were made, to add to the animations made in the previous processes. Melodies were also sought that reinforce the concepts of each brand, with the aim of reinforcing the audiovisual content with music and voiceovers.

It is worth mentioning that in the audiovisual content of "Cybermusic" no type of locution was placed, with the aim of measuring in the investigation if only the content of the animations of each item would be enough to capture the brand concept or if it is, it is necessary to have an auditory reinforcement as it has been proposed in the other brands.

With the material already defined and created, the animations with voiceovers, music and clapperboards that indicate the name of each item in the manual were assembled in premiere; in addition, work was done with the normalization of the audio, the noise corrections of both the image and the audio captured in the films made. To improve the quality of the audio, Auditions was used, which served to clean up the noise captured when it was recorded outdoors.

Finally, all the audiovisual content was exported in mp4 format, since it is an international standard format, compression in this format means that the resulting file is not too large for storage and the quality of the material is not lost.

After the export, all the content was uploaded in the domains of each brand and the QR codes were generated in InDesign and later placed in the corresponding manual pages, as can be seen in Fig. 50.4.



Fig. 50.4 In the image is a page of a brand manual that includes a QR that directs to a multimedia link with information that complements the exposed one

50.4 Discussion

There are business manuals, in which QR codes with augmented reality should be used, such as signage manuals, which can be defined as a system designed, developed, produced, installed and maintained, through graphic and/or auditory indications, and /or tactile to communicate information to people that allows them to facilitate their movement, following the graphic line of the Ecuadorian Technical Regulation [11] and Ecuadorian Regulation of Safety Signs and Symbols [12], prepared by the Ecuadorian Institute for Standardization INEN.

50.5 Conclusions

The use of new technologies to develop corporate identity manuals allows company suppliers to better use the brand in promotional products; because the multimedia material that accompanies the printed material allows us to understand the essence of the brands, the mission, and the vision of the company.

Many times the agencies send the brand manuals to use them, but being a 2D material, it does not allow understanding the essence of the company, and therefore the results can generate many corrections or be approved in a longer time. By including multimedia material in the brand manuals, the company is certain that the essence of what the companies is will be understood by anyone who will use the brand.

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