RESPONSIBLE INVESTMENT IN TECHNOLOGY

THE HUMAN TECHNOLOGY FOUNDATION

Created in 2012, the Human Technology Foundation (HTF) is not only a foundation but a research and action network that places the human being at the heart of technology development.

For the HTF, technologies are part of the solutions for building a more respectful society. While most technologies are neither good nor bad, they are not neutral either; they are the result of a human being's intentionality and vision. The Human Technology Foundation is therefore striving to put technology back at the core of social debates.

A twofold mission, being...

A platform of discussion for all actors of the Tech Environment

> Seminars and events

> Key contributor to innovative collaborations

> Lab 222

An expertise provider for companies and public decision-makers

> Reports

> Coaching and education

> Technology analysis expertise

The Human Technology Foundation network has several thousand members and operates in Paris, Montréal, San Francisco, Rome, Brussels and Geneva.

OUR PARTNERS FOR THE PROJECT

Amundi ASSET MANAGEMENT · EY · IOR Istituto per le Opere di Religione · LA BANQUE POSTALE · RBC

PREFACE

A Californian venture capitalist once asked me, «I'm an investor. How about you, what's your superpower?» A joke that refers to the double effect of technology on our lives and of investment on the technology sector. These aggregate effects make financing disruptive technologies a powerful engine for transformation in our economy and society.

Therefore, responsible investors must be present in the sector, which represents an important part of capital growth. That said, conceptual frameworks and ESG assessment tools are still not able to properly take into account technology's positive and negative externalities, making managing these projects difficult.

In light of this, a group of partners led by Jean-Baptiste de Franssu called on our foundation to mobilize our team and network to study current solutions and their limits, as well as to see which technologies could be the subject of detailed research. This report is the result of the work performed, which led us to develop a framework allowing for a refined analysis of technologies that seemed the most significant to us.

I would like to thank the members of the steering committee, led by Mr. de Franssu, who did not spare any effort in carrying out this project: Anne No Delaide, Anne-Marie Hubert, Élodie Laugel, Pierre-Alix Binet and Romain Lavault. I would like to thank Victor de Salins who led this study effectively, Alain Deschênes for his valuable help, as well as all the experts who were interviewed or who tested our framework. I am equally grateful for the partnering institutions who supported us throughout the process: Amundi, La Banque Postale, the IOR, EY Canada, Royal Bank of Canada, as well as the Hilton Foundation.

It is now up to all of you to share and use the framework we have built and made available to the financial community. My hope is that this modest contribution makes for the deployment of more responsible finance.

Enjoy.

Éric SALOBIR
Executive Committee Chair
Human Technology Foundation

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INTRODUCTION

Social networks, artificial intelligence applications (AI) or digital assets (cryptocurrency, etc.) are becoming increasingly important in society and in the lives of their users. The pandemic accelerated the adoption of these technologies and their various applications. They are essential tools and means to find work, communicate, heal ourselves, get information and consume, among many other uses. Moreover, more than 4.6 billion people in the world use social networks to communicate and get informed, spending an average of 2 hours and 27 minutes daily on these platforms.[1]

Such development of tools and uses has attracted an unprecedented volume of capital to the tech industry.[2] Valuations of technology companies and the number of related transactions has not stopped growing over the last decade, peaking at the beginning of 2022. This expansion affects companies of all sizes, from start-ups to huge organizations like Google or Microsoft, and all types of financing. Moreover, among the 15 world's highest valued companies, eight belong to the tech industry. Among the companies belonging to S&P 500 ESG, 30% fall into the information technology category and out of the index's top 10 stocks, seven can be considered tech companies.[3]

Tech also represents 53% of private equity transactions in 2021 and nearly 43% of the total transaction value. Finally, the total amount of venture capital funds raised rose from $118 million to more than $700 million between 2014 and 2021.

The COVID-19 pandemic also shed light on the social disruption related to new technology. Such technology can also serve the collective wellbeing and contribute to a fair and human development. They also present significant risks of imbalance and negative effects (Part 1).

Social networks illustrate this ambivalence perfectly. During the successive lockdowns caused by the virus, social platforms allowed most of the population to maintain social contact (WhatsApp, Instagram, Messenger, etc.), as well as to continue working (Slack, Teams, etc.). That said, they are also heavily criticized for their impact on health, social relations, politics, as well as their invasion of privacy.

Digital technologies like AI and data analysis have allowed for significant medical research advancements and also made significant contribution in the fight against the pandemic (development of COVID-19 vaccines, outbreak detection, etc.).[4] However, they are often the subject of controversy and worries regarding user privacy and their transparency (e.g., contact tracing apps).[5]

In this context, investors play a critical role in allowing digital technologies to reinforce their positive contribution to society, all while limiting the negative effects and risks posed to humankind and the planet.

This is the goal of responsible investing:[6] integrate an asset's risk and non-financial impact factors into the investment process. This area is currently in full flux, with high growth among assets under management, which reached $35 million in 2020, and could surpass $41 trillion in 2022. Responsible investing also consolidates itself through the development of standards and regulations at the international level.

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1   According to the Digital 2022: Global Overview Report published by DataReportal, We Are Social and Hootsuite.
2   This report considers and analyzes digital technologies and, by extension, companies that produce and market them. The table on page 9 outlines the technologies referenced by the terms «tech» and «technologies.»
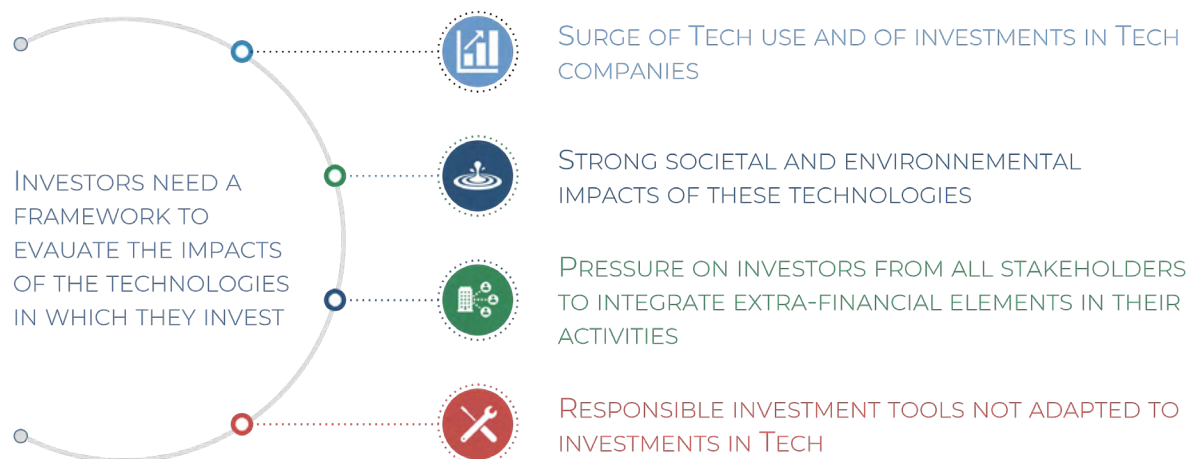3   As at May 31, 2022.
4   As per "Artificial Intelligence (AI) applications for COVID-19 pandemic" by Vaishya R, Javaid M, Khan IH, Haleem A. (2020)
5   Contact tracing (e.g., TousAntiCovid in France)
6   Responsible investment (RI) is a collection of strategies and practices «aiming to integrate environmental, social and governance (ESG) issues into investment and asset shareholder decisions. They complete traditional financial analysis and portfolio building techniques,» as per the Principles for Responsible Investment «What is responsible investing?», 2020).

Despite this boom, investments related to tech are yet to be studied properly. Existing ESG analysis grids apply more to industrial or service companies and are less adapted to technology companies. This shortcoming is compounded by short innovation cycles, which lead to rapid technological change and make it difficult to measure their impact (Part 2).

INVESTORS NEED A FRAMEWORK TO EVAUATE THE IMPACTS OF THE TECHNOLOGIES IN WHICH THEY INVEST

SURGE OF TECH USE AND OF INVESTMENTS IN TECH COMPANIES

STRONG SOCIETAL AND ENVIRONNEMENTAL IMPACTS OF THESE TECHNOLOGIES

PRESSURE ON INVESTORS FROM ALL STAKEHOLDERS TO INTEGRATE EXTRA-FINANCIAL ELEMENTS IN THEIR ACTIVITIES

RESPONSIBLE INVESTMENT TOOLS NOT ADAPTED TO INVESTMENTS IN TECH

This realization drove the Human Technology Foundation (HTF) to initiate a partnership with investors to adapt today's responsible investing tools to technology impact assessment, which in turn led to the creation of a framework that completed the general ESG tools used by investors (Part 3). It combines:

- An exhaustive structure for analysis, which lists the potential positive and negative impacts of any given piece of technology.
- A flexible and adaptable methodology, according to use cases (quick or more detailed analysis, various types of assets, etc.).
- Detailed information that allow for deeper analyses.

This open framework can be used by investors, companies, regulators, NGOs, and providers of data and scoring , as well as by entrepreneurs themselves. It is intended to be used within the context of the investing process as well as to support senior management. Applicable to numerous use cases, it can serve as a common basis for discussion and analysis for all stakeholders.

THIS REPORT AIMS TO ANSWER THREE QUESTIONS:

- What are the ethical, social and environmental impacts of technology?
- Do the traditional investment processes apply to tech?
- What framework can be used to analyze the impact of tech for investors?

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CONTENTS

1.

WHAT ARE THE ETHICAL, SOCIAL AND ENVIRONMENTAL IMPACTS OF TECHNOLOGY?

1.1) WHAT IS TECH ?
WHICH TECHNOLOGIES ARE STUDIED IN THIS REPORT?

The rapid digitization of companies in many sectors has blurred the lines between tech companies and others.

•   Which industry does Amazon belong to: retail, consumer goods or tech?

•   Are Tesla and Uber tech companies or should they be classified under automobiles and transportation?

•   Does a startup that applies innovative AI models in health and energy belong to those sectors or tech?

A fortiori, if criteria for membership in the tech industry is the use or marketing of technology tools, then many key historical corporations in industries like media, finance and energy would be considered tech companies. As such, Publicis's activities extend beyond the ad industry into digital transformation. Data collected by energy providers, especially through connected meters, transforms these organizations into professional data managers. Clearly, it is difficult to define what tech is and which companies make up the industry.

This report considers and analyzes the large spectrum of digital technologies (previously referred to as Information and Communication Technology or ICT[1]). When «tech» or «technologies» are mentioned in this report, they refer to the technologies listed in the table below and by extension to the companies that produce and market it.

Technologies considered in this report		
Applied Artificial Intelligence	Autonomous (cars, etc.) & sensor Tech	Robotics
Blockchain & distributed ledgers	Gaming	Quantic computing
Social media	Cloud and Infrastructure (5G, etc.)	E-commerce
Hardware	3D printing	Process automation
Internet of Things (IoT)	Virtual and augmented reality	Softwares and applications

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1   The tools and technological resources that allow information to be sent, recorded, created, shared or exchanged, especially computers, the internet (websites, blogs, electronic messages), technologies and live broadcasting devices (radio, television, internet) and deferred broadcasting devices (podcasts, audio and video players, and recording media) and telephones (fixed or mobile, satellite, videoconferences, etc.). Source: UNESCO

1.2) WHICH TECHNOLOGIES SHOULD BE STUDIED AS A PRIORITY?

Tech encompasses diverse technologies. As such, challenges and risks vary greatly depending on the kind of technology analyzed and the associated usage. This report focuses on technologies whose:

- Impacts, both positive and negative, potential and materialized, are the most significant.

- Level of development and financial strength make them strategic in the selection of portfolio assets.

The technologies analyzed in the report were selected by correlating the level of ethical risk with their financial maturity and development level. The results are summarized in the chart below.
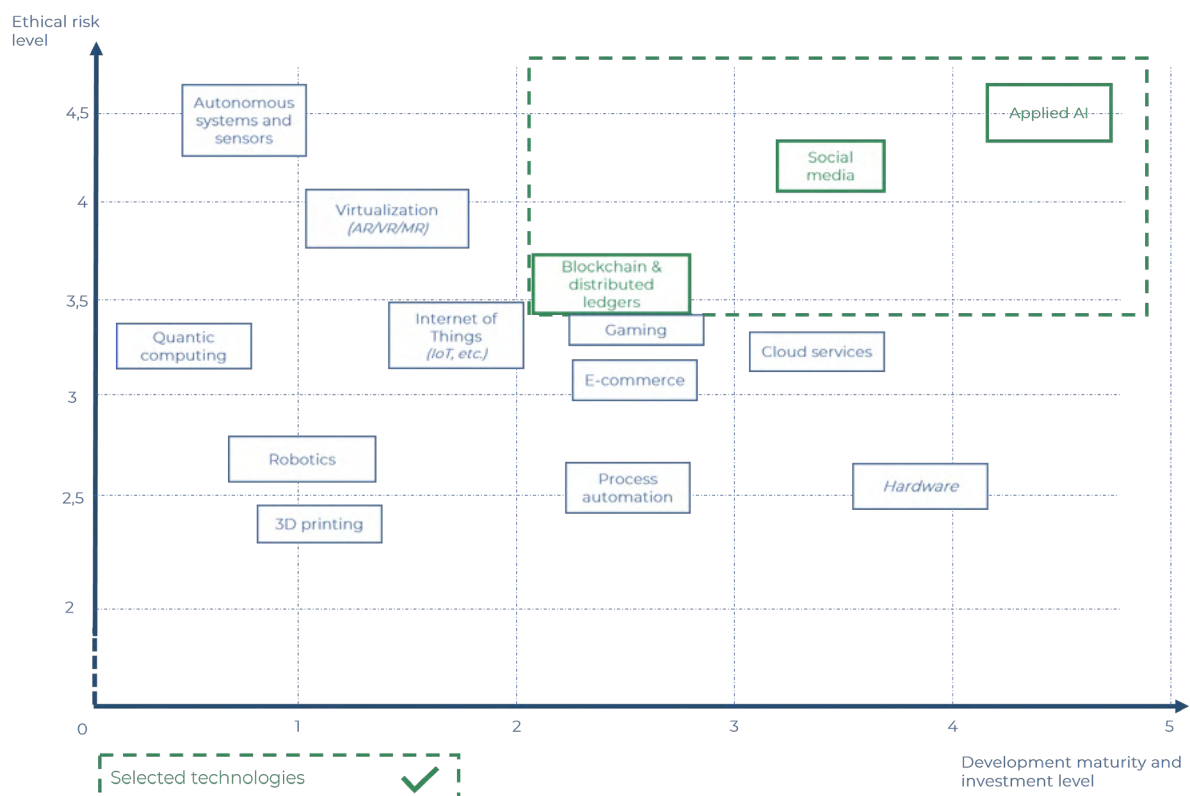
The vertical axis (Level of ethical risk) was estimated based on literature and expert interviews. It evaluates the impact of technologies considered according to eight criteria (fairness and non discrimination, transparency and explainability, privacy, etc.). The horizontal axis (Development maturity and level of investment) was calculated based on financial indicators: market size estimation, number and value of transactions in these technologies.

This graphs allows us to determine the significance of three technologies that the analysis focused on:[1]

- Applied AI.

- Blockchain-based technologies (or distributed ledgers).

- Social networks.

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1   Detailed presentations on these three technologies are appended.

1.3) WHAT ARE THE POSITIVE AND NEGATIVE IMPACTS OF TECH?

Tech companies compete against each other with promises relayed by various media and public policy actors. They put forward real advantages, like user experience quality, productivity gains and the elimination of friction, which are all characteristics of the digital economy.

If the services rendered to the user are indisputable and, for some, free, it is important for investors to evaluate the greater impact. Other than the side-effects for those that use them – like addiction or harmful effects on attention – these technologies have both positive and negative effects on the economy they're disrupting. They also have political and social impacts.

The impact of digital technology on democracy is a good example. Social networks favour direct expression and engagement at a time where political institutions and ideologies struggle to remain relevant. This participative democracy competes with the elected national representation system, whose legitimacy and representativeness results from elections. Furthermore, significant debates and other mobilizations do not have the same binding effect as an amendment voted on at the National Assembly. Faced with such limits, processes of collective intelligence are implemented, leveraging digital technology to act instead of protest. They identify, from the ground up, solutions beyond the reach of those in power. As such, civic tech transforms the political landscapes in a way that is still difficult to grasp.

In order to identify and better understand these disruptions, it seemed important to map out the impacts – both positive and negative – and the risks associated with the three prioritized technologies (see previous section). The map is founded on expert interviews, scientific literature review, as well as on the Human Technology Foundation's experience with the ethics pertaining to technology (facilitating research groups, publication of reports, organization of webcasts, creation of tools and methods of analysis implemented in companies, etc.).

Note that the map identifies impacts and risks without comparing or measuring them or forming an opinion of any technology. It's strictly a representation of the current main trends in terms of the impacts of tech, which have been established by technology experts but remain a topic of debate among scientists.

The map of the artificial intelligence (AI) systems' main impacts is shown below. The two other maps (pertaining to social networks, distributed ledger technology and blockchain) are appended.
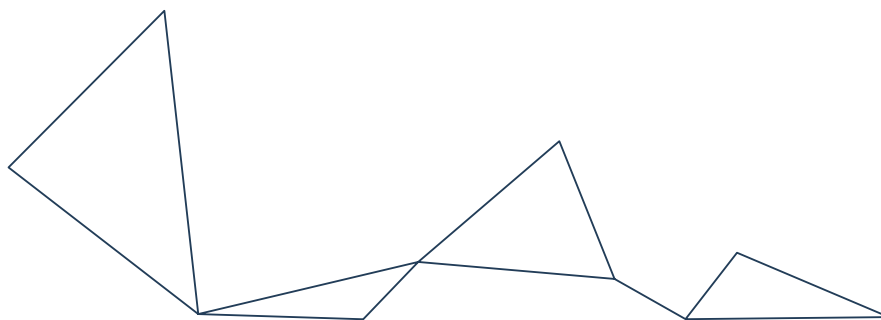
Map of impacts of applied AI systems

SDGs in question	Main positive impacts
1 NO POVERTY	» Detection of poverty zones through the analysis of satellite images » Prediction and improvement of natural disaster responses ---
3 GOOD HEALTH AND WELL-BEING	» Improvement of medical diagnoses » Creation of new, more efficient medications » Improvement of prevention capabilities ---
14 LIFE BELOW WATER **15 LIFE ON LAND**	» Optimization of infrastructure management through a better understanding of their structures and better detection of leaks » Improvement of weather forecasting » Detection and prevention of risk zones (drought, pollution) ---
8 DECENT WORK AND ECONOMIC GROWTH	» Productivity gains related to automation and optimization of resources ---
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE **11 SUSTAINABLE CITIES AND COMMUNITIES**	» Optimization of essential (water, energy, city, etc.), financial and industrial infrastructure management through the improvement of resource allocation and the prediction and anticipation of risk » Productivity gains in the industry ---
6 CLEAN WATER AND SANITATION **7 AFFORDABLE AND CLEAN ENERGY**	» Mapping and improvement of the understanding and ecosystems » Optimization of the conservation, restoration and use

	Main negative impacts and risks

1 NO POVERTY **10 REDUCED INEQUALITIES**	» Inequalities resulting from:
	  • The economic impact of the automation of numerous tasks and jobs
	  • The automation of key decisions, such as access to work, loans, housing
	» Discrimination risks related to algorithmic biases
	--- 	

3 GOOD HEALTH AND WELL-BEING	» Loss or diminishment of cognitive capacities (memory, concentration, etc.) » Impairment of essential functions (sleep, diet, etc.) ---
4 QUALITY EDUCATION	» Risk of replacement of qualified and invaluable educators by smart educational systems that are not adapted to local contexts » Decline in the number of interactions with educators and, thereby, teaching effectiveness » Creation of inequalities through a lack of accessibility and knowledge required for the use of smart educational systems ---
13 CLIMATE ACTION	» Significant carbon footprint of data centres and computer servers mobilized to train AI models ---
Other risks	» Risks related to personal data protection and security » Risks related to the lack of transparency and explainability of results

1.4) ANALYZING THE POSITIVE AND NEGATIVE IMPACTS OF A TECHNOLOGY

Beyond the analysis of the impacts of the three technologies on page 11, the expert interviews also made it possible to identify the steps and challenges involved in analyzing the impacts of a technology. These methodological points guided the construction of the analysis framework (presented in the third part).

1	2	3	4
Find the right analysis level	Identify the impact and risk areas	Identify the adapted indicators	Evaluate, measure, quantify and prioritise the risk and impact

1   Find the right scale for analyzing technology

Within the same category of technologies (social networks, AI or blockchain) the impacts are different. For example, the initial risks of a social network like TikTok cited by experts are the risks of misinformation, addiction and the impact on users' health and social relationships. However, professional social networks (such as LinkedIn) that use the same type of technology[1] appear to be little exposed to these risks. These distinctions are also valid for other technologies: between different types of AI models, connected objects or blockchain-based technologies.

The impacts and risks of a technology cannot therefore be analyzed solely based on general considerations about the technology used. It necessarily involves analyzing the context in which it is produced and sold (sector, users, country, etc.) and how users interact with it.

2   Identify impact zones and risks of these technologies

Each of these technologies has potentially very different positive and negative impacts on the environment, politics, economy and employment, working conditions, health, social relations, etc. They are also exposed to numerous risks, whether reputational, regulatory, safety or accessibility, etc.

This diversity is reflected in the many scientific studies that have sought to comprehensively map the impacts and contributions of these technologies. An international group of researchers has compiled all the scientific work linking artificial intelligence to the UN Sustainable Development Goals (SDGs) and found that all these goals could be impacted by IA.

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1   News feed with recommendation algorithms, messaging, etc.

The Positive Blockchain NGO also sought to assess the impact of blockchain on SDGs.[1] To do so, they identified the blockchain use cases and applications that impact one or more SDGs. They found 1,100 projects making 14 types of contributions ranging from health to energy, identity and logistics topics.

Predicting the future and development of disruptive technologies[2] is a complex exercise, as evidenced by the predictions of well-known experts — such as Nobel Prize winner Paul Krugman on the development of the Internet[3] or Microsoft CEO Steve Ballmer on the potential of the Iphone.[4] Similarly, identifying and predicting the impacts of these technologies is all the more difficult as they are sometimes unpredictable.

Therefore, it takes society much longer to measure the impacts of a technology than to adopt it. For example, scientists are still debating the impact of social networks on the physical and mental health of their users. A consensus is beginning to emerge on this topic as these networks are embraced by billions of people.

The difficulty of analyzing the impacts of technologies is compounded by the speed of their development and growth. Some social networks, for example, have very quickly gained millions of users (it took 6 years for Instagram to reach 800 million users but only 3 years for Tiktok to do the same).[5]
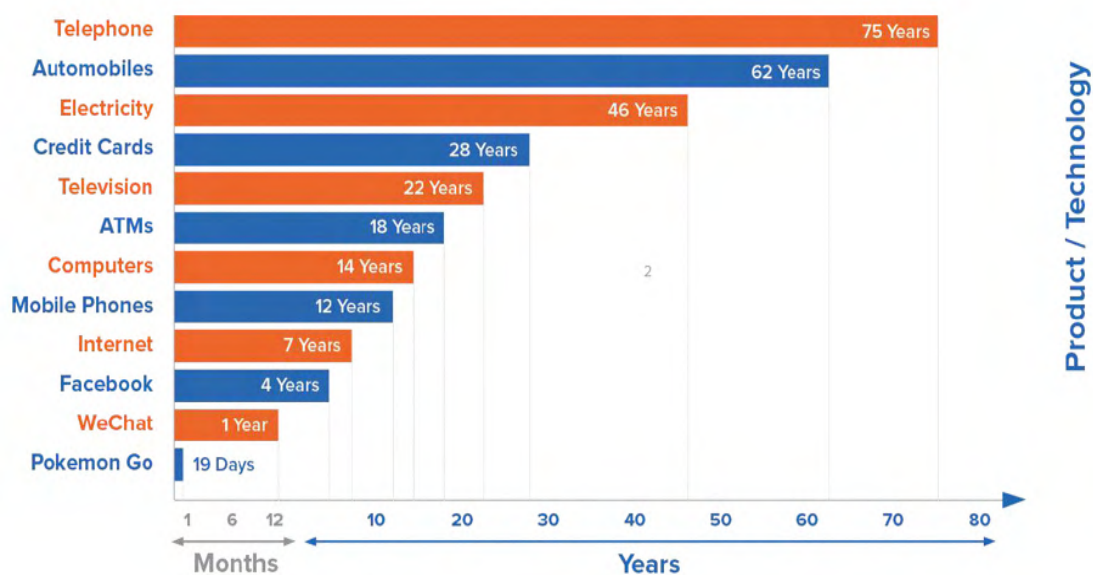
The time it took different technologies to reach 50 million users.
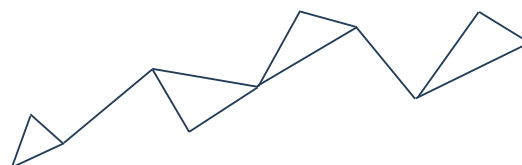
1 "Blockchain Social Impact Projects Dashboard", chainist.de (2020)
2 "A disruptive innovation is an often a technological innovation involving a product or service that ends up replacing a dominant technology in a given market. Examples: digital photography, MP3, Internet, etc. " (BPI France)
3 "The internet will fade away because most people have nothing to say to each other. By 2005 it will be clear that the internet's impact on the global economy has been no greater than the fax machine." Paul Krugman, Nobel Prize Economist, 1998. Source
4 "There's no chance that the iPhone is going to get any significant market share. No chance." Steve Ballmer, Then-Microsoft CEO (Source)
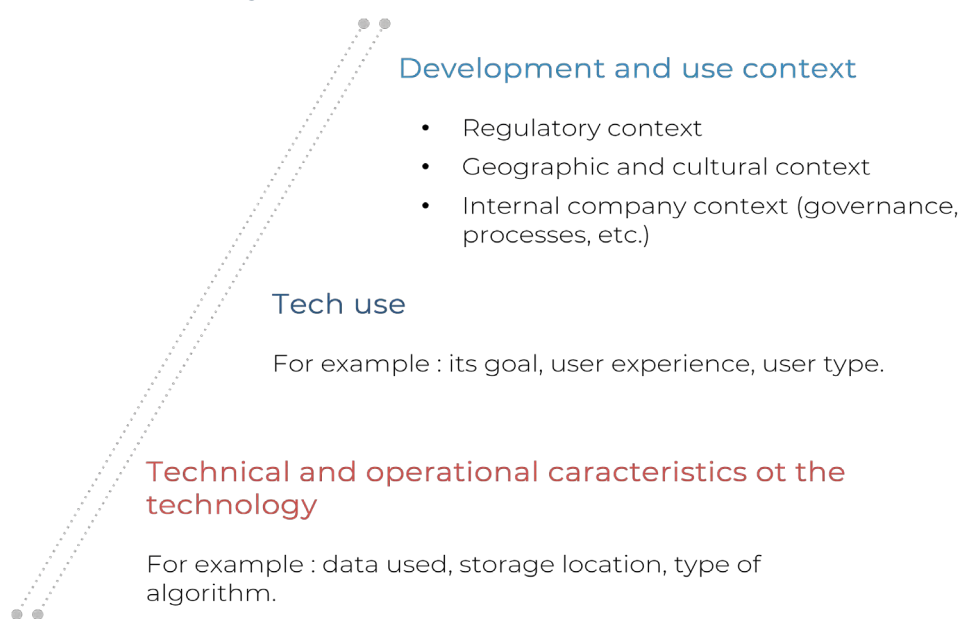5 "How Long Does It Take to Hit 50 Million Users?", Visual Capitalist (2018)

3   Identify coherent indicators

The impacts of a technology depend on many factors that are not limited to its technical characteristics.

- How to isolate the impacts of a technology when it can be used for such diverse purposes? For example, the same AI model can be used to detect diseases on X-rays and recognize faces in the crowd to calculate a «social score,» as is the case in China.

- Similarly, the same blockchain can host a cadastre service for a developing country (thus creating a reliable and transparent infrastructure at a lower cost) and a decentralized finance application used for money laundering or even embezzlement.

While the use cases are potentially unlimited, three types of indicators can be used to assess risk levels of technologies. These indicators should cover:

Development and use context

- Regulatory context
- Geographic and cultural context
- Internal company context (governance, processes, etc.)

Tech use

For example : its goal, user experience, user type.

Technical and operational caracteristics ot the technology

For example : data used, storage location, type of algorithm.

4   Assess, measure, quantify and prioritize risk or impact

Once the analysis scale has been set, the impact and risk areas identified and the indicators defined, the final step is to quantify and measure the risk level.

Currently, indicators vary greatly depending on the impacts. For example, many methods can be used to analyze the environmental impact of technologies. The same cannot be said about the societal impacts of technology. These impacts lead to the following questions:

- How to measure the impacts on social relationships? Disinformation and surveillance risks?

- What metrics can be used for that?

- Is this technology likely to be affected by new regulations? If yes, how will they affect the technology's development?

Beyond quantifying these impacts, building a score – one of the most widely used ESG practices – requires the different impacts to be balanced and prioritized. For example, this involves assessing:
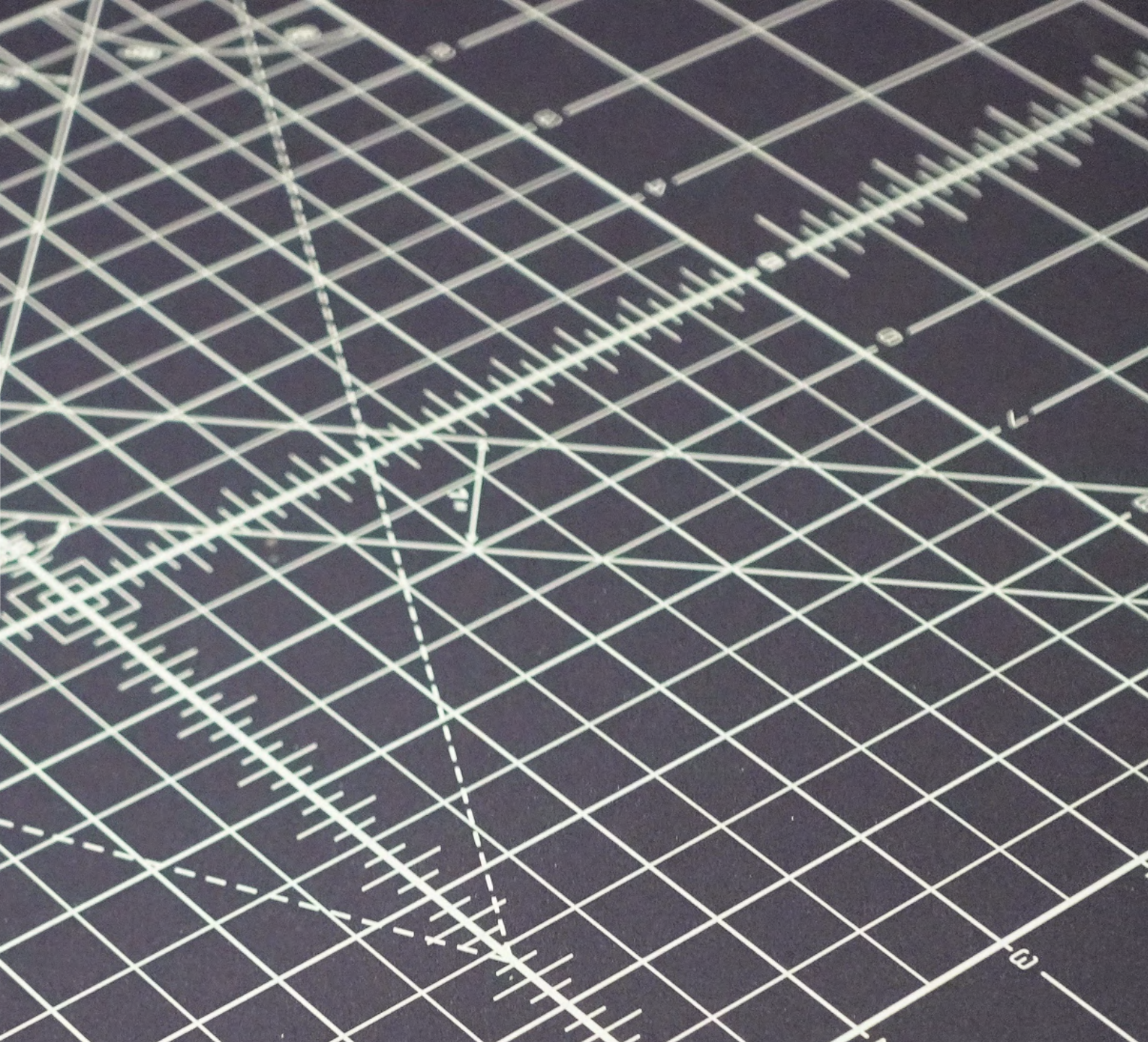
- The importance of environmental risks relative to those affecting users' health.

- The weight given to the risks of addiction compared to the risks related to users' physical health of (impact on sleep, diet, etc.).

2.

DO THE TRADITIONAL APPROACHES TO RESPONSIBLE INVESTING APPLY TO TECHNOLOGY?

HOW DOES THE RESPONSIBLE INVESTING MARKET DEVELOP?

WHAT IS A RESPONSIBLE INVESTMENT STRATEGY AND HOW DOES IT OPERATE?

HOW DOES THE MARKET CONSOLIDATE ITSELF AND MEET THE NEED FOR TRANSPARENCY?

WHICH RESPONSIBLE INVESTING TOOLS AND PRACTICES APPLY TO TECHNOLOGY?

WHAT ARE THE LIMITATIONS OF THESE TOOLS?

2.1) HOW DOES THE RESPONSIBLE INVESTING MARKET DEVELOP?

All indicators point to growth in the responsible investment market, which now covers all investment activities and asset classes.

- ESG assets under management reached $35 trillion in 2020. This amount could exceed **$41 trillion** in 2022 and $50 trillion in 2025, according to a report by Bloomberg Intelligence.[1]

- Net inflows into ESG equity funds amounted to €216 billion over the last three years while equivalent inflows into non-ESG funds were only €55 billion.[2]

- The Global Impact Investing Network (GIIN) estimates that approximately 1,720 impact investors managed **$715 billion** at the end of 2019, which indicates significant growth.[3]

This growth is driven by numerous factors. First, regulation – which is becoming increasingly restrictive – plays a key role in ESG development. For example, the European Sustainable Finance Disclosures Regulation (SFDR) requires asset managers to describe and explain their sustainable investment strategy and how they integrate sustainability risks into their investment decisions. But regulators are not alone in demanding more transparency. All stakeholders are concerned.
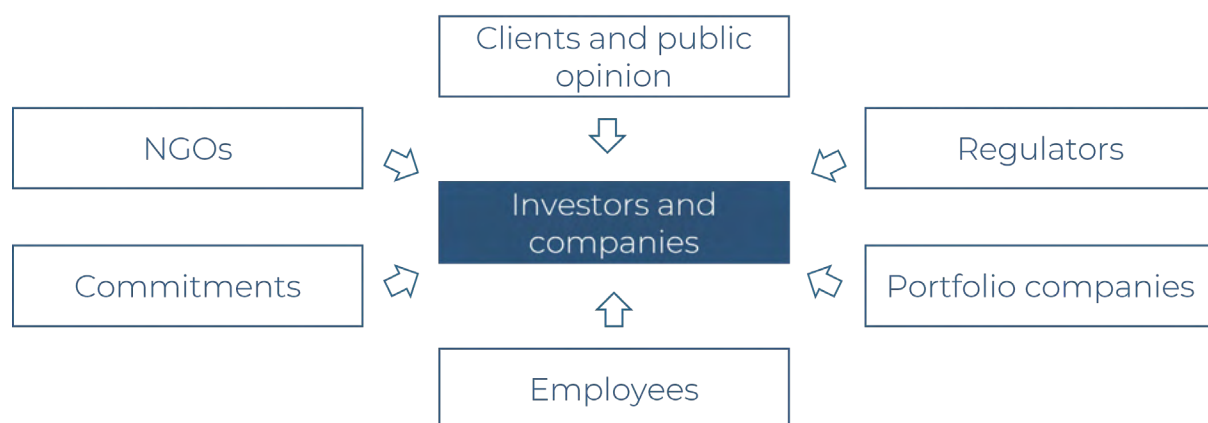
All stakeholders are asking for greater transparency on ESG practices from investors.

As shown by the growth in ESG assets, investors are now aware of the urgency to act to reduce the environmental and social impacts of their investments. They find significant financial growth opportunities in doing so. The adoption of virtuous practices by companies has a positive impact on their recruitment policy, their business performance and evaluation of their resale value (exit).[4] Investors therefore have an interest in favouring these more successful companies.

1 According to the Global Sustainable Investment Alliance's Global Sustainable Investment Review (2021)
2 Based on MorningStar data cited by Verena Ross (Chair of the European Securities and Markets Authority) in May 2022
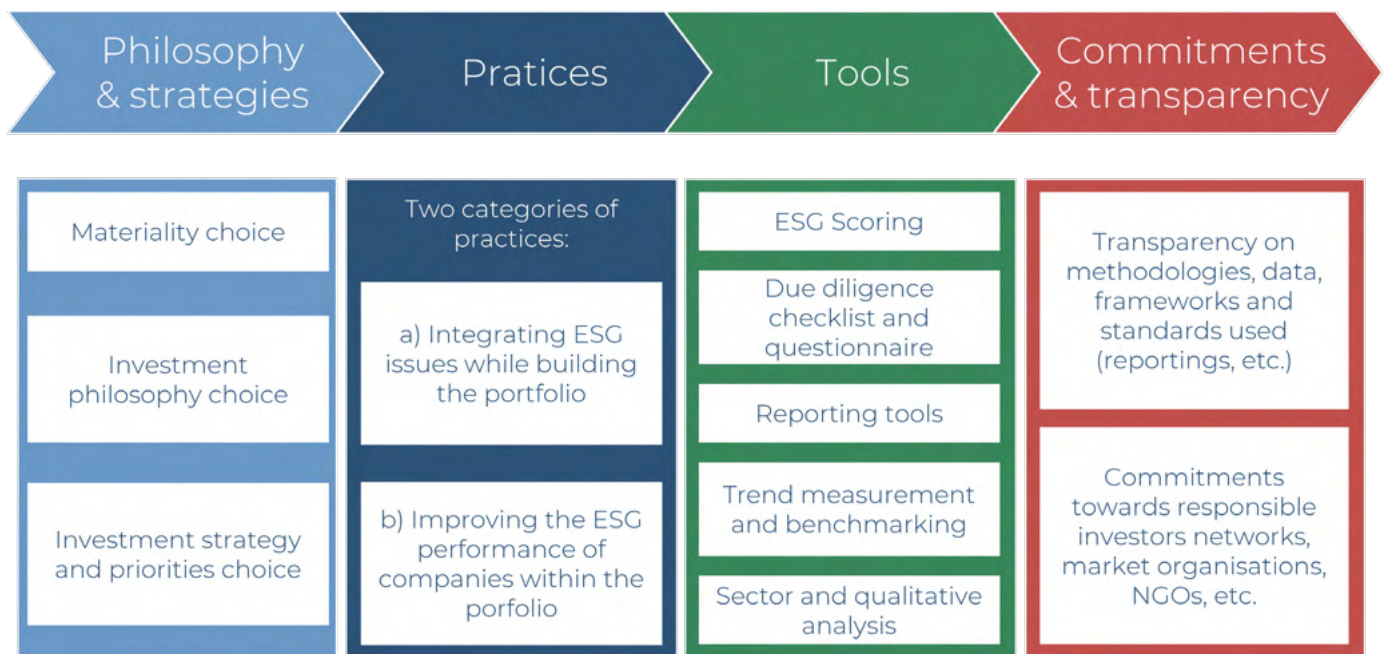3 According to the Global Impact Investing Network's annual survey of impact investors (2020)
4 For example, the study by Gunnar Friede, Timo Busch and Alexander Bassen (2015) aggregates the results of about 2,200 individual academic studies analyzing the links between the use of ESG criteria and financial performance.

## 2.2) WHAT IS A RESPONSIBLE INVESTMENT STRATEGY AND HOW DOES IT OPERATE?

Adopting a responsible investment approach can be summarized in four key steps, as explained below:

Philosophy & strategies	Pratices	Tools	Commitments & transparency
Materiality choice	Two categories of practices:	ESG Scoring	Transparency on methodologies, data, frameworks and standards used (reportings, etc.)
Investment philosophy choice	a) Integrating ESG issues while building the portfolio	Due diligence checklist and questionnaire	
		Reporting tools	
Investment strategy and priorities choice	b) Improving the ESG performance of companies within the porfolio	Trend measurement and benchmarking	Commitments towards responsible investors networks, market organisations, NGOs, etc.
		Sector and qualitative analysis	

Philosophy & strategies

Two objectives can motivate the adoption of responsible investing practices and strategies:

- Integrate the financial risks related to these ESG questions — i.e., **their financial materiality** (risk of natural catastrophes, pollution, etc.)

- Take into account – beyond financial risks – the externalities caused by an investment: this is the principle of **dual materiality**. The investors (fewer in number) who follow this path are thus integrating the environment and society as stakeholders with respect to whom the company must reduce its externalities.
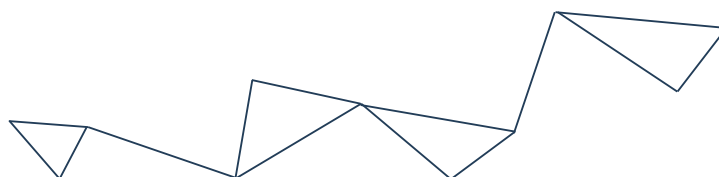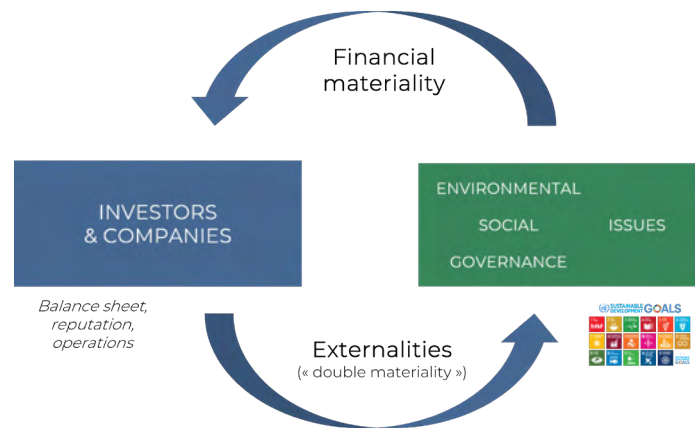
Dual materiality consists in integrating the impact of ESG factors on the company (financial materiality) and its externalities on society and the environment.

Beyond the choice of materiality (financial materiality or dual materiality), there are several philosophies and strategies (see box below). Some investors prefer to invest in sectors where ESG risks are low, avoiding sectors such as coal, textiles or pharmaceuticals. Others, on the other hand, place less importance on the sector, but instead seek to improve their ESG performance during the holding period.[1] These strategies can be combined: some investors choose to exclude "risky" sectors while integrating the company's ESG performance into their investment decisions.

Once their ESG investment strategy has been defined, each "responsible" investor must define investment principles and priorities (preferred investment theme or sector, tolerance for ESG risk at entry and exit, weight and sensitivity to each of the ESG risks, etc.). These philosophies and strategies give rise to different practices and tools.

WHAT ARE THE DIFFERENT RESPONSIBLE INVESTMENT PHILOSOPHIES?

There are three well-known responsible investing philosophies:[2]

• A «purist» philosophy, which is the most restrictive. These ESG investors focus their efforts on rigorously selecting their assets. They only invest in sectors with low ESG risks or high impact potential, excluding any high-risk sector (coal, oil) or low-risk sector (e.g., textile industry).

• A «pragmatic» philosophy under which ESG investors are less restrictive on performance upon investing in the portfolio, accepting higher ESG risks. They focus on improving ESG risks during the holding period.

• Lastly, there are ESG investors following a «pluralistic» philosophy who do not select their assets according to their ESG performance at the time of investment even for risks that are impossible to manage, such as in the following sectors (coal, oil, etc.). A typical example is the investment in a coal plant. A pluralistic investor accepts the negative impact of this investment on the environment but aims to improve other ESG factors — such as improving working conditions in this plant.

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1   Period during which the company is in the investor's portfolio
2   Cf. "Pitchbook Analyst Note: ESG, Impact, and Greenwashing in PE and VC" (2022)

Pratices → Tools

Depending on the strategy adopted by the investor, they will have to implement different responsible investment practices. There are two main types of actions: considering ESG factors when building the portfolio and improving ESG performance of a portfolio already built. Each of these actions have corresponding tools (detailed in the table in the appendix); the tools investors choose to use depends greatly on the asset class in which they are investing.

Commitments & transparency

Lastly, a responsible investment approach requires transparency of the strategy, actions and means implemented by the investor vis-à-vis its stakeholders. This can be done by disclosing the structure of ESG scores or the type of data used but without necessarily disclosing the details of its methodology.

The asset manager's transparency goes hand in hand with the ESG commitments to their investors, clients and market players. These commitments include numerous labels (SRI, Greenfin, Towards Sustainability, etc.), but also many local organizations and networks of ESG investors. The Principles for Responsible Investment[1] is the main network at the international level but there are many others such as the Forum pour l'investissement responsable and Finance for Tomorrow in France or the Global Impact Investing Network (GIIN) for impact investors. They enable investors to communicate and be transparent about their actions, to commit to a greater convergence of the frameworks and standards used and therefore to increase their impact

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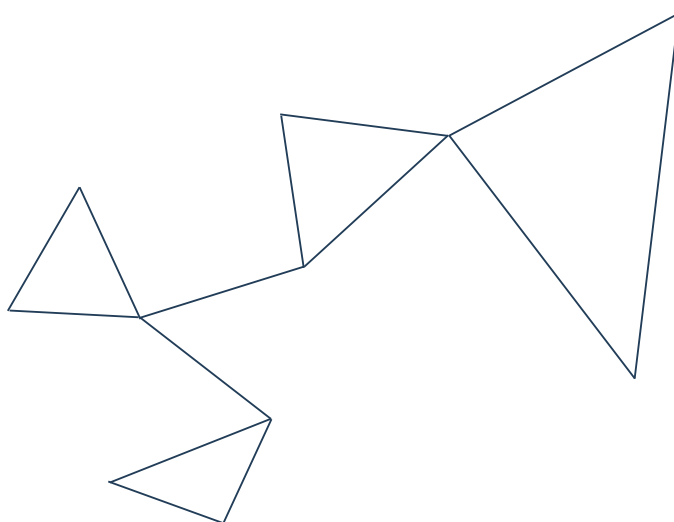
1   The Principles of Responsible Investing (PRI) were launched by the United Nations in 2006. It's an international network that encourages the implementation of "Responsible Investment Practices" (ESG issues) by investors in managing their portfolios. By signing internationally recognized PRIs, organizations can publicly demonstrate its commitment to responsible investment.

2.3) HOW DOES THE MARKET CONSOLIDATE ITSELF AND MEET THE NEED FOR TRANSPARENCY?

The responsible investing market is characterized by many types of data and players (illustrated in the appended table) as well as standards and frameworks (see graph below).
These standards and frameworks provide a structure for information, data and non-financial reporting. Used by all the players shown on the infographic below, they are the keystone used by issuers who produce the information, the auditors who verify it and by all users (data and index providers, investors, regulators, etc.).
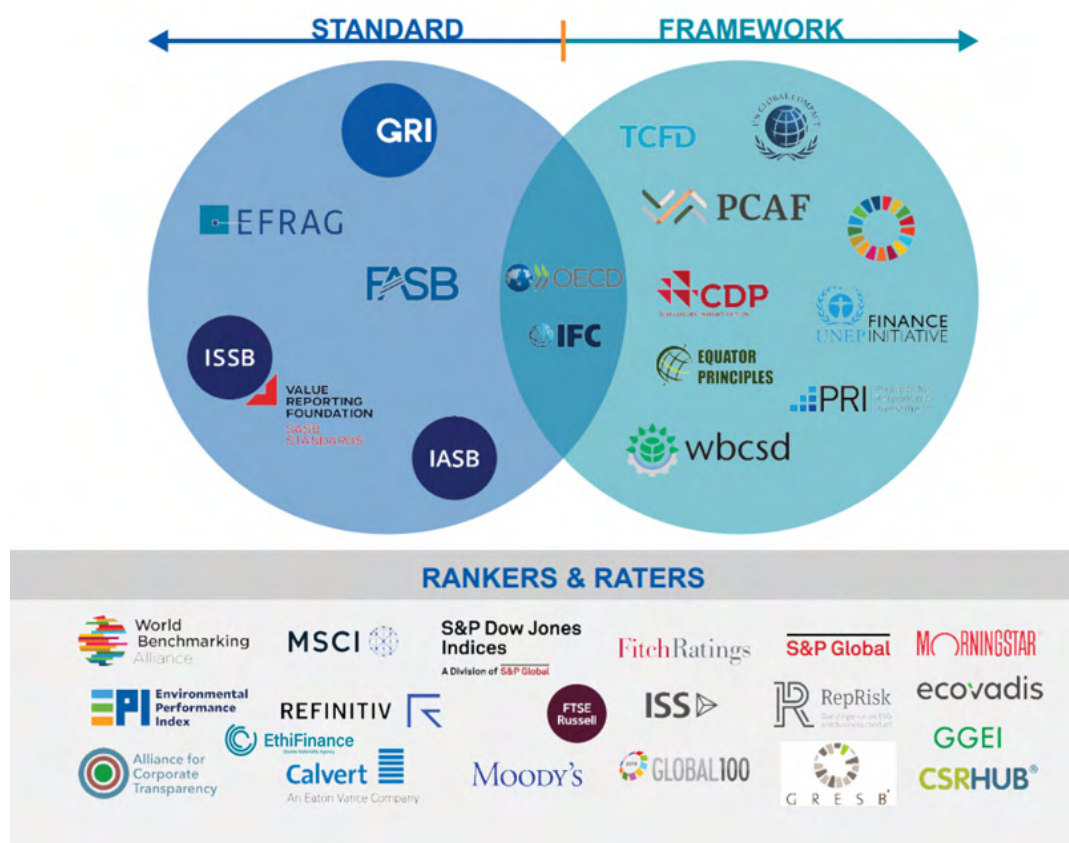
Range of issuers of ESG standards and frameworks and ESG rating agencies.[1]
There is a thin line between standards and frameworks. A standard is a set of specific and widely accepted sound practices. It provides detailed indicators and metrics unlike a framework. Often used in the absence of standards, frameworks are general guidelines that guide reporting, by indicating the topics to be covered by the information and how to structure it.

This multiplicity of standards and frameworks is the most critical point in developing responsible investment. It undermines the efficiency, transparency and understanding of the actions put in place by investors and companies. By reducing the credibility of the ESG practices put in place, it allows the players to pass off basic communication approaches as virtuous initiatives («greenwashing»).
To solve this problem, the market is currently standardizing and consolidating standards, culminating in a number of initiatives detailed in the box below.

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1   Based on the article "ESG standards, frameworks and everything in between" published by the Global Reporting Initiative (2022)

RECENT INTERNATIONAL INITIATIVES FOR STANDARDIZING ESG INFORMATION AND DATA

To improve ecosystem effectiveness and transparency, market regulators and players are joining forces to create international standards shared by a maximum number of players. Important progress made in this respect during the last two decades include:

- **The Davos World Economic Forum (WEF)** recommended in September 2020, in partnership with the Big Four accounting firms, a set of important ESG measures and disclosures for companies.[1]

- **Five of the leading organizations** behind ESG standards and benchmarks announced in September 2020 their intention to develop a common vision for a comprehensive corporate reporting system, as well as their commitment to work together to achieve it.[2]

- **The European Union** is also very active in the standardization of ESG reporting.[3]
  - » The Corporate Sustainability Reporting Directive (CSRD) was published in April 2021. It will eventually modify the current requirements for non-financial reporting.[4]
  - » CSRD's twin applied to financial products, the SFDR (Sustainable Finance Disclosure Regulation) came into force in March 2021. It has a twofold objective: increase transparency of non-financial reporting and harmonize standards.
  - » In September 2021, EFRAG (European Financial Reporting Advisory Group) published a prototype climate standard based on dual materiality.
  - » As part of its roadmap on responsible investment, the European Securities and Markets Authority (ESMA) analyzed the market structure of ESG rating agencies and forwarded its findings to the European Commission so that it could rule on the regulation of this market.[5]

- **The IFRS Foundation's Technical Readiness Working Group (TRWG)** also produced two prototypes of climate reporting and background information standards, created jointly with the five key international organizations in the development of these standards.[6] Lastly, at COP 26 in **Glasgow** in November 2021, **the International Sustainability Standards Board (ISSB)** was created under the auspices of the IFRS Foundation.[7] Its goal is to create an international taxonomy of non-financial reporting and information by consolidating existing work (including CDP, VRF and GRI).[8]
  - » In March 2022, the ISSB published its first proposals for thematic standards, which are open for public comment, developed according to the TCFD recommendations and including the SASB standards.[9]

- US regulator **SEC (Securities and Exchange Commission)** recently approved new proposals to better combat greenwashing. In particular, it opened investigations into three major management players and proposed to strengthen the transparency requirements of ESG funds.[10]

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1 "Measuring Stakeholder Capitalism," World Economic Forum (2020)
2 "Statement of Intent to Work Together Towards Comprehensive Corporate Reporting", CDP, Climate Disclosure Standards Board (CDSB), GRI, International Integrated Reporting Council (IIRC) and Sustainability Accounting Standards Board (SASB) (2020)
3 "Convergence in Sustainability Reporting: The Fog Is Lifting", Article Novisto by Marie-Josée Privyk, 2021
4 Requirements resulting from the Non-Financial reporting Directive (NFRD) to date
5 "ESMA publishes results of its call for evidence on ESG ratings", ESMA (2022)
6 Climate Disclosure Standards Board (CDSB), International Accounting Standards Board (IASB), the Task Force on Climate Related Financial Disclosures (TCFD), the Value Reporting Foundation (VRF) and the World Economic Forum. Source: ibid note 25.
7 International Financial Reporting Standards
8 "ISSB: Frequently Asked Questions" on the IFRS Foundation Website (2022)
9 "ISSB delivers proposals that create comprehensive global baseline of sustainability disclosures" on the IFRS Foundation Website (2022)
10 "Les fonds ESG devront montrer patte verte à la SEC", Boursorama article (2022) et "États-Unis : la SEC fait du greenwashing une priorité", Anytime article (2022)

2.4) WHICH RESPONSIBLE INVESTING TOOLS AND FRAMEWORKS APPLY TO TECHNOLOGY?

There are four types of responsible investment tools and frameworks currently used to assess the impacts and risks associated with technology. They are described below and their limitations are analyzed in part 2.5.

The main observation shared by the investors who were part of the working group is the following: the existing tools are not sufficient to provide a comprehensive, public analysis tailored to the impacts and risks of new technologies.

General taxonomies & standards

Applied and used by the main scoring and standardisation agencies, they integrate and consider Tech as a sector for which they highlight specific and relevant risks

Frameworks covering specific risks

These frameworks integrate risks like those related to privacy or content moderation on social networks. They are most commonly created by NGOs, international institutions and ESG actors

Controversy management tools

They allow to refine the « traditional » data typically extracted from companies' public reportings

Due diligence ESG Questionnaire

They are mainly used by private equity and venture capital funds

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1 *Frameworks and standards of the main scoring, rating and standardization agencies*

The most widely used ESG frameworks and standards treat technology as a specific sector. They apply materiality matrices[1] that determine the main risks and opportunities associated with the different sub-sectors (hardware, software, etc.) and then propose indicators to measure exposure to these risks or opportunities. These frameworks are used to structure data collection, scoring and analysis tools for investors. They are also used by companies for their reporting.
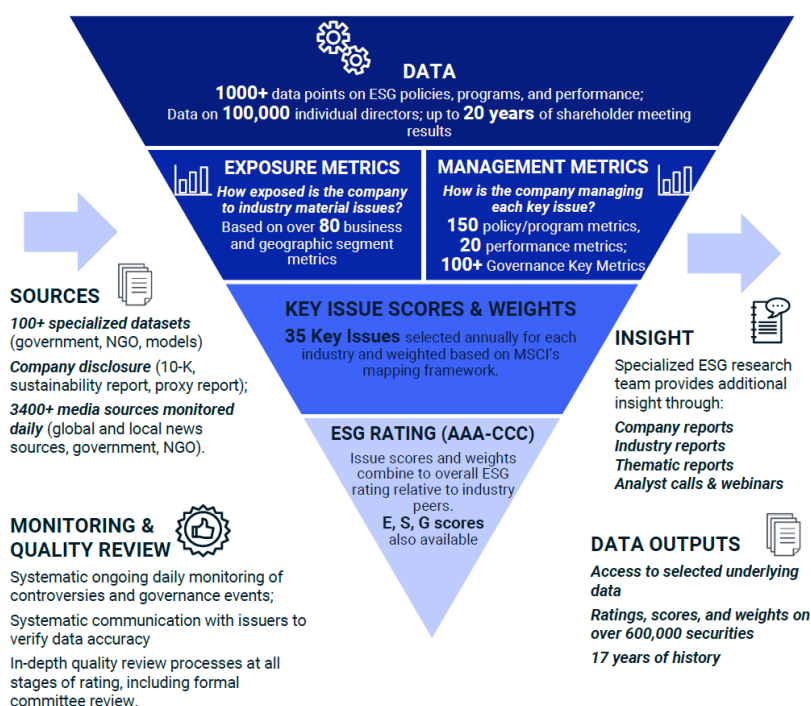
ESG rating methodology of MSCI, one of the leading rating agencies in the market

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1   According to Novethic, the materiality matrix is a tool for identifying and prioritizing a company's or a sector's ESG issues.

Frameworks and standards covering specific risk areas

Other more specialized standards, benchmarks and frameworks are available, mostly created and published by NGOs or international agencies, and are not only intended for investors. They do not target any particular sector, but focus on specific issues such as respect for human rights, protection of personal data and issues of inclusion and accessibility. A table comparing various analytical frameworks has been appended to this report.

Some responsible finance players are also developing special taxonomies. Thus, SASB has published a taxonomy on online content moderation and governance.[1]
EthicsGrade[2], a British startup assesses the quality of AI system governance in large international companies.

3 Due diligence questionnaires[3]

Some investors, such as private equity funds, mainly use due diligence questionnaires. More suitable for SMEs[4] and startups, for which public data is less available, they provide more flexibility to analysts. They are also used as a support for monitoring the actions implemented and for dialogue with the companies assessed.

The Venture Capital ESG Assessment Tool		
ESG theme	**Outcome**	**Question**
Environmental - Decarbonising & Safeguarding Our World	Carbon emissions reduced	Do you measure your carbon footprint?
		Do you have a policy and programme in place to achieve net zero carbon? Including monitoring plan with specific milestones (issued by the end of 2021)
		Have you achieved Carbon Certification for your business? (Carbon Trust Standard, Planet Mark or equivalent independently verified)
		Do you use any carbon offsetting tools or initiatives to offset your carbon emissions?
	Air pollution is reduced	What percentage of your employees take part in a bike to work scheme (or equivalent)
		Do you have a corporate scheme to reduce plane travel in place?
		Do you have measures to reduce the emissions of your own distribution fleet or do you prioritise logistics companies that have a net zero policy?
	Resource efficiency	Does your office have energy-efficient measures implemented throughout the building?
		Do you have a recycling initiative within your company office/s?
	Sustainable procurement	What percentage of the packaging you use for your products is recycled or reusable (e.g. via Loop or other schemes)?
		What percentage of your suppliers are local to your business?
		What percentage of your suppliers have you screened for carbon efficiency? (e.g. data centres, IT/ hosting providers, manufacturers)
		If you have your own warehouse/ manufacturing facilities, do you have initiatives in place to limit energy and carbon footprint?
		What percentage of your suppliers have you conducted modern slavery due dilligence on?

Example of a due diligence questionnaire used by British venture capital funds[5]

4 Controversial tracking tools

Monitoring controversies[6] is a common practice. Such monitoring is considered a leading indicator of ESG risks for the company concerned, thereby complementing the standard data, which is based on the reporting. For example, «Dieselgate»[7] threatened both Volkswagen's market performance and its credibility to limit its negative externalities. The issues monitored relate to the three E, S and G pillars.

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1   "Content Moderation on Internet Platforms," SASB, 2022
2   Cf. ethicsgrade.io
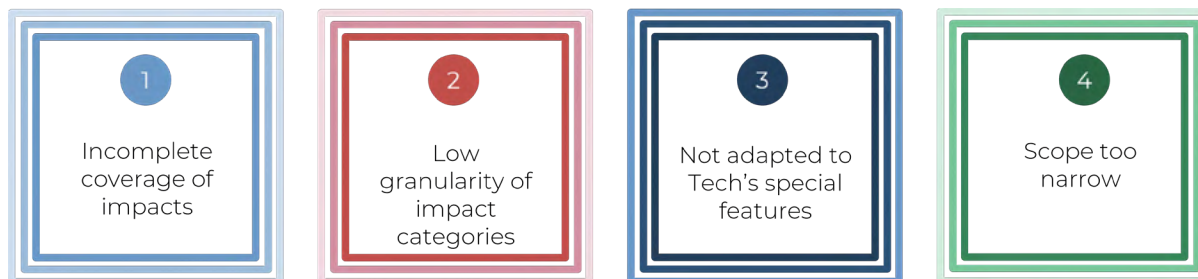3   Cf. Glossary
4   Small and Medium-sized Enterprises
5   Source : ESG_VC (esgvc.co.uk)
6   "ESG-related incidents." from "Sustainable Investing – Understanding controversies", Scotia ITrade and Sustainalytics
7   Cf. Lexicon item "Dieselgate", Novethic.fr

2.5) WHAT ARE THE LIMITATIONS OF THESE TOOLS?

Four limitations common to most ESG tools addressing technology-related risks and impacts have been identified.

1 Incomplete coverage of impacts	2 Low granularity of impact categories	3 Not adapted to Tech's special features	4 Scope too narrow

1 Incomplete coverage of impacts

More applicable to industrial or service companies, ESG scores and assessments traditionally focus on a company's operations. Accordingly, most of the topics covered by ESG tools for technolgoy (frameworks, questionnaires, monitoring of controversies, etc.) deal with internal issues within the company such as:

- HR practices (maternity leave, etc.)
- Security of IT facilities and processes
- Governance and diversity of teams
- Environmental impact of operations
- Compliance measures (GDPR, etc.)

These topics are important and have the advantage of being easily and quickly measurable and quantifiable. However, they offer only a very limited view of the positive and negative risks and impacts that a technology company can give rise to. Such risks and impacts are very often inherent in its products and services, thereby affecting a wide variety of stakeholders (users, suppliers, regulators, society, etc.), but these risks are not detected by most current tools.

ESG theme	Outcome
Environmental - Decarbonising & Safeguarding Our World	Carbon emissions reduced Air pollution is reduced Resource efficiency Sustainable procurement
Social - Building a Resilient, Engaged and Supported Workforce	Parental policy Measuring diversity Encouraging diversity & inclusion Staff Wellbeing Working with community
Governance - Operating ethically and responsibly	Board oversight Fair and equal pay Cyber security controls Health & safety Corporate policy

Examples of topics covered by a due diligence questionnaire used by British venture capital funds[1]

The positive impacts of technology are hardly taken into account by the existing tools analyzed by the working group. Since the most common ESG approach is to limit risk, that is not surprising. However, it is particularly detrimental in the case of technological investments whose environmental and societal contributions are strong and have an impact on the company's performance.

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1   1 Source : ESG_VC (esgvc.co.uk)

In addition, risks such as the impact on users' health, social relations, political processes, employment and the economy, or the potential discriminatory aspects of technology are completely lacking in the tools currently available. This blind spot can be seen in the below list of the risks and opportunities identified by three key frameworks in the software, applications and IT services sector. The specialized frameworks described above only partially address this lack because each of them covers only a small number of risks.

However, these risks are as material financially as those related to the company's operations. Accordingly, the scandals that recently affected some leading U.S. tech companies have directly affected their financial performance.[1] These risks also bring together the main potential externalities of a technology with respect to society, individuals and the environment.

	SASB - Software & IT Services	MSCI – Application Software	S&P's ESG – Software and IT Services
Environment	• Environmental Footprint of Hardware Infrastructure	• Opportunities in Clean Tech • Carbon Emissions	• Greenhouse gas emissions • Waste and pollution • Water • Land use and biodiversity
Social	• Data Privacy, Advertising Standards & Freedom of Expression • Data Security • Employee Recruitment, Inclusion & Performance • Intellectual Property Protection & Competitive Behavior	• Human Capital Development • Privacy & Data Security • Labor Management • Chemical Safety • Supply Chain Labor Standards • Controversial Sourcing	• Human capital management • Cybersecurity • Access and affordability • Safety management:
Governance		• Governance	

The risks and opportunities identified by three key frameworks in the software, applications and IT services sector.

② Low-granularity impact categories

In the absence of an operational standard covering these impact areas, current tools offer impact categories that are too broad. Thus, technology-related externalities are combined — when present — into categories such as «Human Rights and Technology» or «Technology-related Harms». This lack of granularity does not allow for a detailed and detailed analysis commensurate with the importance of these impacts. The proposed indicators and criteria are therefore aggregating topics that are too diverse, making the analyses at best inconsistent.

This issue particularly affects controversy tracking tools where almost no category covers technological risks. While some are covered, they usually appear in a broad category such as « Privacy Violation ».

③ Unsuitable to the Tech sector's specificities

As already mentioned, the standards that investors use do not integrate the particularities of the different technologies. For example, the «Software & IT services» subsector (used by SASB in the table above) covers completely different technologies, ranging from social networks (Facebook, Linkedin, Slack) to customer relationship management software (Salesforce) and the cryptocurrency sales platform (Binance, Coinbase). This aggregation masks a strong diversity of risks and impacts between technologies, and between use cases within these technologies. In order to overcome this shortcoming, ESG actors are developing frameworks specific to certain technologies or risk areas. As a result, SASB has developed a taxonomy on content moderation topics.[2]

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1   "Facebook Stock Tumbles as Controversies Finally Start to Add Up. Outages Don't Help Either.", Barron's (2021)
2   "Content Moderation on Internet Platforms", SASB, 2022

The technology sector is also more diverse in terms of company size, and the companies assessed are growing faster. The criteria used by ESG frameworks or due diligence questionnaires must take this characteristic into account to allow for a fair assessment and an effective dialogue between investors and companies.

Applying the same criteria and demanding the same actions from startups with a few employees, scale-ups in the hypergrowth phase and large corporations with several thousand employees does not seem appropriate. Is it reasonable to require a startup in the seed phase with a few employees to have a Data Protection Officer (DPO) and to regularly carry out a carbon assessment of its activities?

4   Scope of application is too limited

As explained earlier (part 2.4), traditional ESG frameworks and standards structure their analyses around materiality matrices. They identify the risks specific («material») to each sector. Technology is considered as a sector in its own right, divided into sub-sectors, to which risk zones apply. By limiting themselves to companies identified as part of the tech sector, current tools ignore two types of companies.

- Companies at the frontier of tech. As stated in the first part of this report, the boundaries of the sector are becoming blurred as digital technologies take an increasingly important place in all sectors of activity. In this context, should Blablacar, the carpooling company, be considered a tech company or a transportation company?

- Companies in other industries that use technologies like AI or blockchain. Many retail or transportation companies use AI algorithms for commercial, logistical or marketing purposes. Luxury and pharmaceutical companies are turning to solutions using blockchain (NFT for example) to optimize their logistics or for marketing purposes.

CONCLUSION

Investors' needs to better assess the societal and environmental impacts of the technologies in which they invest are as follows:

- » **Complementarity and compatibility** with their current responsible investment tools and practices
- » **Flexibility** to adapt to their values and responsible investment philosophy
- » **Comprehensive coverage of the impacts and contributions** of tech at the right level of granularity
- » **Integration of tech's specificities** and the different types of possible assets (start-ups, scale-ups, large corporations)

3.

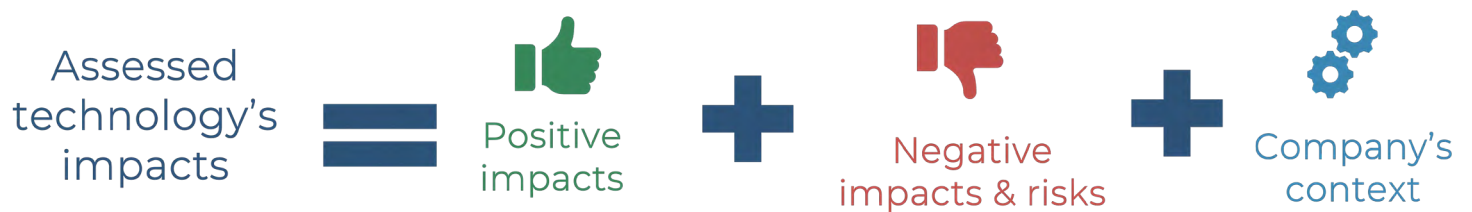# A SPECIFIC FRAMEWORK TO HELP INVESTORS ANALYZE TECHNOLOGICAL IMPACTS
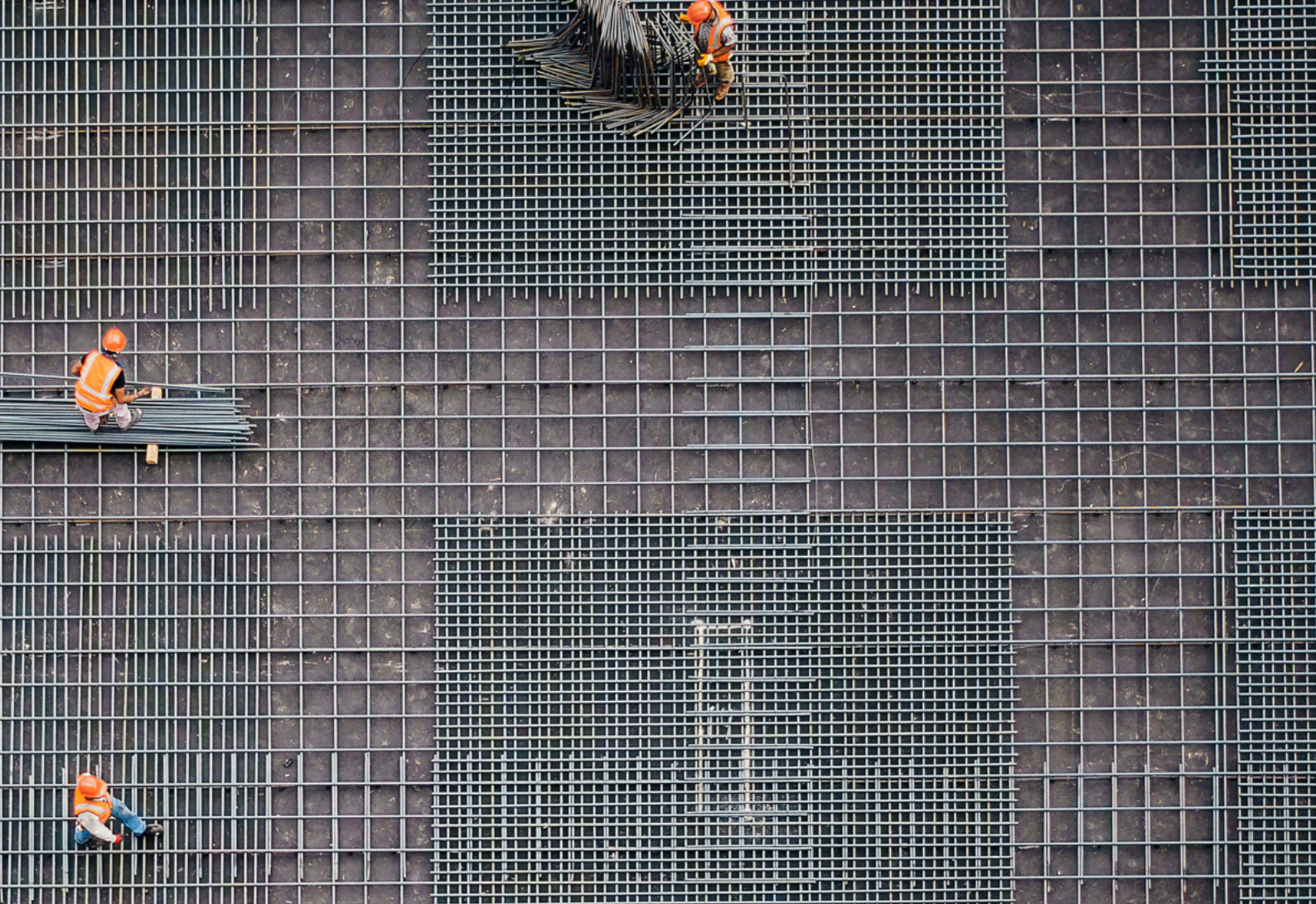
The lack of a complete and operational tool as well as the limitations of existing tools show that **tech is a blind spot of current responsible investment practices and tools**. Our work sought to fill this gap, leading to the creation of a specific framework to assess the impact, contributions and risks of a given technology. This HTF framework includes:

- A comprehensive structural analysis, which draws up the potential impacts and contributions of a technology, both positive and negative.

- A flexible and adaptable methodology according to the use cases (rapid or more detailed analysis, different types of assets, etc.)

- Information (indicators, resources, controversies) making it possible to fine-tune analyses and guide the measurement of risks.

It can be used by investors as well as by companies, regulators, NGOs or providers of data and scores, as well as by the entrepreneurs themselves. It has been designed to be used as part of the investment approach but also to support senior management. Applicable to many use cases, it is intended to serve as a common basis for discussion and analysis by all these stakeholders.

3.1) AN ANALYSIS STRUCTURE FOR A COHERENT AND COMPREHENSIVE ASSESSMENT OF THE IMPACTS OF A TECHNOLOGY

The HTF framework is made up of three parts. It is important to integrate the assessment of the contributions of technology and to separate the actions that companies can or must take from other factors.

Assessed technology's impacts = 👍 **Positive impacts** ➕ 👎 **Negative impacts & risks** ➕ ⚙️ **Company's context**

👍 Positive impacts

- How does this technology contribute to the common good?
- What does it offer to the society and to individuals?

Positive impacts are structured around the **UN Sustainable Development Goals** (see box below). These offer a comprehensive structure, shared internationally by all types of actors (companies, investors, regulators, etc.) covering environmental, social and economic aspects.

👎 Negative impacts

- How can this technology negatively impact society, the environment and individuals?
- What risks and harms does the technology entail?

The working group has drawn up an **exhaustive list of risks and negative impacts** (see box below) related to the three technologies analyzed (applied AI, blockchain, social media). However, it can be applied very well to other technologies and allows for both a high-level view of risks and more detailed risk analyses.

Breach of norms & legal risks	Employment & working conditions	Social relationships	Transparency, discriminations & inequalities
Health, well-being and autonomy	**Misinformation & propaganda**	**Environnemental impacts**	**Privacy risks**

⚙️ Company background

The actions that a company can take are broken down into five categories:

Regulations, standards and charters: compliance with the applicable law and set a framework by creating a code of conduct or a charter.

Business model and use: compliance of the business model and business practices with ethical principles.

Governance, processes and HR: governance measures, particularly at the level of human resources and processes..

Technical elements: technical tools and measures preventing the materialization of risks.

Transparency and commitment: what external commitments and communication relating to sound practices?

UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS

The Sustainable Development Goals (SDGs) define 17 priorities for socially equitable, environmentally safe, economically prosperous, inclusive and predictable development by 2030. They were adopted by the UN in September 2015 as part of the 2030 Agenda.

Each of the 17 SDGs is detailed by targets (169 in total) that define the priorities of the different goals and the actions to be implemented. For SDG 5 on gender equality, for example, one of the priority targets is to ensure women's access to all leadership positions, at all levels of decision-making in political, economic and public life. Among the means put forward to achieve this: to give the same political and economic rights to women and men or to promote their access to and proficiency in new technologies.

Among the limitations of the SDGs are: the lack of direct mention of democratic objectives such as freedom of expression, freedom of the press or free elections, even though SDG 16 on peace, justice and effective institutions refers to the protection of fundamental freedoms. The cultural aspect is also absent from SDGs.[1]

EXAMPLES OF TARGETS AND INDICATORS RELATED TO TWO UN SDGS

SDG 3: Good health and well-being

[...]

SDG 3.4: Reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being.

  » Impact on prevention and awareness (number of people trained in risks or care, number of people cared for)
  » Impact on the treatment (number of persons healed)

SDG 8: Decent work and economic growth

[...]

SDG 8.5: Achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value.

  » Number of additional jobs found through technology by gender, contract and population type (socio-economic level, disability)
  » Number of people trained through technology by gender, contract and population type (socio-economic level, disability)
  » Total number of employees by contract type and gender
  » Number of employees with disabilities
  » Financial or non-financial value (e.g., time saved) of the benefits provided to employees by the technology
  » Additional revenue generated by the technology or its use to the users

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1   Source: https://www.novethic.fr/entreprises-responsables/les-objectifs-de-developpement-durable-odd.html

NEGATIVE IMPACT ANALYSIS FRAMEWORK

The exhaustive list of risks and negative impacts drawn up by the working group is linked to the three technologies analyzed as part of the project (applied AI, blockchain, social media). However, the tests conducted show that the risks identified apply very well to other technologies. This list is built around 8 areas of societal and environmental impacts, which are divided into subcategories allowing for more detailed analysis.

Risk areas	Detailed risk areas	Examples
Breach of norms & legal risks	**Violent and hateful content** — Used to create or propagate hateful or violent content	Moderation of content on social networks with the risk of spreading violent, hateful content to sensitive audiences such as children
	Deviant or illegal behaviour — Enables deviant behaviour and facilitates illegal practices	Cryptocurrencies used to launder money or for frauds
	Litigation and liability — Increases litigation risk for the company	AI models using databases or external tools that raise important liability questions, for example in cases of discrimination
	New regulations — Exposure to new regulations limiting the development of technology	Draft European MiCA laws on cryptocurrencies and the "AI Act" regulating AI
	Security — Exposure to risks of hacking of sensitive data or high-value systems	Ransomware, theft of cryptocurrencies by hacking smart contract
	Subversion — Being diverted from one's original purpose to pursue malicious objectives	Automated word processing model used to create fake news. Cryptographic algorithm used to complicate fraud investigations and thefts.
Health, well-being and autonomy	**Addiction** — Creates dependence and addiction	«Attention economy»: Recommendation algorithm maximizing the time spent by users of a platform
	Physical impacts — Creates a direct negative physical impact	Sedentary lifestyle and prolonged screen time (harmful for example to the eyes, back, neck), or the accident of a self-driving car
	Essential activities — Disrupts users' essential activities	The impact of social media on sleep, diet and physical activity
	Mental and emotional well-being — Has a negative impact on mental health and emotional wellbeing	For example by triggering depression, anxiety, or by having a negative impact on body image, for example through objectification
	Cognitive functions — Weakens our cognitive functions and practical skills	Impact of GPS on the direction of orientation, information available online on memory and attention spans
Social relationships	**Quality of social relationships** — Decrease the quality of relationships and social interactions	Online harassment scandals are an illustration of the distance created by online interactions (e.g., the Mila trial, etc.)
	Type of social interactions — Changes the nature of feelings, interactions, and social relationships	«Sharing economy»: Sell a service or charge for a good instead of giving, helping or lending free-of-charge. Importance of metrics (likes, followers, etc.) in relationships
	Social skills — Diminishes our social skills and the diversity of our relationships	Ultrapersonalization of recommendation algorithms. For example, newsfeed or dating websites
	Decreases the time spent with others — Shifts time spent on social relationships to online content	Replacement of precious parent-child time with child-machine interactions (connected speakers)
Environnemental impacts	**User devices** — Harmful impact of user devices on the environment	Production of smartphone or IoT components
	Datacenters — Harmful impact of datacenters on the environment	Cooling of data centers and production of the required servers and machines
	Networks — Harmful impacts of networks on the environment	Production and power consumption of network components (antennas, cables, etc.)

Misinformation & propaganda

Fake news
Used to create or propagate fake news

Algorithms for recommending content on social networks highlighting false information

Propaganda
Allows the spreading of propaganda

Deep fake chatbots or algorithms intentionally used by an entity (public or private) to highlight biased or misleading political information

Freedom of speech and access to information
Helps restrict freedom of expression and access to information

Content moderation practices on social networks and associated algorithms that are too restrictive

Extreme content
Promotes extreme content and points of view

Recommendation algorithms highlighting extreme content on social networks to maximize their number of interactions

Polarization
Contributes to the polarization of opinions

Algorithms for recommending content on social networks

Employment & working conditions

Job elimination
Eliminates jobs by automation or by seeking productivity gains

Industrial automation or word processing algorithms (invoice analysis, etc.)

Precarious work
Increases the precarious situation of vulnerable populations

Clickworkers, gig economy, outsourcing tools such as Mechanical Turk

Workforce monitoring
Enables intrusive and ubiquitous monitoring of employees and their performance

Real-time monitoring of breaks and employee productivity in plants

Anxiety and mental health
Creates anxiety and mental health issues

Remote work applications (video conferencing, chat, document sharing, etc.)

Decrease in productivity
Creates negative habits leading to a decline in productivity

Emails and chat notifications interrupting work, use of social networks

Transparency, discriminations & inequalities

Respect for rights and free will
Violates the rights and free will of users or deprives them of remedies

Any technology that affects users critically, such as facial recognition algorithms to access a public service

Transparency
Lack of transparency on technical or legal elements

Data used for analyzing health data, recruitment algorithms and automation tools

Explainability
Produces inexplicable results thereby posing ethical and legal risks

Black box algorithms for CV analysis

Accessibility
Inaccessibility due to technical, financial factors or lack of skills

Costly hardware preventing access to services

Discriminatory bias
Creates discrimination via algorithm bias

Predictive algorithms of police and justice. Risks of gender or racial discrimination (e.g. facial recognition)

Right to access essential services
Creates discrimination by preventing non-users to access essential services

Recruitment algorithms and automation tools

Privacy risks

Monitoring
Used for monitoring purposes or enables monitoring

Facial recognition software, tracking technologies, targeted adware

Abusive use
Enables or used for illegal processing of personal data

Resale of user data without permission to ad services

Piracy
Be the source or tool for personal data privacy

For example, identify theft, blackmail, spamming, etc.

Disproportionate collection
Be the source or tool for disproportionate collection of personal data

Collection of localization date by recipe site (unnecessary for its functioning)

3.2) A METHODOLOGY BASED ON THREE LEVELS OF ANALYSIS TO ADAPT TO DIFFERENT USE CASES

The methodology on which the HTF framework is based comprises three stages:

- The first stage makes it possible to identify, in a few minutes, the areas of impact and high-level contributions. That is, to filter Sustainable Development Goals and the areas of impact not related to technology and prioritize those that are.

- More specific impact areas are then identified, i.e., targets related to the SDGs and sub-categories of risks.

- Finally, the last step guides the user to conduct a more in-depth analysis based on the indicators, resources and examples of highlighted controversies.
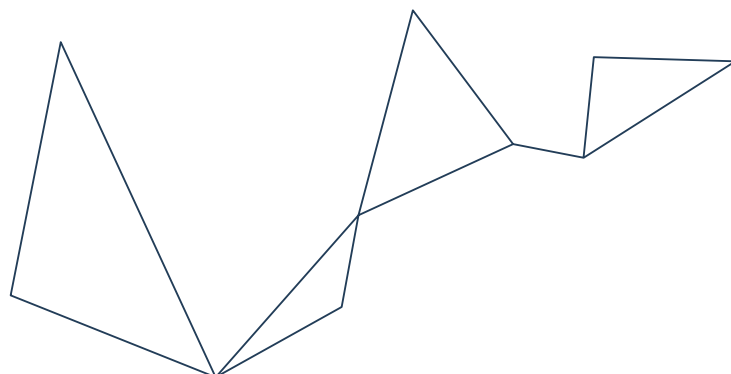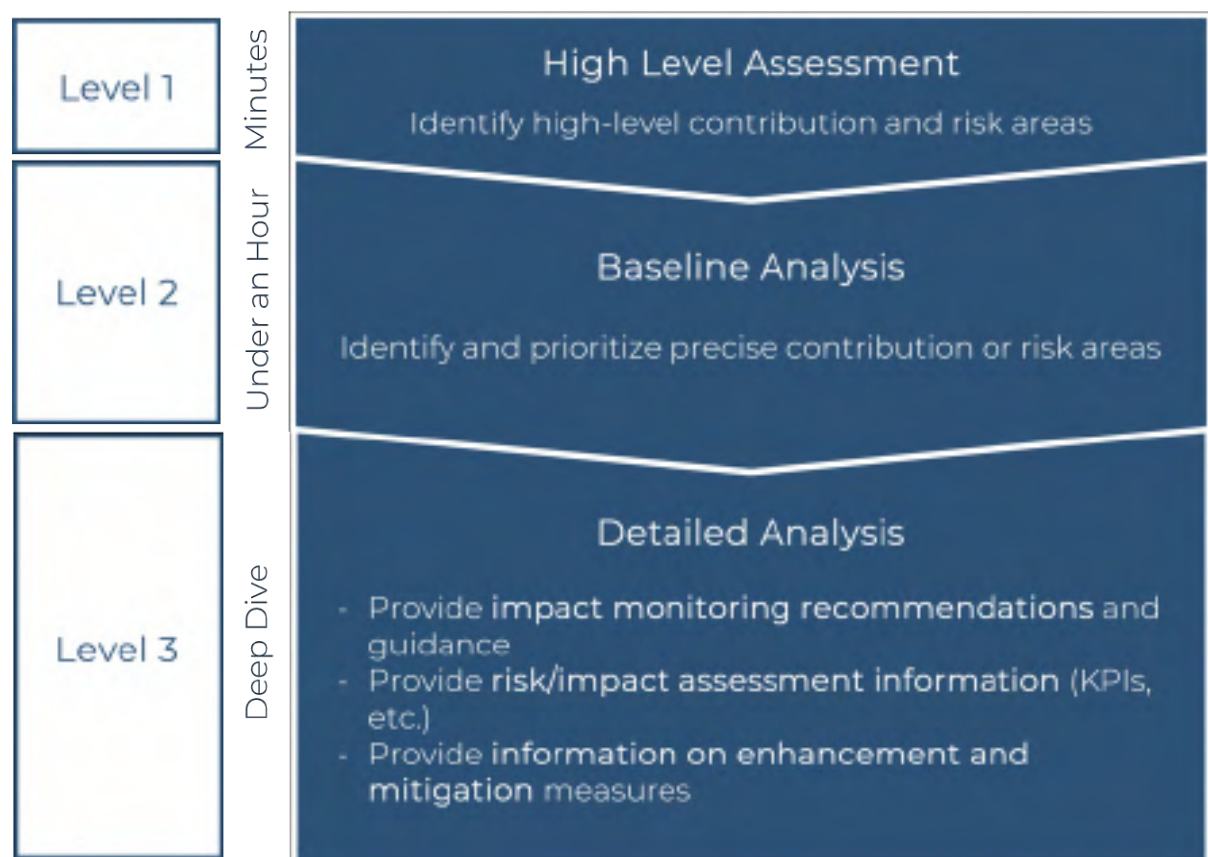
3.3) DETAILED INFORMATION TO FINE-TUNE ANALYSES

To perform a detailed assessment, additional information is required. The framework proposes four types of information:

- A list of technologies concerned by this risk.
- Indicators can be used to fine-tune the assessment of risk level or the likelihood of a significant negative impact.
- Examples of issues illustrating the materiality of risk and possible externalities of a technology.
- Resources recommended to fine-tune the assessment and to better understand the analyzed mechanisms.

EXAMPLES OF TECHNOLOGIES CONCERNED

The following technologies are particularly exposed to disinformation risk:

Social media
- Social and professional networks (except for dating applications)
- Messaging applications and software

Applied AI
- Recommendation algorithms
- Content management algorithms
- Chatbots

EXAMPLES OF ASSESSMENT CRITERIA AND INDICATORS

The following indicators have an impact on the exposure to disinformation risk:

- Type of content (political, social, professional, etc.)
- Type of users (specifically, presence of vulnerable people, children, etc.)
- Nature of content (live video, podcast, video, text, images, etc.)
- Possibility to anonymize or pseudonymize data
- Conditions and actions required to join the network (price, age and other eligibility criteria, identity verification, coopting)
- Capacity of users to create, access and share content on a larger scale
- Capacity of the platform to moderate content (e.g., live video vs. text, encrypted messages, etc.)
- Scale of platform (in terms of users, countries and languages spoken on the network)

Controversies examples

Title	Description	Source
Data breach used for political advertising	From a simple quiz on Facebook, users' data were recorded by Cambridge Analytica. Users were then profiled and targeted with political advertising. This transfer and profiling were done without the users' knowledge.	Link
Twitter under Federal Trade Commission (FTC) investigation for alleged misuse of user data	Twitter is accused of using personal information provided by users for security reasons to target them with advertising	Link
Experts raise privacy concerns over Amazon fleet surveillance	Several experts and prominent political American leaders expressed privacy concerns on the collection and potential detrimental uses of personal data through its fleet surveillance system.	Link
Bitcoin mining activities harmed some New York State communities	Mining needs a huge amount of electricity. The article shows how blockchain technology has a harmful impact on the environment and on local communities.	Link

Available resources

Title	Description	Source
CNIL's guidelines on integrating privacy in tech development	This web page's goal is to help to apprehend privacy by providing methodological and technological choices.	Link
CNIL's open source Privacy Impact Assessment software	The CNIL (French Data Protection Authority) provides a software called Privacy Impact Assessment (PIA). It helps evaluate the compliance with the GDPR. This webpage is a complete explanation about this tool.	Link
CNIL's guidelines on Privacy Impact Assessment	This webpage includes 4 guides to better understand how the PIA works. There is a guide about IoT, a methodology, a template and a guide detailing various knowledge bases.	Link
"Blockchain and the GDPR: Solutions for a responsible use of the blockchain in the context of personal data"	A web page detailing concrete solutions and points of caution for actors wishing to use blockchain to process personal data	Link
Linux Foundation's report on «The Carbon Footprint of NFTs»	This report, from The Linux Foundation, explains the environmental concerns around NFTs and gives recommendations on how to avoid or mitigate them.	Link
EPFL's report on "Ensuring the Environmental Sustainability of Emerging Technologies"	This report analyses the environmental impact of five emerging technologies (from synthetic biology to digital technologies). It provides high-level recommendations to ensure that environmental risks are identified and considered while technologies are being developed.	Link

3.4) WHAT ARE THE APPLICATIONS OF THE HTF FRAMEWORK?

The HTF framework can be used by many stakeholders (rating agencies, investors, companies, data providers, regulators), each of which could have several uses for it.

🏛 INVESTORS *(Venture capital, private capital, institutional investors)*

» Assess a particular investment across all asset classes (from start-ups to listed companies).

» Provide tools and structure to foster dialogue between shareholders and portfolio companies.

» Provide focus and structure for the overall assessment of a portfolio.

Examples of possible uses:

» An a**sset manager** wants to identify the high-level risks and areas of positive contribution of an AI-based automated resume analysis company before an **investment committee meeting**. The assessment using the HTF framework highlights that the company can contribute to SDG 8 and 10, but also that it is particularly exposed to discrimination, privacy and security risks.

» An **investment or ESG analyst** is preparing a due diligence of an online social network. They want to identify key indicators to compare the company to its competitors in terms of misinformation risk and health impact. The HTF framework **provides indicators to support this assessment** (but does not provide the underlying data).

🏢 COMPANIES *(all sizes)*

» Can be used as a self-analysis tool applicable to the technologies they develop for commercial or internal purposes.

Examples of possible uses:

» The **CEO/founder** of an AI-based satellite image analysis company wants to identify the best practices their company should implement to mitigate its ethical risks. The HTF framework provides them with best practices (processes, governance, training,...) to mitigate risks related to, for example, privacy.

🔍 RATING AGENCIES AND DATA SUPPLIERS

» Provides the structure, questions and key performance indicators required to understand the specific impacts and risks related to technology.

⚖ REGULATORS AND STANDARD-SETTING ORGANIZATIONS

» Provides a starting point for future standards or guidelines.
» Helps create a taxonomy on the impacts and risks of technology.

3.5) A TOOL FOR APPLYING THE HTF FRAMEWORK

The HTF has developed a web interface through which the framework can be applied to analyze a use case. This tool can be used to identify precise impact areas, prioritize them and provide information to fine-tune the analyses. It is currently a beta version and is being tested by different partner investors, two of which testify below.
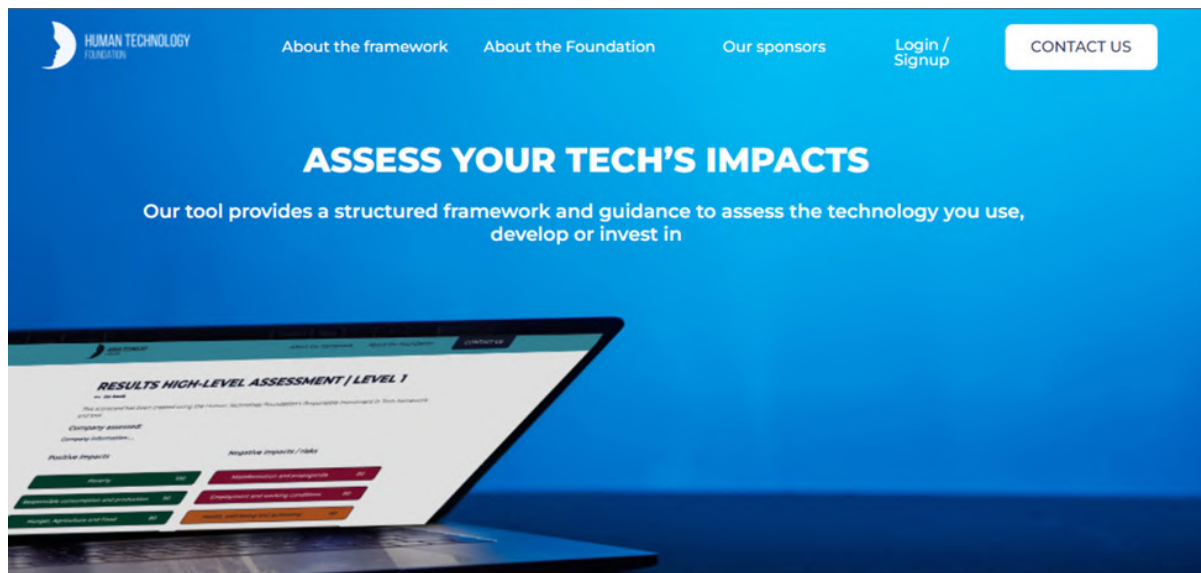
3.6) WHAT NEXT FOR THIS FRAMEWORK?

The Human Technology Foundation is proud of the results of this project. The initial feedback from users of the HTF framework and the web interface (beta version) is positive as the testimonials below show.

We hope that investors will integrate the HTF framework into their investment process and shareholder dialogue with their portfolio companies. The HTF teams are available to answer your questions on this topic (see last page of this report).

However, this project is only a first step towards more responsible investments in technology. Development possibilities have already been identified and we are at your disposal to study the areas for improvement or new developments for this framework.

Use this short questionnaire (6 questions), accessible through the QR Code below, to let us know:
·   Your opinion on the content of this report and the HTF framework
·   Your interest in using the web interface
·   Your interest in continuing this reflection with HTF
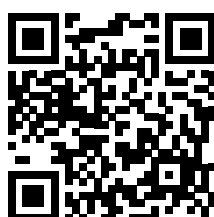
3.7) WHAT DO INVESTORS THINK ABOUT THE HTF FRAMEWORK?

Romain Lavault
General Partner
Partech

"Tech is gradually transforming all industries by promising tremendous productivity gains, and is becoming a must for investors of all types. However, technological innovation does not necessarily mean progress for man and there can be no sustainable finance if technology enslaves man and dries up resources.

It has become essential to have tools, not only to inform investors in their analyses, but also to better support entrepreneurs. This is why it is particularly important to have a framework that covers both the benefits of tech but also identifies areas of risk. This framework is very easy and fast to use as part of a due diligence and integrates perfectly with existing ESG analysis frameworks. In this way, we can ask the right questions and in particular feed the ESG roadmap of companies financed. In recent weeks, we tested the tool in our investment approach with new startups and it is already establishing itself as a future standard!»

Guillaume Lasserre
Deputy CIO,
La Banque Postale
Asset Management

"The specificity of new technologies and the companies that promote them is the speed at which they can move from concept to maturity with broad-based acceptance. As a result, traditional ESG assessment models can find it difficult to track these companies in a consistent manner throughout their development, from startup to big tech. This framework has been specifically designed to meet this challenge and generate promising results. The system's capacity to deal with several levels of granularity on topics specific to new technologies is a genuine innovation that allows investors to maintain consistency regardless of the company's level of maturity.»
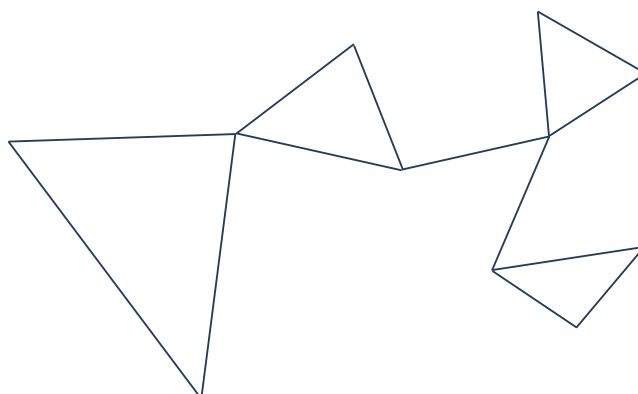
ACKNOWLEDGEMENTS

The Human Technology Foundation wishes to thank its partners who made this project possible and the experts who were involved throughout the project.

PROJECT PARTNERS

EXPERTS INVOLVED IN THIS PROJECT

APPENDICES :

Scan the QR code below to access the appendix of the report comprising:

- A mapping of common ESG tools and practices
- A comparison of frameworks dealing with specific risks
- Additional information on the three technologies analyzed and their impacts
- Graphs and diagrams illustrating the report's different messages
- A glossary, a bibliography and a file making available the resources (reports, research papers, articles, tools, etc.) used during the work

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