A PARIS BLOCKCHAIN WEEK SUMMIT

STUDY

CHALLENGES IN IDENTITY MANAGEMENT AND VERIFICATION

A PRACTICAL APPROACH TO BLOCKCHAIN

PBWS

PARIS NFT DAY

Table of Contents

A BRAND NEW ECOSYSTEM

Blockchain is a brand-new technology, and new technologies always require a period of adaptation to become effective and reliable! In a world of constant change, identity management and verification are one of the main challenges ahead. With a growing population, information is much harder to process, especially in this globalized setting.

Challenges in identity management and verification need to be addressed, possibly with a practical, and simple solution to the problem. In this instance, Paris Blockchain Week Summit decided to provide you with an in-depth overview of a practical approach to identity management and verification. Businesses spend a considerable amount of time verifying and processing the identity of consumers via third party applications, making the process tidy and complicated to achieve.

Many challenges associated with identity management could be solved but imply the emergence of a new technology facilitating processes and procedures.

With current protocols in place, it indeed is too difficult for companies to come up with a reliable and effective framework to verify millions of individuals through transactions. Indeed, this concept is true for both the public and private sectors, in need of technological reform to facilitate information processing for all.

BLOCKCHAIN EXPLAINED

Blockchain is often discussed, but not always clearly described in a practical setting. Sousa et al. (2020) related: *"Blockchain can be seen as a distributed database that maintains a list of sorted records in an increasing sequence. Different transactions are written in a block data structure"*. A cryptographic hash function links each block to the one before it, producing a blockchain.

In practical terms, blockchain is an efficient way for entities to store, transmit or exchange data in a safe manner. Demand for such technologies has seemingly increased, in a world where information is key, and data must be protected at all costs.

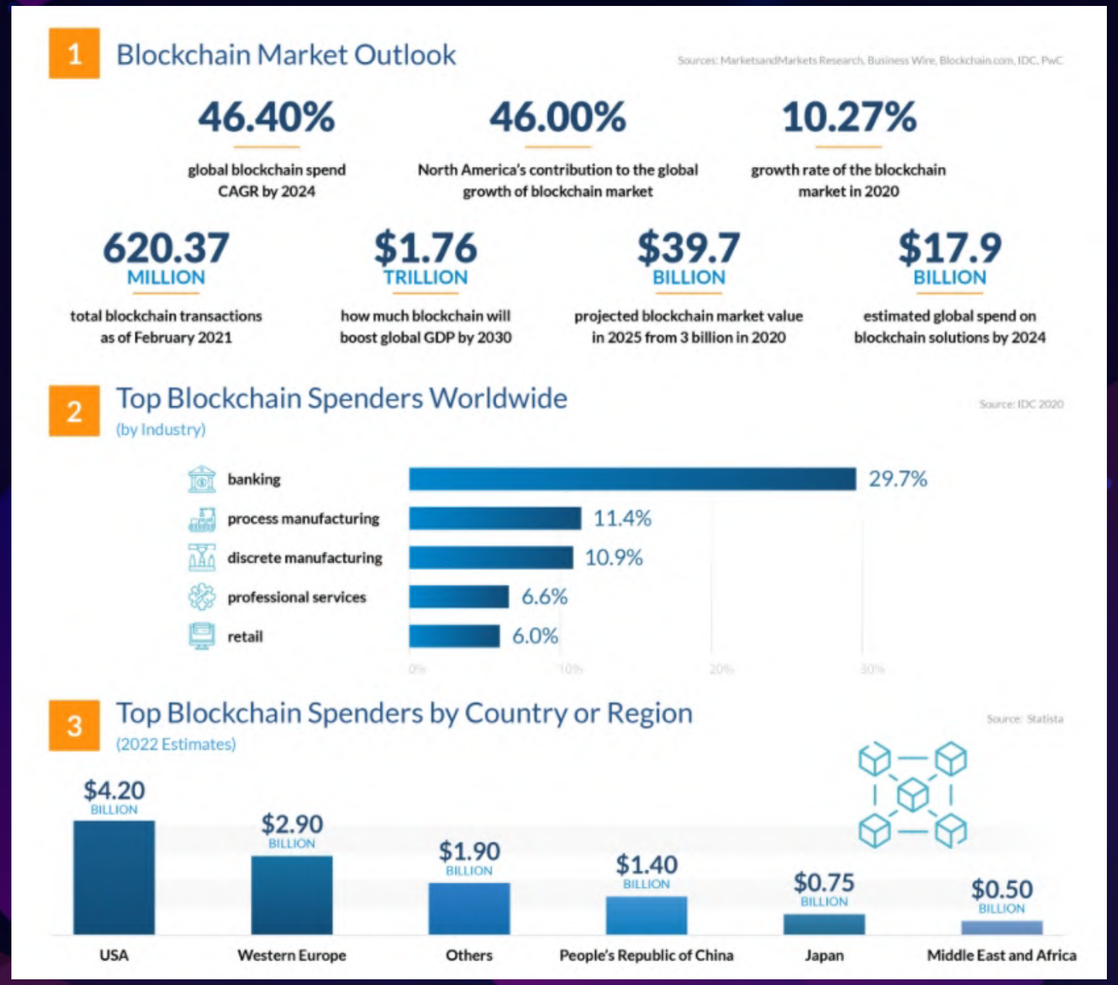
Identity management and verification is a redundant challenge for both corporations and governments.

To guarantee the security, and effective processing of information for citizens, clients, vendors, partners, and stakeholders, identity management and verification must be implemented while guaranteeing the security of the parties involved. Identity management has strongly benefited from the use of Blockchain to provide a safe, decentralized ecosystem. Rathee & Singh (2021) mentioned: *"Particularly, the blockchain methodology permits the execution of decentralized identity management (IdM) systems that provide the digital identity, which is not distributed through a Trusted Third Party (TTP)"* . Thus, the effectiveness of the technology can be observed, guaranteeing security for all parties involved.

CURRENT BLOCKCHAIN PROTOCOLS

Currently, Blockchain can be defined and explained through two different protocols, one being the “proof-of-stake”, and the other one also called “proof-of-work”. The first consensus ever created was the proof-of-work initiated on Bitcoin, where one party verifies the transaction exchanges information with the prover. This system, while effective, raises a series of issues on the consumption side, as too much energy is required to conduct a transaction. In essence, this process is hardly sustainable at scale considering high transaction fees, and environmental sustainability.

On the other hand, the proof-of-stake framework shows to be much more effective and reliable for long-term use with lower expectations for energy consumption. This alone, can make a case for the sustainability of the blockchain technology, mainly depending on its consensus. Other innovation should be taking place regarding the technology in the following decade, allowing a blockchain to be much more effective, inexpensive, and reliable in the long run.



MARKET OUTLOOK

When mass democratization will be attained, entities will benefit from this new technology as ongoing issues related to identity management will be less of a challenge.

The application of the technology is viable in many industries, including real estate, green technologies, art, fashion, healthcare, construction, finance, entertainment, government services, etc. In essence, such technology can rather be perceived as a tool, instead of a niche-oriented technology. Similarities with the infancy of the Internet could be relevant to cover, with a similar path observed.

In most cases, blockchain can be used to solve or address a specific issue within an industry. All entities faced operational problems, and are looking for ways to reduce costs, while improving their productivity. In this instance, blockchain helps entities to maximize their output, in relationship to current input.

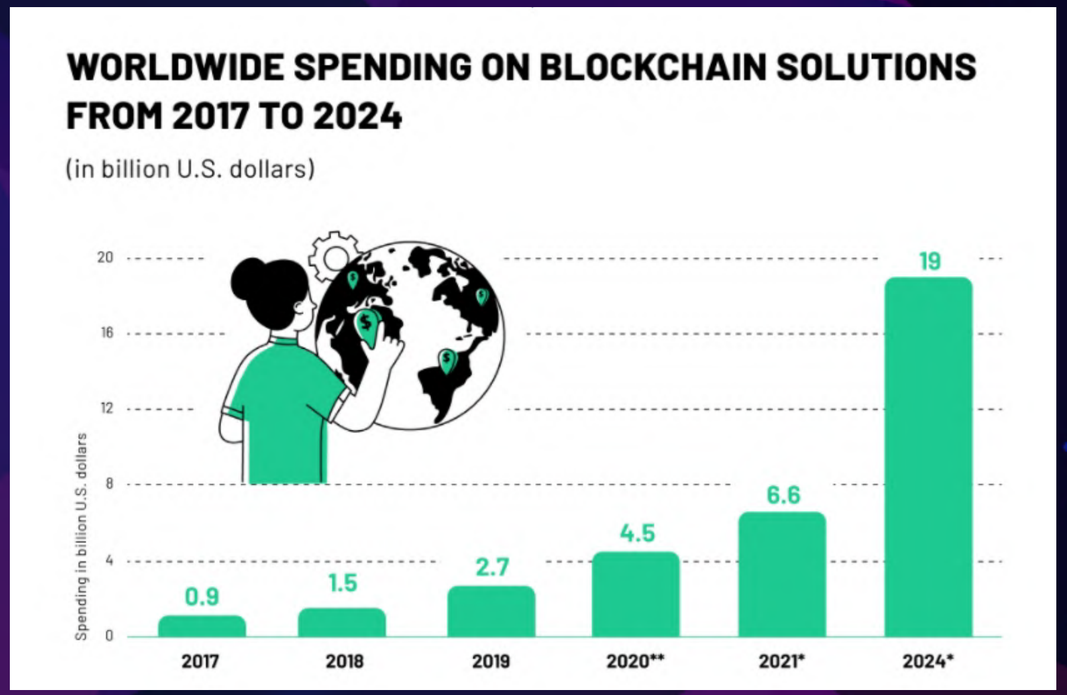
They are nevertheless necessary for companies and government entities, who must be able to collect and store information.

Many elements must be considered, such as cybersecurity, exchange of information, data accuracy, and forecasts for some entities. To answer all these issues, blockchain presents a viable, and adaptable solution to address such issues at a lower cost, and therefore greater efficiency.

A great example would include information processing, which all large entities must do. Such practices are however inefficient, time consuming, and quite costly.

A TOOL FOR ENTITIES

In most cases, blockchain can be used to solve or address a specific issue within an industry. All entities faced operational problems, and are looking for ways to reduce costs, while improving their productivity.



In this instance, blockchain helps entities to maximize their output, in relationship to current input. A great example would include information processing, which all large entities must do. Such practices are however inefficient, time consuming, and quite costly.

They are nevertheless necessary for companies and government entities, who must be able to collect and store information. Many elements must be considered, such as cybersecurity, exchange of information, data accuracy, and forecasts for some entities. To answer all these issues, blockchain presents a viable, and adaptable solution to address such issues at a lower cost, and therefore greater efficiency.

IDENTITY MANAGEMENT EXPLAINED

Figure 1. Traditional identity

Figure 2. Blockchain-based identity

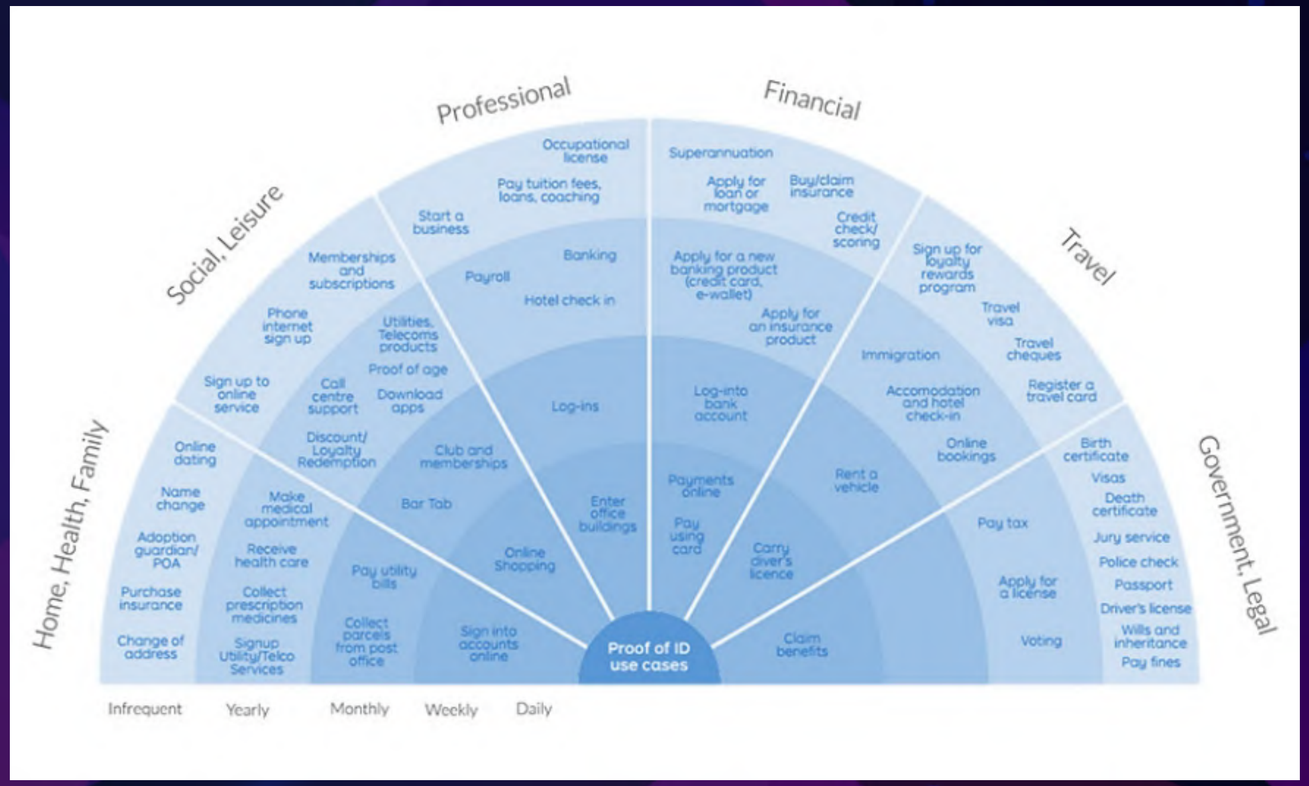
The process of identifying, validating, and approving a group or person of people on a program, network, or a complete IT ecosystem is known as identity management. Identity management is a concern and should be useful to all stakeholders, as emerging technologies, while efficient, are always posing a risk of threat, when not idealized efficiently.

Dupont (2017) argued: *"Today, the notational aspects of digital technologies are perhaps the most critical ones and ought to be recognized as the key to understanding contemporary computing"*. Therefore, a proper understanding on how to use computed applications is much needed, ensuring that identity is successfully managed.

Identity Management can be applicable in multiple industries and will remain an ongoing issue to solve. The following issue remains in finding an applicable, and economical blockchains that will sustain larger infrastructures for years to come. Current protocols may not offer enough environmental guarantees to be released at scale.

The issue of energy consumption should be raised once academic data will be provided to draw further conclusions on this topic. Currently, different blockchains protocols have not yet released clear numbers on their level of consumption, which makes it very difficult to get an accurate estimate of energy consumption.

OVERVIEW



While energy consumption remains one of Blockchain's biggest challenges, the advantages offered by the technology cannot be overlooked, and it is very unlikely that this will change over time.

Identity management is wide in the sense that it can be applied to most industries, where a need of identifying consumers is needed.

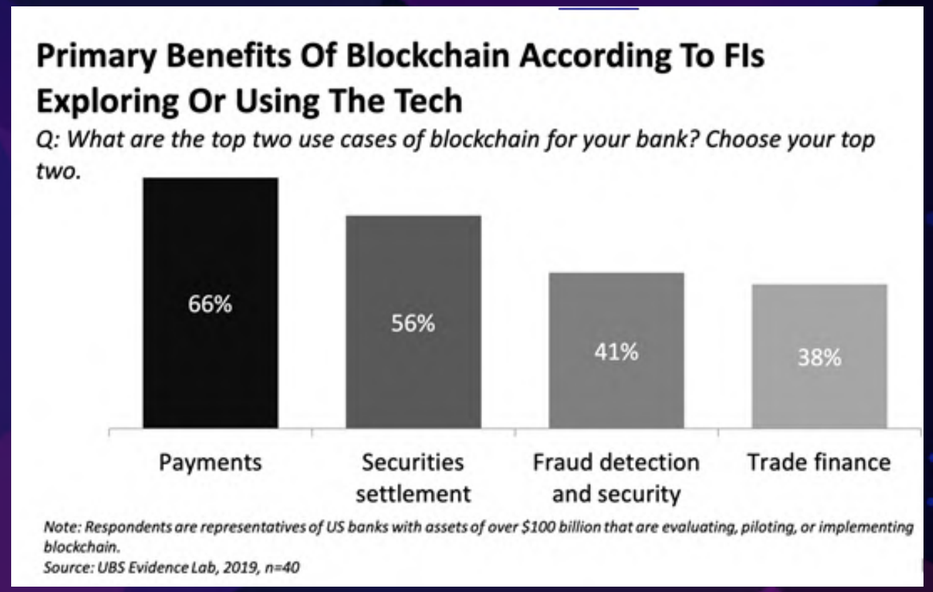
This can be applied to the public sector, which must be able to offer viable and sustainable ways to verify identity within public spaces. Identification, while being biometric, is not registered under blockchain in most instances, and requires an additional layer of security to guarantee the safety of citizens, facilitating identification procedures.

A TOOL FOR SECURITY MANAGEMENT

Security management is one of the main aspects where blockchain could have an immediate impact. Javed et al. (2021) stated: *"Since SARS-CoV-2 (COVID-19) emerged, the demand for eHealth has gone viral. The novel coronavirus has swept across communities forcing a new normal that requires social distancing"*.

The pandemic has brought a definite need to successfully detect information, to preserve the health of citizens. In essence, governments needed an immediate solution to be able to propose a way to securely store information to avoid the spread of the virus. Such information implies that patients' health could be revealed, thus putting the information at great risk. Information protocols are often quite difficult to manage and may represent a security threat. Blockchain is applicable in this instance, providing the necessary tools and information needed.

IMPLEMENTATION



While noting the technology's efficacy, a proper implementation plan must be set in place to ensure a successful outcome for both corporations, and private entities.

Kuberperg (2020) reported: "Running authentication and authorization services costs the service providers significant money. Thus, service providers often elect to support lowest cost authentication" (p. 1010).

In the case of health, Khurshid et al. (2021) declared "Our study provides preliminary evidence of the feasibility of using a blockchain-based patient-centric identity management system for patients" (p. 7). This statement emphasizes the idea that the technology is here to stay and will provide significant value to the marketplace for the next decades to come.

Figures mentioned on this graph are likely to change overtime considering an emerging need for corporations and public entities to process information moving forward. Payments, securities settlement, fraud detection/security, and trade finance will all be a major aspect of the ecosystem, but other sectors, such as supply chain could be integrated in this field. With an imminent launch of Central Bank Digital Currencies (CBDCs), public entities are expected to take a huge lead in blockchain development, with a greater need to process information while managing gateways through identity management.

SUMMARY

In conclusion, a case could be made for blockchain as a practical implementation for identity management and verification!

Prior to the use of this technology, no clear solution had been provided to efficiently manage information, and guarantee safety for third parties.

Sarier (2021) explained: *"Current identity management systems do not guarantee efficiency, non-transferability, scalability, auditing, revocation and most importantly privacy of identities/credentials simultaneously"*.

Indeed, blockchain is the right solution to address this current issue. Blockchain is still in its infancy and brand-new contributions must be made by developers and industry leaders for advanced, and effective blockchain practices.

REFERENCES

Dupont, Q. (2017). Blockchain identities: Notational technologies for control and management of abstracted entities: BLOCKCHAIN IDENTITIES. Metaphilosophy, 48(5), 634-653. https://doi.org/10.1111/meta.12267

Rathee, T., & Singh, P. (2021). Secure data sharing using merkle hash digest based blockchain identity management. Peer-to-Peer Networking and Applications, 14(6), 3851-3864. https://doi.org/10.1007/s12083-021-01212-4

Kuperberg, M. (2020). Blockchain-based identity management: A survey from the enterprise and ecosystem perspective. IEEE Transactions on Engineering Management, 67(4), 1008-1027. https://doi.org/10.1109/TEM.2019.2926471

Javed, I. T., Alharbi, F., Bellaj, B., Margaria, T., Crespi, N., & Qureshi, K. N. (2021). Health-ID: A blockchain-based decentralized identity management for remote healthcare. Healthcare (Basel), 9(6), 712-712:21. https://doi.org/10.3390/healthcare9060712

Khurshid, A., Holan, C., Cowley, C., Alexander, J., Harrell, D. T., Usman, M., Desai, I., Bautista, J. R., & Meyer, E. (2021). Designing and testing a blockchain application for patient identity management in healthcare. JAMIA Open, 4(3), ooaa073-ooaa073. https://doi.org/10.1093/jamiaopen/ooaa073
Sarier, N. D. (2021).

Efficient biometric-based identity management on the blockchain for smart industrial applications. Pervasive and Mobile Computing, 71, 101322. https://doi.org/10.1016/j.pmcj.2020.101322

Sousa, P., Resende, & Martins, R. (2020). The case for blockchain in IoT identity management. Journal of Enterprise Information Management, ahead-of-print(ahead-of-print) https://doi.org/10.1108/JEIM-07-2018-0148