

Blockchain concepts in business research – a scoping review

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Abstract

Purpose – The purpose of this paper is to provide a condensed perspective of blockchain-related concepts for business researchers and practitioners, amid the growing popularity of the subject.

Design/methodology/approach – This paper is a literature review following the Preferred Reporting Items for Systematic reviews and Meta-Analysis Extension for Scoping Reviews methodology. We have revised 42 papers that have detailed concepts such as blockchain, Web 3.0, blockchain types, affordances, and limitations.

Findings – The paper creates a comprehensive overview of blockchain-related concepts. It starts by looking at the blockchain's various definitions and explains the technology's novelty. The components and the process of making a transaction in the blockchain are explained from a combined paradigm, including both business and technological concepts. Further on, the paper discusses the existing types of blockchain, together with the affordances provided by the usage of the technology. The last part includes the limitations of blockchain.

Originality/value – The present study reveals the existence of three paradigms while studying the subject: business-centric, technological-centric, and combined. While the primary aim of this research is to explain concepts for business researchers and practitioners, it includes technological aspects as well, therefore, aligning with the combined paradigm.

Keywords Web 3.0, Blockchain, Information technology, Affordance

Paper type Research paper

1. Introduction

The contemporary business environment is intricately intertwined with recent advancements in the technological domain. Among the most significant innovations of the last 15 years, blockchain technology has catalyzed the emergence of a new iteration of the World Wide Web (from here on referred to as Web). In the previous iteration, Web 2.0, the users started noticing problems such as loss of trust, censorship and loss of security (Alabdulwahhab, 2018; Zarrin et al., 2021). These mainly appeared due to the presence of a central authority that collected and manipulated data at their free will. Therefore, blockchain technology has emerged as a transformative force, reshaping traditional Web 2.0 paradigms and introducing new approaches to data management, security and transparency. Initially conceived as the foundational technology underpinning cryptocurrencies, blockchain has risen above its original application, gathering attention from many industries, due to its potential for innovation and efficiency improvement. This technology has a significant impact on business models (Lim et al., 2021) and the economy on a global scale (Li et al., 2019).

Over the past half-decade, there has been a substantial increase in research dedicated to the topic of blockchain, with a particular surge observed during the last three years. While the tendency is to look towards blockchain-based cryptocurrencies, the public is less familiar with other blockchain-enabled applications and how it could impact businesses (Zhan et al., 2022).

While various studies have explored the technical aspects of blockchain, a gap can be identified in the current research due to the shortage of comprehensive studies addressing the key components of blockchains and the potential blockchain has in business from a rather



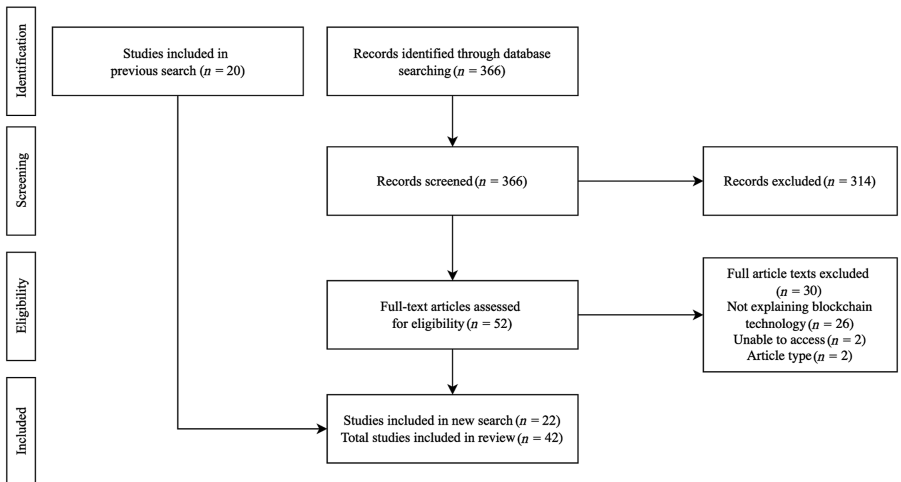
business-centric perspective (Sultan *et al.*, 2018; Zhan *et al.*, 2022). Several studies have highlighted the need for business leaders (Lacity and Van Hoek, 2021) and practitioners (Casino *et al.*, 2019) to grasp and understand thoroughly blockchain concepts in order to utilize and implement blockchain solutions in their organizations. For better development of other blockchain-enabled business applications, Huang *et al.* (2022) state a need for research that highlights the essentials of blockchain technology. This scoping review aims to bridge the gap by analyzing 42 papers. It sets the objective of providing business researchers and practitioners with an understanding of the basic concepts of blockchain.

The paper contains the following sections: after the methodology section, the results section reveals the main aspects of blockchain technology as the foundation of Web 3.0, including its definition, types, affordances, challenges associated with blockchain use and the ecosystem perspective associated with the blockchain adoption; the fourth discusses the paradigms observed in research regarding blockchain. The last section concludes.

2. Methodology

The inception of this study was for an in-depth understanding of the business perspective of blockchain technology and how it allows Web 3.0 to develop. This research has been performed in two phases. In the initial selection, conducted in September 2023, Tranfield’s methodology for literature reviews (Tranfield *et al.*, 2003) has been followed, providing the study of 20 articles on the topic of blockchain and Web 3.0, using the Google Scholar database. Further on, the research was expanded in September 2024 according to Preferred Reporting Items for Systematic reviews and Meta-Analysis Extension for Scoping Reviews (PRISMA-ScR) guidelines (Tricco *et al.*, 2018). Using these guidelines, a search scheme has been conducted to identify relevant studies regarding blockchain and Web 3.0. The database used was Web of Science, and the keywords considered were “Web 3.0”, “Web 3” and “blockchain”, so all the studies mentioning them would be included. Several restrictions were imposed for the search: the years considered were between 2018 and 2024, and the types of articles desired were “highly cited papers”, “review papers” and “open access”.

Study selection: The article selection process using PRISMA-ScR is highlighted in Figure 1. At first, 366 potential studies were selected for inclusion, and 314 studies were



Source(s): PRISMA flow chart by authors

Figure 1. PRISMA flow chart

excluded through a title and abstract screening. We excluded studies that do not have a focus on blockchain technology or Web 3.0. Many studies mention blockchain or Web 3.0 in their abstracts in an enumeration of new technological forces but are not focused at all on developing the study on the subject. Therefore, 52 studies have been selected for an in-depth analysis, being assessed as full-text articles. Here, 2 bibliometric analysis papers have been excluded due to their nature, 2 papers were not available for access and the remaining 26 papers did not cover any of the targeted aspects concerning blockchain technology. This way, 22 studies ended up in the selection based on the PRISMA-ScR methodology. The final selection, combining the two phases, is formed of 42 studies.

Extracting data: For each study included, an iterative model was used in order to extract the data for the review (Arksey and O'Malley, 2005). Two researchers were involved in extracting the data and agreed on selecting the following relevant aspects to be covered by this scoping review: What is the definition of blockchain? How does the blockchain technology work? What types of blockchains exist and which is best fit for what? What are the blockchain affordances for a business? Are there limitations to blockchain usage and adoption?

3. Results

3.1 Blockchain definitions

There isn't evidence for one main definition to be globally accepted, which will explain in detail what blockchain is and what it does (Hasselgren *et al.*, 2020). Three approaches to the definitions on the same subject have been identified, as further detailed.

In the *business* approach, the blockchain is defined as a peer-to-peer network (Alabdulwahhab, 2018; Fernandez-Carames and Fraga-Lamas, 2018; Panarello *et al.*, 2018), where all actors have control over the information related to the transactions (Ølnes *et al.*, 2017; Schlecht *et al.*, 2021). Each node/actor (Alabdulwahhab, 2018; Schlecht *et al.*, 2021) has an identical copy of the distributed ledger (Panarello *et al.*, 2018; Schlecht *et al.*, 2021; Cerchione *et al.*, 2022), which is updated and maintained by the nodes (Alabdulwahhab, 2018; Panarello *et al.*, 2018) while it is continuously expanding with new transactions, added in chronological order (Cerchione *et al.*, 2022). The terms employed considering this approach are *node*, *actor*, *database* and *distributed/shared ledger*.

In the *technological* approach, the blockchain is a decentralized network of computers (Tandon *et al.*, 2020; Schlecht *et al.*, 2021), which is built on distributed ledger technology (Andoni *et al.*, 2019; Weking *et al.*, 2020). The blockchain technology enables algorithms and protocols (Hasselgren *et al.*, 2020) to monitor and react to the changes automatically (Murray *et al.*, 2021). The transactions that occur are verified (Bodkhe *et al.*, 2020) by the entire network using encrypted transactional data (Chang and Chen, 2020a) and digital signatures (Agbo *et al.*, 2019; Weking *et al.*, 2020) and are added to the immutable chain (Murray *et al.*, 2021) by using advanced cryptography (Agbo *et al.*, 2019; Schlecht *et al.*, 2021). The terms employed considering this approach are *technology*, *protocols*, *cryptography*, *encryption* and *algorithms*.

The mixed approach of *business* and *tech* is the most frequent one in the analyzed articles. Considering this approach, the blockchain is a decentralized (Agbo *et al.*, 2019; Chong *et al.*, 2019; Morkunas *et al.*, 2019; Murray *et al.*, 2022; Zhan *et al.*, 2022; Zuo, 2023), fully distributed (Chong *et al.*, 2019; Morkunas *et al.*, 2019; Viriyasitavat *et al.*, 2019; Ragnedda and Destefanis, 2020) database of transactions (Adel, 2022), known as a ledger (Agbo *et al.*, 2019; Chong *et al.*, 2019; Dai *et al.*, 2019; Morkunas *et al.*, 2019; Ragnedda and Destefanis, 2020; Weking *et al.*, 2020; Zhan *et al.*, 2022; Huynh-The *et al.*, 2023). In creating a peer-to-peer network (Chong *et al.*, 2019; Viriyasitavat *et al.*, 2019; Ragnedda and Destefanis, 2020), the data and transactions (Zuo, 2023) are verified (Morkunas *et al.*, 2019) and securely stored (Murray *et al.*, 2021) on the immutable chronological log (Agbo *et al.*, 2019; Chong *et al.*, 2019) through cryptographic techniques (Zuo, 2023).

3.2 Blockchain technology components

Through its construction, blockchain technology was developed on top of the distributed ledger technology (Andoni *et al.*, 2019; Schlecht *et al.*, 2021), and it provides the blockchain network with a decentralized digital database of transactions (Morkunas *et al.*, 2019). In business terms, there is no single actor that controls and owns the information related to the transactions made in the blockchain (Ølnes *et al.*, 2017; Schlecht *et al.*, 2021). In technological terms, there is no centralized server where all the transaction information is stored (Andoni *et al.*, 2019; Cerchione *et al.*, 2022). All the information saved inside the ledger is stacked inside interconnected and distributed nodes (Alabdulwahhab, 2018; Cerchione *et al.*, 2022; Schlecht *et al.*, 2021), where each node of the network has stored an identical copy of the complete ledger (Ølnes *et al.*, 2017; Schlecht *et al.*, 2021).

The name of the blockchain network comes from the way the ledger is created and maintained. Each transaction and its information are stored on a block (Makhdoom *et al.*, 2019; Huynh-The *et al.*, 2023), which is linked to the previous ones (Alabdulwahhab, 2018; Ali *et al.*, 2020), in a timely manner (Dai *et al.*, 2019; Cerchione *et al.*, 2022), thus creating a chain of information (Alabdulwahhab, 2018). The first block of a blockchain is the genesis block, the foundation of a blockchain (Zia *et al.*, 2020). The new information is stored in a block and linked to the rest of the chain using cryptography (Alabdulwahhab, 2018; Chong *et al.*, 2019; Schlecht *et al.*, 2021; Cerchione *et al.*, 2022; Huynh-The *et al.*, 2023). The cryptographic algorithms used (Schlecht *et al.*, 2021) ensure a block with a unique cryptographic signature (Morkunas *et al.*, 2019), composed of the digital signature and its cryptographic hash (Pournader *et al.*, 2020; Ratta *et al.*, 2021), which guarantees the integrity and authenticity of the record encrypted, and in this way, they create a cryptographic link to the previous blocks in the chain (Chong *et al.*, 2019).

A transaction on the blockchain is made following a series of steps, which will be respected each time; otherwise, the transaction and the block recorded on will be deemed invalid (Alabdulwahhab, 2018). Therefore, the first step is for the node (actor) to request a transaction to be added to the ledger (Alabdulwahhab, 2018; Morkunas *et al.*, 2019; Schlecht *et al.*, 2021; Zarrin *et al.*, 2021) (Step 1). Further on (Step 2), the data are stored in a block, to which is added a cryptographic signature (or key) (Fernandez-Carames and Fraga-Lamas, 2018; Agbo *et al.*, 2019; Pournader *et al.*, 2020) and becomes a candidate for the ledger (Morkunas *et al.*, 2019; Zarrin *et al.*, 2021). The block is then sent to all the nodes in the network for validation (Morkunas *et al.*, 2019; Schlecht *et al.*, 2021; Zarrin *et al.*, 2021) (Step 3). To validate the block (Ali *et al.*, 2020), all the nodes must verify the authenticity of the cryptographic signature (Alabdulwahhab, 2018; Schlecht *et al.*, 2021) (Step 4). If there is a consensus over agreement on the validity of the block (Agbo *et al.*, 2019; Casino *et al.*, 2019; Schlecht *et al.*, 2021), it will be added to the most recently verified block in the chain (Alabdulwahhab, 2018), always following the longest chain in the ledger (Morkunas *et al.*, 2019; Zarrin *et al.*, 2021) (Step 5). If all the steps are run through, the transaction will be completed, and the asset will be transferred between the two parties (Morkunas *et al.*, 2019; Schlecht *et al.*, 2021; Zarrin *et al.*, 2021) (Step 6). Once the transaction is completed, the block is added to the blockchain and is unalterable and undeletable for any participants (Bodkhe *et al.*, 2020).

The consensus mechanisms are among the main technological innovations accompanying blockchain (Lim *et al.*, 2021). This part of the technology is a set of rules (Makhdoom *et al.*, 2019) describing how blocks are accepted and added into the distributed ledger (Hasselgren *et al.*, 2020; Ratta *et al.*, 2021). Being decentralized, the mechanism that allows block validation must include participation from all authorized nodes (Bodkhe *et al.*, 2020; Feng *et al.*, 2020; Zia *et al.*, 2020), establishing trust among them (Lim *et al.*, 2021). There are many types of consensus mechanisms, but the most known are proof-of-work (PoW) and proof-of-stake (Zia *et al.*, 2020). PoW was developed along with the first iteration of the blockchain (Nakamoto, 2008) and is a computational process similar to a puzzle or a mathematical problem (Panarello *et al.*, 2018; Casino *et al.*, 2019; Zia *et al.*, 2020). The nodes compete against each other, and the one to solve first will be the one creating the next block (Huynh-The

et al., 2023). However, PoW was very demanding in terms of electricity consumed (Casino *et al.*, 2019; Hasselgren *et al.*, 2020). Therefore, PoS was developed as a response, needing less computational power than PoW (Fernandez-Carames and Fraga-Lamas, 2018; Zia *et al.*, 2020). Focusing on the assumption that people would be less likely to be dishonest if there are high stakes involved (Makhdoom *et al.*, 2019), PoS implies proof of ownership for participation in the mining process (Dai *et al.*, 2019). The node to solve the computation is randomly chosen, based on the stake presented by the miners (Panarello *et al.*, 2018). Once the validation is completed, the validator gets a reward and the stakes are reset for everyone to get another chance at the next mining (Panarello *et al.*, 2018; Makhdoom *et al.*, 2019).

3.3 Types of blockchains

Most blockchains can adopt a public, private or permissioned governance structure (Chong *et al.*, 2019). The types are distinguished in terms of user access (Zarrin *et al.*, 2021) and scheme of ledger sharing (Viriyasitavat and Hoonsopon, 2019).

Public, open or permissionless blockchains allow open participation (Casino *et al.*, 2019; Ali *et al.*, 2020; Zarrin *et al.*, 2021) for the users, meaning that anyone can become an actor and/or node and access and maintain the ledger (Fernandez-Carames and Fraga-Lamas, 2018; Agbo *et al.*, 2019; Viriyasitavat *et al.*, 2019) unconditionally (Makhdoom *et al.*, 2019). The network participants are using pseudonyms or are entirely anonymous (Morkunas *et al.*, 2019), but are still allowed full access and transparency to the ledger (Chong *et al.*, 2019; Morkunas *et al.*, 2019; Viriyasitavat *et al.*, 2019; Murray *et al.*, 2021; Zarrin *et al.*, 2021). However, to keep the blockchain valid, it relies on the nodes to maintain the records of transactions (Viriyasitavat and Hoonsopon, 2019), using a consensus mechanism (Dai *et al.*, 2019; Morkunas *et al.*, 2019; Viriyasitavat and Hoonsopon, 2019). For the maintenance of a distributed ledger on a larger scale (Morkunas *et al.*, 2019), the blockchain demands a large amount of computational power (Morkunas *et al.*, 2019) and will need a longer period to finalize a transaction (Casino *et al.*, 2019; Makhdoom *et al.*, 2019). Such a blockchain can be achieved by constructing a large network made up of numerous nodes. Being generally used for cryptocurrencies, known examples of public blockchains are Bitcoin, Litecoin, Ethereum and Ripple (Fernandez-Carames and Fraga-Lamas, 2018; Agbo *et al.*, 2019; Makhdoom *et al.*, 2019; Morkunas *et al.*, 2019; Ali *et al.*, 2020; Hasselgren *et al.*, 2020; Pournader *et al.*, 2020; Zarrin *et al.*, 2021).

Conversely, private or closed blockchains will allow only some users to partake in the network (Agbo *et al.*, 2019; Chong *et al.*, 2019; Morkunas *et al.*, 2019; Viriyasitavat *et al.*, 2019; Viriyasitavat and Hoonsopon, 2019; Zarrin *et al.*, 2021). To participate, they must be prevalidated by a predefined group of nodes (Viriyasitavat and Hoonsopon, 2019; Ali *et al.*, 2020), which are part of the same group (Zarrin *et al.*, 2021) and act as an authority (Viriyasitavat *et al.*, 2019). Due to this fact, private blockchains have a lower degree of decentralization (Agbo *et al.*, 2019; Zarrin *et al.*, 2021) and are ideal for use inside of a closed system, where all nodes can be trusted (Casino *et al.*, 2019; Viriyasitavat *et al.*, 2019) and their IDs are known (Makhdoom *et al.*, 2019), generally inside a company (Morkunas *et al.*, 2019) or inside a nation's government (Ali *et al.*, 2020). Since the private blockchains are running a closed network, they not only offer more transaction privacy and security and are fitted for sensitive data (Morkunas *et al.*, 2019), but also permit making changes to the blockchain if there is a consensus among the leader nodes (Li *et al.*, 2019).

Permissioned or consortium blockchains are acting as a hybrid between the public and open models (Casino *et al.*, 2019; Makhdoom *et al.*, 2019; Viriyasitavat *et al.*, 2019; Viriyasitavat and Hoonsopon, 2019; Zarrin *et al.*, 2021), being partially decentralized (Makhdoom *et al.*, 2019; Hasselgren *et al.*, 2020). They are similar to the private blockchain, due to the authority over the participation being handled to a select group of users, known as a consortium (Viriyasitavat *et al.*, 2019; Viriyasitavat and Hoonsopon, 2019; Ali *et al.*, 2020; Zarrin *et al.*, 2021). Ideally implemented in a system that consists of a few enterprises (Makhdoom *et al.*,

2019; Viriyasitavat and Hoonsoopon, 2019), the users that are part of the consortium are not from the same group, as in the private blockchains, but from more groups that are part of the network (Viriyasitavat *et al.*, 2019). The degree of data openness varies (Viriyasitavat and Hoonsoopon, 2019), being controlled by the consortium.

3.4 Affordances of blockchain

Blockchain technology presents multiple characteristics and features, but it is needed to come to an understanding of how these features influence the usage of blockchain and the value they create when put in use in a certain environment. Applying the theory of affordances (Gibson, 1977), it can be concluded that individuals perceive the following affordances when using the blockchain:

- (1) *Decentralization*: Being its most preeminent feature (Dai *et al.*, 2019; Huynh-The *et al.*, 2023), in a decentralized network, the blockchain creates decentralized governance, meaning that it prevents any entity from accumulating enough power to create a monopoly (Viriyasitavat and Hoonsoopon, 2019; Ali *et al.*, 2020), and instead grants equal voting rights and power to each node of the network (Zarrin *et al.*, 2021; Zheng and Lee, 2023).
- (2) *Auditability*: One important affordance of the blockchain is having the possibility to trace and verify the transactions and events occurring (Dai *et al.*, 2019; Viriyasitavat and Hoonsoopon, 2019; Zarrin *et al.*, 2021). This characteristic later ensures transparency (Pournader *et al.*, 2020) and partial accountability within the network. It is facilitated by the inclusion of time-stamped records into the information imprinted into the blockchain nodes (Viriyasitavat and Hoonsoopon, 2019; Zarrin *et al.*, 2021). This concept can be understood as leaving a discernible footprint on each transaction within the blockchain network (Zarrin *et al.*, 2021).
- (3) *Persistency*: The persistency of transactions documented in a blockchain ledger is a result of their widespread dissemination across the network, with individual nodes autonomously managing and controlling their records (Viriyasitavat and Hoonsoopon, 2019).
- (4) *Transparency*: The blockchain is offering the possibility of a decentralized network, where all the information regarding the transactions is stored on public ledgers (Dai *et al.*, 2019; Chen and Bellavitis, 2020; Murray *et al.*, 2022). Using the public ledgers, decentralized networks engender distributed trust and accountability (Chen and Bellavitis, 2020; Ray, 2023) due to the information stored on blockchain being immutable and traceable (Chang and Chen, 2020a; Murray *et al.*, 2022).
- (5) *Interoperability*: Even though full interoperability between blockchains remains unrealized, projects developed on the same public blockchain benefit a lot from interoperability (Chen and Bellavitis, 2020). In order to fulfill the various services, there are projects, which aim to interconnect blockchains, to get closer to full interoperability (Chen and Bellavitis, 2020). The affordance appears due to using open standards and protocols, where developers dismantle existing information silos and foster data sharing and collaborations (Ray, 2023; Zuo, 2023).
- (6) *Anonymity and privacy protection*: Blockchain's design allows users to maintain anonymity by unlinking their real-world identity (Viriyasitavat and Hoonsoopon, 2019) from their unique system-generated ID (Zarrin *et al.*, 2021). Some systems (Ethereum and Bitcoin) generate a new ID or address for each transaction (Zarrin *et al.*, 2021), which is not linked to the previous one, enhancing privacy and eliminating the necessity for a central entity to manage the private information (Viriyasitavat and Hoonsoopon, 2019). Private or permissioned blockchains mandate ID verification

(Viriyasitavat and Hoonsoapon, 2019) and users must authorize access to private information (Zheng and Lee, 2023), thus promoting privacy protection. Even though absolute security is never given (Xu *et al.*, 2019), blockchain minimizes data breach risks.

3.5 Limitations to blockchain usage and adoption

Even though the usage of blockchain technology allows for multiple mentioned benefits for a company, it can also present some limitations in its usage and adoption. The following were extracted from the selected papers:

- (1) *Storage and scalability*: Simply adopting a blockchain protocol is insufficient for a decentralized web, since storage represents one of the main limitations for the blockchains (Alabdulwahhab, 2018). This comes hand in hand with the problem related to scalability. Every transaction must be confirmed by a trusted (Panarello *et al.*, 2018) central node, where the problem would be caused by the rising number of transactions that occur every day (Zarrin *et al.*, 2021). The bottleneck issues stem from the block sizes, which are limited to 7 transactions per second (Zarrin *et al.*, 2021). By implementing relevant technologies such as graph-chain, parallel mining can help to overcome the bottleneck (Zarrin *et al.*, 2021).
- (2) *Privacy*: Another issue is that both the public and private keys can be compromised, even though the blockchain's innate security provides anonymity for the user by hiding both keys (Zarrin *et al.*, 2021). Both of these keys can be extracted to show private information about the user, while the keys can be exploited to delete stored information in the nodes (Zarrin *et al.*, 2021). The identity tracing is the result of the nodes using the same address constantly, since the blockchain does not refresh a new false address for the node.
- (3) *Cost issues*: It can be expensive to establish distributed trust in decentralized platforms. In order to use blockchain technology, the decentralized network makes the information stored publicly available to all the actors, using distributed consensus to confirm information, and stores redundant information among users (Chen and Bellavitis, 2020). Preparing, processing and storing information can become much more expensive when dispersed trust is established (Chen and Bellavitis, 2020). Because of this, distributed trust frequently has comparatively high costs, which may restrict its use.
- (4) *Lack of accountability*: Accountability may be lacking in a decentralized ecosystem. It proves difficult to determine who should be held responsible for certain wrongdoings when central bodies are minimally or non-existent. No central party has the authority to stop transactions, solve issues and resume regular operations when issues occur (Chen and Bellavitis, 2020). A decentralized system may be severely constrained in the absence of adequate accountability.

4. Discussion

Following the results of the review, a discussion can be made on the paradigms used when developing studies on Web 3.0 and the blockchain area. Three main paradigms have been identified throughout the analyzed studies: the business paradigm, the technological paradigm and the combined paradigm.

- (1) *Business paradigm* – The exclusive choice to use a business paradigm is the rarest of the three. Analyzing a subject such as “Web 3.0,” without affording due attention to its technological aspects proves to be quite difficult. However, this type of overview can

be considered when the focus of the research paper considers aspects such as characteristics and affordances of the blockchain in Web 3.0. Another use of this paradigm would be popular when the focal points are the business applications, which arise from the usage of Web 3.0 technology.

- (2) *Technological paradigm* – A common inclination when researching in the technological field is evidently present within the area of Web 3.0 as well. When looking to explain the way the blockchain technology functions, researchers usually direct their attention towards the technological aspects that enable it to work properly. Concepts such as encryption, cryptography, digital signatures and validation cannot be understood and explained under the business paradigm.
- (3) *Combined paradigm* – Being the most present in the field of Web 3.0, the combined paradigm is the approach to use when not dealing with the theoretical aspects. It is widely known that Web 3.0 technology and, in particular, blockchain have taken the business world by storm by providing a new way of governance for information. Therefore, each research that considers a case study of the usage of blockchain falls into the combined paradigm. The researchers correlate terminologies from both previous paradigms, intricately interweaving theoretical underpinnings and practical applications. This complex approach allows for a comprehensive explanation of the novelty of the new applications and highlights the benefits of their usage.

5. Conclusions and future research

Coming as the basis of Web 3.0, blockchain technology was revolutionary and disruptive for the sectors where it emerged (finance), therefore calling for a more in-depth look at the subject. Three main categories of definitions are given, which are mainly split into business and technological and a combination of the two. The main feature of the technology is being decentralized, not needing a central authority to manage the information but having a constantly updated distributed ledger, and it builds up the information on the ledger by using consensus mechanisms for verification. The steps of adding information to the ledger are always the same, and the process is described thoroughly.

It can be concluded that Web 3.0 is creating complex opportunities for the business sector. Through its characteristics and affordances, it promises to entirely change the way the businesses work. Business practitioners looking to enter the blockchain sector can leverage blockchain's transparency to address trust issues by making processes clearer and verifiable. This can solve insufficiencies in sectors such as healthcare or supply chain (Chang and Chen, 2020a, b). Through its structure, permissioned blockchains can streamline collaboration across businesses, creating shared and secured data environments that gain value in the financial sector and logistics (Pournader *et al.*, 2020). Intergovernmental communication can be done through consortium blockchains (Ølnes *et al.*, 2017), while intragovernmental communication is facilitated by private blockchains (Ali *et al.*, 2020). Blockchain cannot only be added to existing businesses but also can stand ground for new emerging business models, such as Decentralized Autonomous Organizations, which use the consensus mechanisms for governance (Huynh-The *et al.*, 2023).

However, there are also less-positive aspects of blockchain technology, coming in the form of certain limitations to the capacities of the technology. The ones identified are storage and scalability issues, privacy issues, cost issues and a lack of accountability for possible problems.

Through them, it lays the ground for numerous possible future works. When focusing on the business perspective, understanding where the future of blockchain technology extends while setting aside the popular and studied finance sector and its cryptocurrencies. Another direction of future research regards constantly evolving business models and what role blockchain has in impacting their development and changes.

This analysis of Web 3.0 and blockchain-related papers has revealed the main concepts business practitioners and researchers who are starting their blockchain journey should consider. This introductory study in the field of blockchain should be followed by more specific analyses concerning the adoption of blockchain in different industries.

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