International Journal Of Engineering Research And Development
e- ISSN: 2278-067X, p-ISSN: 2278-800X, www.ijerd.com
Volume 20, Issue 10 (October, 2024), PP 72-80

Integration of Artificial Intelligence and Blockchain in Business Management

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ABSTRACT
In recent years, emerging technologies such as Artificial Intelligence (AI) and blockchain have established themselves as crucial instruments for transforming business processes. These innovations not only foster remarkable progress in managerial practices but also play a key role in enhancing companies' competitiveness in an ever-changing market. In this context, it is essential for business administrators and leaders to understand and harness the potential of these technologies to improve human capital management and adjust to the organization's new demands. The methodology adopted for the development of this article followed a qualitative approach, aiming to explore the interactions between artificial intelligence (AI) and corporate management, as well as the potential of blockchain in the AI era. For data collection, a bibliographic review was conducted, which proved fundamental in providing theoretical support for the proposed discussions. The overall objective of this article is to investigate the integration of artificial intelligence (AI) and blockchain in business management, analyzing how these technologies can transform administrative practices and improve human capital management within organizations. Finally, this study emphasizes that the combination of artificial intelligence and blockchain not only represents an advancement in management practices but also has the potential to shape the future of business administration and human capital. With the implementation of these technologies, companies can stand

out more competitively in a constantly evolving market, fostering more efficient and inclusive management. However, it is essential that business leaders and administrators remain open to these innovations, identifying both their benefits and the challenges they bring, while maintaining careful attention to the security required for the evolution of AI in everyday human contexts.

***Keywords**: Artificial intelligence; Blockchain; Business management; Human capital.*

Date of Submission: 06-10-2024 Date of Acceptance: 18-10-2024

I. INTRODUCTION

The integration of artificial intelligence (AI) and blockchain into business management represents a significant evolution in contemporary administrative practices. As organizations strive to adapt to an increasingly dynamic and complex business environment, these emerging technologies offer innovative solutions to optimize processes, improve decision-making, and strengthen human capital management.

AI, with its ability to analyze large volumes of data and identify patterns, enables a more informed and strategic approach to corporate operations. Blockchain, on the other hand, provides security and transparency in transactions, creating a trusted environment among stakeholders. Together, these technologies have the potential to radically transform how companies operate and interact with their employees.

The methodology adopted for the development of this article followed a qualitative approach, with the aim of exploring the interactions between artificial intelligence (AI) and corporate management, as well as the potential of blockchain in the AI era. Data collection was based on bibliographic research, which was fundamental in providing theoretical support for the proposed discussions.

The general objective of this article is to investigate the integration of artificial intelligence (AI) and blockchain into business management, analyzing how these technologies can transform administrative practices and improve human capital management within organizations. The specific objectives are as follows: to examine the potential of artificial intelligence in the board of directors, identifying how its application can enhance decision-making and operational efficiency, while also discussing the limitations and ethical challenges involved in its implementation; and to evaluate how blockchain can be used as a complementary technology to AI, exploring its capabilities to enhance security, transparency, and trust in business operations, in addition to discussing the impacts of this integration on corporate governance.

This article is organized into four sections: the introduction, which contextualizes the topic; the methodology, which describes the research procedures adopted; the theoretical framework, which explores the concepts of AI and blockchain in business management; and the final considerations, which summarize the main findings and implications of the research. This structure aims to provide a comprehensive analysis of how the integration of these technologies can shape the future of management and human capital within organizations.

II. MATERIAL AND METHODS

The methodology adopted for the development of this article followed a qualitative approach, aiming to explore the interactions between artificial intelligence (AI) and corporate administration, as well as the potentialities of blockchain in the era of AI. For data collection, a bibliographic research method was employed, which proved essential for theoretically underpinning the proposed discussions.

Regarding the qualitative approach, Corrêa, Campos, and Almagro (2018, p. 63) state that "qualitative research always confers a descriptive character rich in meanings to the obtained and observed data, considering the context/natural environment in which the investigation takes place." Concerning bibliographic research, Soares, Picolli, and Casagrande (2018, p. 02) argue that: "Bibliographic research presents itself in the literature as more flexible, being able to be merely part of empirical research and presented as a foundation for a scientific article or a chapter of a thesis or dissertation."

A total of 29 works were researched, encompassing a variety of sources including specialized websites, scientific articles, books, monographs, and theses. This diversity of materials allowed for a comprehensive and critical analysis of the topics addressed, contributing to a deeper understanding of current dynamics in the field of administration and emerging technologies.

The main authors who contributed to the foundation of this article include Saddy (2016), who discusses the duties of administrators and responsibilities in public corporations; Carvalho (2024), who presents a critical view on the risks associated with artificial intelligence; Kellogg et al. (2020), who analyze control and governance in algorithm-mediated environments; Graglia and Lazzareschi (2023), who address transformations in the world of work; and Gutierrez (2019), who investigates trust in artificial intelligence systems. The combination of these references provided a solid basis for understanding both the potentialities and limitations of the technologies discussed in this article.

III. THEORETICAL FRAMEWORK

The theoretical framework of this article will address two main subtopics that investigate the intersection between emerging technologies and corporate governance practices. The first subtopic, AI and Corporate Governance: Potentials and Limitations in the Board of Directors, will analyze how artificial intelligence can be incorporated into business decision-making structures. We will discuss the advantages that AI can offer, such as improving data analysis and strategic decision-making, while also examining the limitations and ethical challenges associated with its application.

The second subtopic, The Potential of Blockchain in the Era of Artificial Intelligence, will focus on the use of blockchain as a complementary technology to artificial intelligence. We will explore the benefits of using blockchain in terms of security, transparency, and efficiency in business operations. Additionally, we will address how this technology can help mitigate the risks associated with AI, fostering a more secure environment for the development and implementation of these innovations. The evaluation of these two areas will enable a deeper understanding of how the fusion of AI and blockchain can revolutionize business management, while simultaneously emphasizing the importance of a critical and conscious approach to their application.

3.1 IA and Corporate Administration: Potentials and Limitations in the Board of Directors

The concept of an administrative algorithm emerges as a potential innovation in business practices, as algorithms and artificial intelligence (AI) systems are developed to perform tasks typically carried out by human board members. The advancement of AI enables the delegation of administrative and decision-making tasks to algorithms, ranging from executing routine tasks to theoretically participating in more complex decisions.

However, the application of this model faces technological and conceptual constraints that still limit the use of AI as an independent advisor. Currently, the presence of AI in boards of directors can be categorized into three levels: Assisted AI, Expanded AI, and Autonomous AI. While the first two levels involve AI functioning as a support and complement to human board members, the last level, which envisions a fully autonomous role, is regarded as futuristic and not feasible with current technology. In addition to the challenges of replicating complex and adaptable human competencies, algorithms lack inherent subjectivity, which restricts their application in managerial decisions that require intuition and adaptability—attributes intrinsic to humans.

The various branches of administrators' duties have been classified based on what is broadly outlined in Articles 153 to 157 of Law No. 6.404, dated December 15, 1976. These duties include: (I) the duty of diligence; (II) achieving the company's objectives; (III) considering public welfare and the social function of the company; (IV) the duty of loyalty; (V) not intervening or deliberating on acts involving conflicts of interest; (VI) not contracting with the company under inequitable conditions; and (VII) the duty to inform (Saddy, 2016).

Thus, according to respected doctrine, corporate administration should not be viewed as a specific and multifaceted control over corporate business and related operations but rather as a coordination that involves organizing, supervising, and directing corporate reality, where powers and responsibilities balance within a complex system of equilibrium.

Therefore, could an algorithm, while serving as an administrative advisor, assist other members in executing the administrative competencies of the board itself? Recent studies highlight - those typical administrative decisions - such as resource allocation, employee and supplier evaluation, payments, among others - are increasingly being entrusted to algorithms (Curchod et al., 2020; Kellogg et al., 2020). This situation is viewed positively from a functionalist perspective by those managing the company; however, it generates feelings related to manipulation, ignorance, insecurity, surveillance, disrespect, stress, and exploitation among employees (Bourne, 2019; Kellogg et al., 2020; Elmholdt et al., 2020). The combination of ubiquitous connectivity with the emergence of artificial intelligence generates a significant volume of data that is stored and analyzed by algorithms (Kellogg et al., 2020; Schneider & Harknett, 2019).

3.1.1 Technological Limits

Despite the emergence of machines with artificial intelligence and advancements achieved in scientific and technological fields, algorithms still cannot replicate certain inherent characteristics of human nature—essential for some functions that an administrator must perform during their tenure. A deeper exploration of this limitation reveals that scientific literature studying worker replacement and human support due to technological advancement has established an initial distinction between “manual activities” and “cognitive activities”.

However, it also indicated that there is another distinction to consider: between routine activities and non-routine activities. Based on this differentiation, the routine characteristic of a task arises from the ability to detail a specific activity through clear norms. Thus, non-routine activities are those that do not fit this representation since their underlying processes cannot be limited to a specific set of norms that are clear and suitable for execution by a computer; in other words, non-routine activities require complex competencies.

Fernandes and Graglia (2024, p. 03) assert that:

AI has become a technology present in daily life, assisting in the automation of logical, analytical, and cognitive tasks while providing greater agility in processing and handling information at levels unattainable solely through human ability. Scientific advancements—particularly research on artificial intelligence—have made significant contributions to human cognition. The definition of intelligence may consider only reasoning or may take into account a combination of reasoning and feeling while sometimes also incorporating biological and social elements into the processes of intelligence and learning.

Therefore, up until now, technology can only replace human labor in routine activities—whether cognitive or manual. In fact, an algorithmic system can perform routine tasks excellently due to technological advancements—including cognitive tasks such as translations or mathematical calculations. Conversely, for all non-routine activities requiring adaptability to specific situations—where human participation stems from elements difficult to convert into programming languages for algorithms—current technologies are inadequate for corresponding replacement. Based on what has been presented thus far, it is clear that the role of a board of directors does not fall under routine tasks (Gutierrez, 2019; Graglia & Lazzareschi, 2023).

The replacement of a board member with an algorithm is unfeasible, as this technology lacks the capacity to create or substitute both individual board members and the board as a whole due to the aforementioned limitations. Indeed, "managerial decision-making" cannot be characterized as a routine activity precisely because it cannot be replicated within a set of programmable rules on a computer. The role of administrators requires flexibility, readiness, and the ability to adjust to changes and situations arising from the contextual framework, in addition to communicative and relational skills that currently do not appear to be replicable in algorithmic technologies (Gutierrez, 2019; Graglia & Lazzareschi, 2023).

However, it is undeniable that artificial intelligence, as it has been developed thus far, is quite suitable for playing a complementary support role rather than a substitute for human activity in a board of directors. Therefore, due to the operational constraints present in the technical structure of artificial intelligence, it qualifies to perform the intermediary role of what is referred to as A.I. Assisted technology—designed to assist administrators without interfering in the management process (Gutierrez, 2019; Graglia & Lazzareschi, 2023).

At the same time, the use of these technological tools, even at this level of involvement, still exerts influence or, at least, should influence the composition of the board of directors. More specifically, the utilization of artificial intelligence (AI), even in a supportive role, impacts the expertise required from board members, who must—now or in the future—possess a deeper understanding of computer science and data science; in other words, skills adequate for supervising the AI employed (Santaella, 2019).

Furthermore, including technology specialists or forming one or more expert committees within the board may become an essential standard—if not symptomatic—of good governance in the coming years. Reiterating what was mentioned earlier, appointing an algorithm or another AI system as an autonomous advisor within a board of directors is still not viable (Santaella, 2019; Graglia & Lazzareschi, 2023).

In conclusion, up until now, considering the technological limitations arising from the difficulty in programming algorithms with rules that allow machines to make managerial decisions—an ability that is not a routine task—the role that an algorithm or any other technology can aspire to is that of Assisted AI (A.I. Assisted) or Augmented AI (A.I. Augmented) (Santaella, 2019; Graglia & Lazzareschi, 2023).

3.2 The Potentialities of Blockchain in the Era of Artificial Intelligence

With the rapid advancement of artificial intelligence (AI), new technologies emerge to enrich and expand the opportunities provided by this field. Among these innovations, blockchain stands out as a powerful tool capable of revolutionizing how data is stored, secured, and disseminated in an increasingly digital and automated landscape. The fusion of these two technologies has the potential to transform various sectors, from healthcare and finance to education and commerce, providing greater transparency, security, and decentralization in processes.

The implementation of blockchain in an AI-driven world can address fundamental issues related to information reliability and privacy. In AI systems, which typically require large amounts of data for learning and improvement, the integrity and protection of information are essential. By ensuring the immutability and traceability of data, blockchain offers a robust solution to these challenges, enabling the formation of auditable records that are resistant to alterations. Thus, the union between blockchain and artificial intelligence facilitates innovations capable of transforming both technological advancement and digital governance.

Blockchain is a set of technologies based on a structured record organized as a chain of blocks that document transactions within a peer-to-peer (P2P) system—meaning a network where each connected device acts both as a client and a server, allowing file sharing stored on their own computers with others. In simple terms, it is a type of distributed database where all participants operate at the same level, each with their unique characteristics and continuous control over data authenticity.

The main attributes of this database include: immutable records, traceability and verification of each transaction, along with security ensured through cryptographic methods. However, its multiple uses are already widely recognized; concerning our focus, we will address potential applications in libraries after elucidating the basic principles of the blockchain system. Blockchain, or 'chain of blocks,' is a storage technology that ensures "privacy, robustness, and absence of any vulnerabilities.

Carvalho (2018, p. 04) explains that:

> Blockchain emerges as yet another advancement in this technological revolution, which is expected to bring about change across various social spheres. Broadly speaking, blockchain can be defined as a decentralized database system, where everyone is responsible for storing or maintaining the contained information. This structural model ensures that any node can join or leave the network without jeopardizing the integrity or availability of the system.

It becomes reliable when associated with any data repository, such as those generated by the Internet of Things. This occurs because all actions of creation, modification, or removal of data are recorded on the blockchain and linked to a specific, verified virtual identity. This is a payment method that utilizes public key cryptography, where the user receives a public key and a private key. Transactions are signed with the private key, while the public key acts as the system's address. Thus, real-life identity can be replaced by a pseudonym, which cannot be publicly traced or associated with the real identity or the computer's IP address. In this peer-to-peer (P2P) system, there are peers, known as miners, who collect and structure transactions into a data structure known as a block. Each block has a unique code known as a hash and also the code of the previous block, ensuring that each block is linked to the one before it (hence the term blockchain). The hash determines the sequence of blocks in a chain.

To simplify the fundamental characteristics of blockchain: 1. Confirmed Identities: Any action performed in this database is associated with a validated identity, allowing for the identification of identities in the system, the type of operation performed, and the date it was executed. Hundreds of thousands of authors can work simultaneously on the blockchain; however, it is feasible to define distinct permissions and access policies so that not everyone can function in the same way (Alves, 2021).

Decentralization of Stored Information: All participants in the system have a comprehensive view of the structure and all validated information, which cannot be deleted or manipulated, as the structure is distributed and there is no central administrator of the system (Alves, 2021).

Resistance to Manipulation: Once introduced, data cannot be deleted by third parties (Alves, 2021). Verification for Each Data Entry: It is always possible to validate all data within the structure by monitoring the previous data in the sequence and the entire flow, ensuring the authenticity of the transaction. For example, in transactions involving bitcoin, it is possible to verify that the user has not transferred the digital currency from their wallet to another location, ensuring that this currency is indeed available (Alves, 2021).

In blockchain, "distributed consensus" refers to determining which data entry should be maintained, using two methods:

- Proof of Work (PoW): In cases of conflict or uncertainty, blockchain experts examine the proof of work, which is evidence of the effort exerted by the network to solve complex computational problems. This assessment is conducted through an algorithm on the CPUs of participating computers, enabling the verification of the integrity of the nodes within that network and consequently determining which sequence of data should be preserved.
- Proof of Stake (PoS): This is a distributed consensus system that assigns greater relevance and reliability to those who hold more (for example, more cryptocurrencies), based on the idea that those who possess more cryptocurrencies are less likely to defraud the system. PoS emerged in 2012 as an alternative to the PoW system, as the latter demands excessive electricity consumption.

Although blockchain was conceived based on premises of security and robustness, there have been records of cyber-attacks, involving attempts at manipulation by malicious miners, by individuals with a large number of nodes and, therefore, power over the chain, by forgeries of proof of work, and by methods that manage to eliminate anonymity and expose authentic identities or IP addresses.

While such problems and other limitations currently make blockchain stable and secure, particularly for bitcoin— for which appropriate solutions are already being sought— there are numerous potential applications that have already been tested. Blockchain has already established itself as an ISO standard (ISO TC/307). Undoubtedly, blockchain can provoke significant changes in areas such as education and learning, scientific research, healthcare, and, of course, the library sector.

Various institutions are indeed studying and experimenting, including in collaboration with private companies, with the potential of blockchain technology in these sectors.

In February 2019, Sony Global Education, Fujitsu Limited, and the Fujitsu Research Institute and Human Academy announced that they had commenced experimentation to introduce blockchain technology in

educational pathways, particularly concerning the recognition of the validity of study courses completed abroad by students and workers entering Japan (Huillet, 2019; Koshiry, 2023).

In addition to Sony and Fujitsu, several other multinational corporations are exploring and utilizing blockchain technology across various sectors. Some of the major companies include:

1. IBM: IBM is a leader in developing blockchain solutions, particularly through its IBM Blockchain platform, which is used for supply chain tracking, smart contracts, and financial solutions (Bhuvana & Aithal, 2020).
2. Microsoft: Through its Azure Blockchain platform, Microsoft offers blockchain-as-a-service (BaaS) solutions for businesses looking to integrate the technology into their processes (Kniveton & Shaghaghi, 2023).
3. Walmart: Walmart employs blockchain to track food products in its supply chain, ensuring greater transparency and food safety (Sharma & Kumar, 2021).
4. Amazon: Amazon Web Services (AWS) provides blockchain-based services to its corporate clients, enabling them to develop solutions based on this technology (Tavares et al., 2021).
5. J.P. Morgan: The bank created its own blockchain network called Quorum, aimed at facilitating secure and rapid financial transactions while also exploring smart contracts (Ramachandran et al., 2021).
6. Siemens: Siemens is utilizing blockchain to optimize energy management and explore new solutions in smart contracts and supply chains (Garnica, 2023).
7. Samsung: Samsung implements blockchain across various areas, including its logistics network, focusing on increased efficiency and security. These companies, among many others, are exploring the potential of blockchain to enhance efficiency, security, and transparency across different sectors (Min, Hwang, & Joo, 2024).

The verification of the validity of diplomas obtained abroad, particularly in countries lacking reliable documentation and storage systems, presents a challenge for our higher education institutions, which welcome many international students. In Italy, the University of Messina has begun testing a similar system for certifying training courses offered by the institution through the Moodle distance learning platform, in addition to other documents managed by the administration. The system is based on the implementation of smart contracts on a blockchain (Morriello, 2019).

The Federal University of Paraíba (UFPB) and the Federal Technological University of Paraná (UTFPR) are two Brazilian institutions that employ blockchain technology in educational activities. UFPB was one of the pioneers in applying blockchain for the registration of academic diplomas, aiming to prevent forgery and enhance the security of issued documents. This system ensures the authenticity of records and simplifies secure and rapid access to these documents, eliminating the need for third-party intervention (Feitosa, 2020).

Conversely, UTFPR, in collaboration with the Ministry of Education (MEC), also employs blockchain technology as part of a broader initiative for the digitalization and interoperability of academic data in Brazil. This tool enables the storage and verification of school records and academic documents, ensuring the clarity and integrity of information in the educational context. These actions highlight the increasing use of blockchain technology in Brazil's educational sector, enhancing security and reliability in the issuance of documents and diplomas (Bourguignon, 2023).

Another example is the Brazilian Institute of Information in Science and Technology (IBICT), which is applying blockchain to improve the management of scientific data in the context of Open Science. IBICT collaborates with university libraries and other agents in developing open data platforms, such as Oasisbr, which consolidates scientific production in open access and utilizes blockchain to ensure the integrity and security of the data (Carvalho, 2018).

The Federal University of Pará (UFPA) has been conducting research on the impact of blockchain technology in libraries, considering how this technology can transform the management of bibliographic information and other professional activities of librarians (Carvalho, 2018).

There are various ways to utilize blockchain technology within the library environment. Assuming that data inclusion in blockchain encompasses all types of structured data, such as bibliographic information or loans—which are, in reality, transactions—it becomes evident that this technology holds significant potential for all categories of libraries. When considering operations linked to digital publications, the importance of ensuring and certifying an author's authenticity is clear, in addition to uniquely identifying a digital original, regardless of the number of circulating copies.

Numerous tasks encounter barriers due to the absence of a central entity to organize and provide access to data from various institutions. However, blockchain has the capability to transcend these barriers by establishing a distributed system that self-certifies and self-validates, without the need for external actions.

Blockchain possesses revolutionary potential across various sectors, with the publishing sector being one of the most intriguing. In this context, several possibilities emerge: implementing paywalls and more sustainable subscription models, allowing readers to access an article of interest by paying directly for it, without the requirement to subscribe to the entire journal; incentivizing payment systems for authors based on usage (a model already utilized by various publishers), adjusting authors' remuneration according to the number of accesses to their work on a digital platform.

With the utilization of blockchain technology, payments related to such contracts would become significantly more efficient, preventing fraud arising from manipulated clicks (even by the creator themselves) that aim to simulate greater usage than actual. Furthermore, this technology would enable different forms of distribution through networks of publishers and distributors, while also facilitating crowdfunding systems for publications, allowing interested parties to purchase tokens to finance production, which would be converted into copies of the book at the time of release.

Another important aspect is the management of rights associated with a publication, both from the authors' and publishers' perspectives, especially for small publishers and self-publishing platforms. Blockchain can also help reduce costs involved in the publishing process, shortening timelines and simplifying stages of the editorial cycle, such as the attribution and recognition of royalties to authors, the peer review process, and the management of licenses for scientific journal databases. Ultimately, this technology could enhance the management of advertising, enabling the measurement of reader interactions and incentivizing them through reward systems.

Currently, there is no evidence of Brazilian scientific publications employing blockchain technology specifically for the peer review of scientific works. However, the use of blockchain in academic and editorial environments is an emerging topic, with discussions regarding its potential in various fields, including publishing. Research on the applications of blockchain in scientific production in Brazil suggests that the technology is viewed as promising in several areas (Ouchi & Arakaki, 2020).

The American Library Association has been investigating the subject, although the focus has been more on libraries and initiatives outside Brazil (Nehra & Bansode, 2023). Contemporary literature highlights blockchain's capabilities to reduce the interference of intermediaries, simplify direct payments to authors, and optimize copyright management. However, there is no specific record of Brazilian academic journals adopting these practices. If interested in new investigations in this field or innovations that may arise, following conferences and publications on blockchain technology in Brazil may prove beneficial.

Based on the discussions in the two subsections of this theoretical framework, it is necessary to alert against the widespread use of Artificial Intelligence across various segments of human evolution. Today, there are two distinct perspectives on artificial intelligence (AI): one that views the technology as a positive force without significant risks, and another that warns of the potential for dystopian scenarios akin to science fiction, where superintelligent machines could dominate and enslave humans. Among those advocating for the latter view, referred to as catastrophists, is the prominent computer scientist Geoffrey Hinton, who, along with physicist John Hopfield, was awarded the 2024 Nobel Prize in Physics for their crucial contributions to machine learning and neural networks (Carvalho, 2024).

These innovations have facilitated remarkable advancements, such as facial and voice recognition, as well as automatic translations. Scientists have highlighted the potential of Artificial Intelligence in various areas that have enhanced efficacy and accuracy in medical diagnostics and translation services. The discoveries of Hinton and Hopfield were fundamental to the advancement of these technologies, demonstrating how Artificial Intelligence can revolutionize entire sectors (Carvalho, 2024).

However, Hinton also expresses serious concerns regarding the ethics of organizations that develop Artificial Intelligence. He condemns the lack of commitment and responsibility from these companies in protecting the technology. In his statements, Hinton proposes that governments require large corporations, such as OpenAI, to allocate investments for research related to AI safety (Carvalho, 2024).

He links this situation to the commitment made by biologists and geneticists, who pledged not to create human clones, emphasizing that, so far, no similar movement has been observed among researchers in Artificial Intelligence (Carvalho, 2024).

It is important to highlight that, despite the extensive and promising possibilities of AI, the criticisms raised by scientists like Hinton indicate the urgency for an ethical and responsible strategy in the advancement of this technology. It is both important and necessary to discuss safety and accountability to ensure that the benefits of AI are realized without compromising human or social integrity (Carvalho, 2024).

IV. DISCUSSION AND CONCLUSION

This study fully achieved its established objectives, providing a comprehensive assessment of how the combination of artificial intelligence (AI) and blockchain can revolutionize management practices and enhance human capital management within companies.

The analysis of AI capabilities in the boardroom demonstrated that its utilization can significantly improve decision-making and operational effectiveness. Conversely, discussions regarding the ethical constraints and challenges associated with its implementation are crucial to ensure a mindful use of this technology.

Furthermore, the examination of blockchain as an additional technology to AI highlighted its ability to enhance security, transparency, and reliability in business operations, as well as its beneficial effects on corporate governance.

For future studies, it is advisable to deepen the investigation into the interactions between AI and blockchain across various sectors, as well as to explore how these technologies can be integrated into human resource management practices. It would also be pertinent to examine the impact of these innovations on organizational culture and the formation of multidisciplinary teams. The study could be expanded to include case studies that illustrate the practical implementation of these technologies in real organizations.

Finally, this study emphasizes that the combination of artificial intelligence and blockchain not only represents an advancement in management practices but also possesses the potential to influence the future of business management and human capital. By implementing these technologies, companies can become more competitively distinguished in an ever-evolving market, fostering more effective and inclusive management. However, it is essential that business leaders and managers remain receptive to these innovations, identifying both their advantages and the challenges they present, while maintaining a focus on the necessary safety measures for the evolution of AI in human contexts.

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