

An Overview of the Applications of Blockchain and AI in Business

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Abstract: One way that the various business operations could be enhanced as a result of the increasing firm evolution and the most recent Artificial Intelligence is the capacity to create new forms of cooperation (AI). The supply of brand services and even some innovative types of employee and consumer interactions in the workplace are made possible by these rapidly evolving technologies. Because to AI digitization, businesses were simultaneously pushed to focus on their current strategies and actively look for new market opportunities on a regular basis. Although increasing emphasis is being paid to digital technology research in the context of corporate innovation, blockchain technology can safeguard data privacy. BI-AIBT, or business innovation based on blockchain technology and artificial intelligence, is presented in this study with the goal of enhancing business operations and maintaining safe client interactions. Two distinct business sectors comprise a limited number of significant respondents for the collection of qualitative empirical data. BI-AIBT has been examined by contrasting and comparing the ways in which digitization has impacted proposals, business capture, and value development. Concerns about business effectiveness and employee relations can also be resolved with BT's assistance. The experiment's findings demonstrate how digital transformation—which is widely regarded as essential—strengthens business innovation efforts. The numerical result supplied by BI-AIBT improves the ratios for customer behavior analysis (96.3%), customer satisfaction (97.2%), product quality (98.3%), firm development (98.9%), and demand projection (97.1%). Blockchain and artificial intelligence (AI) are the two disruptive technologies of the Fourth Industrial Revolution (IR4.0) that have significantly altered the market. The development of new business models enabled by digitalization holds great potential with the application of blockchain and artificial intelligence. Although there has been research on the usage of blockchain in conjunction with AI, nothing is known about the benefits of this combination for businesses. In an attempt to bridge this gap, this paper explores the benefits and uses of hybrid blockchain and artificial intelligence systems across several industry sectors. This research use bibliometric analysis to determine the essential works on the subject matter based on publications, citations, and significance in the academic community. The conceptual framework of the study is revealed through content analysis, and it is underpinned by four main theme clusters that are focused on supply chains, healthcare, secure transactions, and finance and accounting. Ten possible commercial uses for these technologies are listed in the study's conclusion. Artificial intelligence (AI) algorithms find application in personalized therapy in healthcare, drug development, and global health epidemic forecasting, such as in the case of the ongoing COVID-19 pandemic. Machine learning (ML), a branch of artificial intelligence, enables computers to learn and grow without explicit programming. Machine learning (ML) algorithms have the ability to evaluate massive amounts of data, or "Big data," from electronic health records in order to prevent and identify disease. Wearable medical technology tracks and stores health data on the cloud continuously. This paper discusses the potential benefits of advanced data analytics and machine learning in light of a recently released study. All trustworthy databases, such as Google Scholar, MEDLINE/PubMed, Scopus, and Web of Science, have been searched. This essay discusses the applications of blockchain, big data, and machine learning as well as their significance for public health monitoring, medical and healthcare surveillance, and case estimations for the COVID-19 pandemic and other epidemics. The research delves at the possible consequences and difficulties that health technologists and medical experts may face when developing futuristic models aimed at improving human well-being.

Keywords: Big data, blockchain, artificial intelligence, machine learning, internet of things.

I Introduction

Artificial intelligence (AI) is a field of research that aims to create machines that are intelligent

enough to do complicated activities without the need for human intelligence. As it encourages the adoption of cutting-edge technologies in the Fourth Industrial Revolution (IR 4.0), such as blockchain, cryptocurrency, cloud computing, and the internet of things (IoT) among others, AI is one of the driving forces behind industrial development. In reality, the proliferation of IoT devices, social media, and online apps has sped up the advancement of AI. This data is employed to train machine learning algorithms. However, there are several issues with AI. Particularly in light of countless data breaches and other cases of abuse, privacy has grown to be a serious issue. The Facebook incident, in which the political consulting company Cambridge Analytica unintentionally targeted millions of users, is one instance of this. The technology cannot be evaluated or trusted since it is unable to interact with or communicate with human users—another concern with AI that is becoming more and more prevalent.

Similar to this, blockchain is growing in popularity as a technology with numerous potential uses in a variety of industries. Blockchain, a revolutionary concept that gained notoriety with the creation of bitcoin in 2008, is still transforming a variety of aspects of our lives, including how we interact, keep track of transactions, and make payments automatically. In reality, the blockchain has enabled its users to send money directly among themselves in a safe and secure manner. Additionally, because blockchain is a shared database that is synced across various locations, the execution of smart contracts may make it easier to check rights and compliances. Using consensus techniques like proof of stake or proof of work, blockchains store data in blocks with hash values and timestamps. Proof of stake is less expensive than proof of labor due to its superior energy efficiency. However, the ability for all mining nodes that have a copy of the whole ledger to independently validate each transaction is made feasible by the fact that every transaction on the blockchain is cryptographically signed. As a result of not requiring a centralized authority to authenticate transactions, blockchain is secure and cost-effective.

The acceleration of AI and blockchain integration will change the IR 4.0-inspired future digital generation. Blockchain-based solutions, can provide explainability, privacy, and trust to AI-based applications, whereas AI can improve scalability and security while addressing customization and governance issues. As seen in Table 1, even though blockchain and AI are conceptually distinct in a number of ways, they can be combined to make up for each other's weaknesses. This is how AI and blockchain function as the yin and yang of digital trade, with blockchain facilitating execution, verification, and recording and AI supporting comprehension, recognizing, and decision-making. As the term suggests, big data refers to enormous amounts of data that are difficult to manage using regular software or web-based solutions. Google will have processed 40,000 queries per second and 44 trillion gigabytes (GB) of data. 3.46 million Searches are performed every day, for a yearly total of 1.2 trillion. The capacity for storage, processing, and analysis has all been expanded. There are numerous definitions of big data, but the most popular and well-known one is by Douglas Laney. Laney emphasized the growth of (big) data in terms of the three "V's" of volume, velocity, and variety. Big data's "huge" component refers to its volume. Patients can define the conditions under which certain researchers may temporarily access specific portions of their medical records with the aid of blockchain technology. Patients can connect to other organizations and have their medical information automatically collected using blockchain technology. Because of how transparent it is, information may be sent in a secure manner. Clinical trial data, monitoring equipment, electronic medical records for sharing and keeping, mobile health apps, and cloud storage for insurance data are all examples of blockchain applications in the healthcare industry. Blockchain is stable because it would take an unimaginably large amount of processing effort to refigure the altered block and all future blocks if someone wanted to change a block after it had

been added to the chain. Along with volume, big data also relates to velocity and diversity. The rate or pace at which data is gathered and made accessible for additional processing is known as velocity. Every business or system has the ability to collect transaction-level data in addition to other types of structured and unstructured information like audio, video, text, or log files. The industry now uses these three "Vs" to describe big data. Big data has recently become incredibly popular all around the world. For a variety of reasons, nearly all study domains, both in academia and in business, produce and analyze enormous amounts of data. The hardest challenge is managing this enormous amount of data, which may be both structured and chaotic .

With such a huge amount of data, using artificial intelligence (AI) algorithms and cutting-edge fusion techniques would make sense. Automating decision-making using machine learning (ML) techniques like neural networks and other AI algorithms would be a significant advancement. Instead of directly coding computer programs using algorithms and statistical models, machine learning research focuses on developing computer systems that learn through inference and patterns. Machine learning has advanced significantly during the past ten years. The most crucial components of machine learning are the data, which form the basis of any model. The forecasts become more accurate as the data becomes more relevant. To get more precise forecasts, we must select an algorithm based on the information and the situation. Blockchain is secure because several copies of the data are kept on different nodes, eliminating the chance of an adversarial user assaulting a centralized structure. These characteristics make blockchain useful for handling healthcare data. It is regarded as a promising method of securely transmitting medical data. However, not every issue involving extremely sensitive data can be solved by blockchain. It has been questioned if blockchain technology has a place in the healthcare industry. Governments may wish to look into potential blockchain applications in the healthcare sector given the technology's recent debut and take into account the challenges posed by the industry's traditionalism. A thorough analysis of the trade-offs is required when developing and deploying blockchain solutions for the healthcare industry. We aim to discuss how machine learning, big data, and blockchain technology operate in this environment as well as potential applications in the fields of medicine, healthcare, and public health.

II Extent of Past Works

The current study makes use of bibliometric analysis to assess the intellectual organization and performance (such as productivity of publications, most well-known articles) of the literature on AI and blockchain integration in business. In order to comprehend a body of literature, bibliometric analysis essentially uses quantitative approaches to analyze bibliometric data, such as publication and citation statistics. The approach is a tried-and-true technique for doing scientific research that can be used to a variety of fields, including business. There are numerous methods for reviewing the literature, but the bibliometric method relies on quantitative analytical methods and a review protocol, making it the most objective. Other review methods, such as critical, either lack review protocols or are only capable of providing subjective interpretations because they lack objective analysis methods, such as thematic analysis. The current study explicitly adheres to the four-step bibliometric analysis methodology, which comprises deciding on an analysis strategy, choosing the right data to use, conducting the analysis, and reporting the findings. The study's methodology is outlined in its broadest sense. The current study combines bibliometric and content analytic techniques to follow the evolution of the business-related literature on AI and blockchain integration. Blockchain technology, business data analytics, and artificial intelligence: Use in the accounting profession and ideas for inclusion into the accounting curriculum. Journal of emerging

technologies in accounting. In order to pinpoint the major themes and topics in the research field, the study specifically conducts a performance analysis using a number of bibliometric indicators, such as citations, cite score, impact factor, publication count, and h-index. After this research, the authors read the full text again to conduct a content analysis.

Business innovation occurs when a company implements novel practices, products, or services that profitably expand a market. Business innovation is the process by which a company introduces new trends, services, or other products to foster firm growth. It can entail kicking off the project without any previous planning and utilizing tried-and-true techniques. Technology that has been trained to perform intelligent tasks that have historically been created by people is referred to as AI. Blockchain is a decentralized computer network that collects and stores data to display an event's chronological evolution on a simple and immutable record basis. This innovation can need either altering current practices or developing a whole new method. Blockchain, for instance, may boost confidence, accountability, protection, and privacy in business units by offering a shared and decentralized distributed directory. A blockchain is similar to a register or well-known distributed ledger in that it may store a wide variety of features. A distributed ledger is a set of data that is freely exchanged and synchronized by multiple people over numerous locations, businesses, or topographies. The same technology that is used by blockchain and bitcoin is known as basic appropriated records. A hash, a type of irreversible cryptographic stamp, is used in the blockchain DLT system to track transactions. Every each square in the subsequent block-based compilation of the transactions has a hash of the square before it, linking them together. This leads to the word "blockchain" being occasionally used to refer to transmitted records. These data have a strong connection to both identities and money. The IoT is developing in German and European businesses to enhance industries and business processes. Not to mention, AI improves operations by recognizing and enhancing the results of business processes. The goal of the innovation process is to increase a company's bottom line. By creating new sales opportunities, increasing revenue on existing platforms, saving time and resources, and improving output or performance.

Because existing expertise would become outdated owing to technology advancement, the blockchain invention eliminates it. All business structures in all industries would change if this revolutionary architectural breakthrough were to be widely adopted. Blockchain enables the utilization of processing power, data, and algorithms for various artificial intelligence components, including decentralized markets and collaborative platforms. It might encourage the usage of artificial intelligence (AI) and several other technical developments. Artificial intelligence (AI) refers to tools created in the past to do mental tasks. A decentralized computer network known as blockchain records and saves data in an immutable, transparent ledger system that shows an event chronology. Combining AI and blockchain can enhance machine learning and give AI access to financial resources. Among other things, the blockchain enables safe data exchange and storage. Manufacturing supply chains could undergo a significant transformation as a result of the development of blockchain technology. Middlemen could be eliminated, operations could be reorganized, overall security would increase, and information governance would improve. Artificial intelligence (AI) has the potential to reduce time and costs at work by streamlining and automating repetitive tasks and procedures. A rise in efficiency and productivity overall enables quicker management decisions based on cognitive technology results. Businesses might benefit from using artificial intelligence to provide more individualized customer experiences. Big data analysis is substantially more effective when using AI. It can quickly identify trends in the data, including previous purchases, preferences, credit scores, and other pertinent elements .Building a solid brand and marketing the ideas of digitization and artificial intelligence are challenging tasks.

AI is widely employed in marketing initiatives where speed is essential. Without the assistance of marketing professionals, AI systems might be able to engage with customers more successfully based on information and client data, then deliver personalized messaging at the right time to achieve maximum productivity. Artificial intelligence can help businesses better manage their online reputation and protect their current online presence. Giving brand and service executives access to websites, social networking sites, and other locations allows them to undertake in-depth assessments and research. Conducting the bibliometric-content analysis and presenting the results are the final steps. The authors do bibliometric analysis and network the results using the programs Gephi and VOSviewer. To enhance the presentation of their data, the authors also employ a Python script to generate word clouds that capture the key ideas in bibliographic clusters. Jupyter Notebook and Python 3.7 were both used to run the script and create the word clouds. Each article in each significant subject cluster identified by the bibliometric study was read in its entirety and fairly evaluated. The sections that follow present the results of the bibliometric-content analysis.

III - How AI and Blockchain Technology are used in Business

AI (Artificial Intelligence) and blockchain technology are two separate but powerful technologies that can be used in various ways to enhance and transform businesses. Here's an overview of how they are employed in business:

AI (Artificial Intelligence) in Business:

Customer Service and Support: AI-powered chatbots and virtual assistants can provide 24/7 customer support, answer frequently asked questions, and handle routine inquiries, improving customer satisfaction and reducing response time. **Data Analysis and Insights:** AI can analyze large datasets to identify trends, patterns, and correlations that may not be apparent to human analysts. This helps in making data-driven decisions and improving strategies.

Personalization: AI algorithms can analyze user behavior and preferences to provide personalized recommendations, content, and product suggestions, enhancing the customer experience.

Automation: AI can automate repetitive and time-consuming tasks, such as data entry, processing invoices, and managing inventory, leading to increased efficiency and cost savings.

Predictive Maintenance: In manufacturing and logistics, AI can predict when equipment or machinery is likely to fail, enabling proactive maintenance and reducing downtime.

Fraud Detection: AI can identify unusual patterns and anomalies in financial transactions, helping to detect and prevent fraud.

Natural Language Processing (NLP): NLP is used for sentiment analysis, content summarization, language translation, and more, making it easier to understand and engage with customers and stakeholders.

Healthcare and Life Sciences: AI is used for drug discovery, disease diagnosis, patient monitoring, and optimizing healthcare operations.

Marketing and Advertising: AI helps in targeted advertising, optimizing ad campaigns, and analyzing consumer behavior to improve marketing strategies.

Blockchain Technology in Business:

Supply Chain Management: Blockchain can be used to create transparent and tamper-proof supply chains, allowing businesses and consumers to track the origin and journey of products from manufacturer to end user.

Smart Contracts: Smart contracts are self-executing contracts with the terms of the agreement between buyer and seller directly written into code. They automate contract execution and reduce the need for intermediaries.

Digital Identity Verification: Blockchain can be used for secure and decentralized digital identity verification, making it easier to establish trust in online interactions and reducing identity theft.

Cross-Border Payments: Blockchain can facilitate faster and more cost-effective cross-border transactions by eliminating intermediaries and reducing currency conversion fees.

Intellectual Property Protection: Businesses can use blockchain to prove the authenticity and ownership of intellectual property, including patents, copyrights, and trademarks.

Voting Systems: Some countries are exploring the use of blockchain for secure and transparent voting systems, reducing the risk of fraud and ensuring the integrity of elections.

Real Estate and Property Records: Blockchain can streamline the process of property transfer, record-keeping, and title management by ensuring a secure and immutable ledger.

Tokenization of Assets: Businesses can tokenize assets like real estate, art, or company shares on a blockchain, making them more accessible and liquid for investors.

Data Security and Privacy: Blockchain can enhance data security and privacy, allowing individuals to have greater control over their personal information.

Both AI and blockchain technology offer a range of opportunities for businesses to improve operations, enhance security, and create new revenue streams. The choice to implement them depends on specific business needs, goals, and the industry in which the business operates.

VI Results and Discussion

The social and economic institutions that support businesses as well as the way they are operated have the potential to be significantly changed by blockchain technology. We'll look at how, in some circumstances, block chain can be utilized to quickly validate a transaction's properties. The blockchain provides an authenticating system that is reliable. Your customers' and your employees' electronic IDs make it simple to verify their identities. When this data is kept on a public blockchain, the risk of identity fraud, financial fraud, theft, and other cybercrimes is decreased. Blockchain and artificial intelligence-based business innovation (BI-AIBT) have been proposed as ways to improve corporate operations and provide a secure link with a variety of clients. In the collection of qualitative analytical data, there are just a few noteworthy respondents from two different business sectors. The corporation evaluated BI-AIBT and contrasted and compared how digitization affected value generation, proposal, and business capture. Additionally, BT can improve the way organizational strengths and talents interact. A thorough analysis of the literature and localization strategies for peer-reviewed studies serve to highlight the business innovation. SMEs can experience sustainable productivity development in the modern economy if new technologies are employed in the workplace. By implementing a number of strategies, including working with other businesses and academic organizations, businesses can become even more imaginative. Additionally, the majority of SMEs in Moldova are unaware of the need to market research findings and implement innovations based on scientific discoveries. Big-data analytics (BDA), should be given much more attention since it may support business planning and provide

useful data for boosting service innovation. They investigated the application of thorough service innovation analytics. Actual customer requests were gathered through the digital service channel by the emphasis using analytical data characteristics. Research on business transformations, applied mathematics, business engineering, financial science, and the global business infrastructure is done using the applied holistic mathematical model (AHMM) developed by Trad et al. Chandrachai, Triukose, One instance of how the suggested formality of AHMM replicated many aspects of human cognition was the heuristic decision-making process, which mostly depended on beam examination. By supporting a thorough separation process, synchronization of various EA methodologies, and transition strategies, the AHMM facilitated business transformation operations. It is unique because of this.

The model-narrative review (MNR) technique, according to Hakala et al, may link extensive work on the market, entrepreneurial, and innovation contexts to comprehend this evolving narrative. They contributed to the opening up and conceptual clarity of the language around the environment by disclosing a number of implicit interpretations and basic presumptions. MNR as a whole synthesizes and carefully considers the parallels and differences among linked ideas, resulting in the development of a method for developing model narratives that offer room for alternative research studies.

Improvised marketing interventions (IMIs) are defined as social media actions that are created and executed in real-time close to an actual incident. Five multi-method assessments were conducted; their findings were recorded along with analytical information and simulated tests. The IMI's effectiveness was evidenced by the laughter and unexpected results. The findings showed both the IMI's potential for social media and the attributes that companies need to have in order to benefit from proactive online networking. According to Mustafa et al. Typical FinTech companies may present opportunities as well as challenges for Islamic banking systems. According to the results of this investigation, Islamic financial institutions are more likely to see Islamic FinTech firms as partners than as rivals. Adaptive Hybridized Intelligent Computational Models (AHICM) were developed by to study consumer behavior for business expansion. A detailed examination of market segmentation and customer needs is necessary for product advancements, innovative concepts, and societal revolutions. The blockchain-based integrative safety mechanism (BISM), which intends to provide secure access management and privacy protection for both products and individuals, is described. While privacy protection depends on the robustness of response times, user access procedures are based on the state of virtual resources at different points in time. SMEs, BDA, AHMM, MNR, and IMI are among the established business strategies that have been outperformed by Business Innovation based on Artificial Intelligence and Blockchain Technology (BI-AIBT). The demand forecast ratio, product quality ratio, business development ratio, customer behavior analysis ratio, and customer satisfaction ratio all have potential for improvement, according to BI-AIBT. A data-collection technique called blockchain makes it hard or impossible to alter, hack, or cheat the system. A blockchain is a collection of duplicate digital ledgers that have been dispersed over the whole computer network. Blockchain, also known as Distributed Ledger Technology (DLT), uses decentralization and cryptographic hashing to make it simple and impossible to change the past of a relatively complex resource. The disclosed method concurrently grants everyone access to the record by creating a decentralized appropriation chain. Only a few non-financial uses for blockchain technology include supply chain management and digital identity. Supply chain management promotes effectiveness, teamwork, and superior outcomes. Additionally, it lowers costs. It encourages companies to better meet customer demands and more swiftly manage demand, stock distribution, interference management, and expense control. With

the use of blockchain technology, consumers may have more control over their own actions. There is no chance for any focus point to take the client's personality into consideration, and customers must consent before a company may use their information. The most current research demonstrates the benefits of combining blockchain technology with IoT and AI. For instance, the system architecture of many Internet of Things (IoT) devices could be improved by the use of blockchain technology. Making judgments using computers IoT creates flexible instruments that effectively mimic smart leadership with almost no human resistance. While IoT manages their internet communication, AI allows the devices to learn from their data and experience. IoT makes it possible for Internet-connected devices to communicate information with private blockchain firms so that secure records of shared transactions may be updated. Thanks to IBM Blockchain, your coworkers can access and share IoT data with you, but only you and the leaders will need to serve as the primary central authority. Most of the time, the interrelationships between blockchain, IoT, and AI are neglected, and each technology is applied on its own. These technologies could, and in a perfect world, ought to, be developed simultaneously. There may be a connection between IoT and AI in that while IoT gathers and feeds data, AI improves corporate processes and legal frameworks through Blockchain, constructing infrastructure and defining engagement standards. It demonstrates how blockchain technology and artificial intelligence are being applied in business. Coordination of commercial transactions between demand and resource providers may be accomplished using blockchain technology. The resources that are available will determine the project manager who will put together the tools required to do the assignment. Finding stronger company motivators is the main benefit of having solid, healthy supplier relationships. The likelihood that you will acquire enthusiastic dedication, correct evaluation, and excellent terms increases as you and your suppliers become more familiar with one another. In this scenario, blockchain is primarily utilized to sustain supply chain connections between the needs of many consumers and many providers. Customers can create new demand using the decentralized order engine, and producers can provide new items as part of a new transaction using the decentralized product engine. Because a blockchain's centralization or decentralization often pertains to the rights of participants in the record, it is also a design issue. Anyone can participate and make decisions in a decentralized organization. Only recognized and well-known groups are allowed to take measures on the record in a united organization. To confirm and secure the data patterns for transactions between providers and consumers, the smart contract mechanism serves as an authenticating protocol between the two engines. Commercially accessible technology might not always be able to offer the necessary level of security. "Commercial-off-the-rack" (COTS) programming is a term used in the business world to describe programming that is immediately accessible for purchase. In order to upgrade, replace constraining frameworks, and carry out other duties, public area associations are increasingly relying on COTS applications. A protection plan that is mission-based is a solution that can be adjusted to meet specific needs. It serves as an example of how an additional layer of specialized security could safeguard the data on a company's network. This personalized method has the advantage of allowing the employee's agent (EA) to control the rate of public and private key renewal and monitor key creation parameters. Employee agents (EAs) are persons who have been given permission to act as another person's agent by their employer. For instance, even when no other representatives are permitted, you can designate a worker as an authorized expert to allow them to make substantial purchases on the company's behalf.

Accounting for indirect costs is known as ICA. The ICA only grants authorized EAs restricted access to each database cluster. a method of gathering complex data that needs at least one

mathematical operation and a secret key or other "key" to decode the data. To prevent identity theft and extortion, websites that communicate sensitive data, such as bank account numbers and Mastercard numbers, should always encrypt the data. Before entering the database, the data is encrypted. Each data cluster is encrypted with a different key in order to restrict access to the data to only authorized workstations. Thanks to ICA, the firewall in the receiving state can access customer and business data from the internet or extranets. The secret key to utilize when symmetrically encrypting data is specified by the ICA. Secret keys are generated for symmetric key encryption while the ICA is processing in this mode. Information about corporate and customer accounts can be stored in databases using passwords. The primary delivery's personnel are under the ICA's control. Location or account balance are the two ways that EAs can be assigned to an account. While in the transmitting state, the ICA sends the secret keys of the associated EAs. Using a secret key, the ICA encrypts data collected from external networks. The ICA sends data to the clustered database. The company accounts for each employee's workstation are under their control. To exchange data with other team members, the sender encrypts it using the recipient's public key and decrypts it using the recipient's private key. Data is protected from internal illicit use by this upgraded authentication layer. It also demonstrates how blockchain marketing has evolved. Its key focuses are peer-to-peer communication, shifting market dynamics, and getting rid of middlemen that limit and filter data sources and raise costs. Intermediaries are helped by this mediation. By facilitating access to data and generating widely used, immutable data archives, blockchain technology can enhance the quality of data. Information quality includes a wide range of components that affect an association's ability to function [21]- [24]. Reports are unreliable when data isn't acquired properly. Frameworks with divergent preset values obstruct real risk awareness. Clarvonyt aids in resolving these problems and improves each piece of work. Blockchain technology has the ability to drastically impact corporate experiences through data exchange, information privacy, and a customer-focused strategy. Innovative plans are put in place to ensure client pleasure and potential value. With the development of the internet, business practices for marketing their goods and services have changed. Due to technology, which has also produced new electronic intermediaries, traditional middlemen have lost some of their significance. Access to the internet has also made it easier for new online intermediaries to provide customers innovative goods and services. In order to respond to RQ1, which asks what the publishing productivity of research on AI is and blockchain integration for business, the study examines all of the publications in the field organized by year [25] – [29]. Scopus provided the bibliometric data that was used in the inquiry. Information on scientific publications, including publication details (such as the title, abstract, keywords, and year) and citation details (such as the author, document, and journal citation total) are included in a subset of big data called bibliometric data.

IV Conclusion

Among the key technologies of Industry 4.0 are blockchain and artificial intelligence (AI). Academics and practitioners are interested in amalgamation, even though the two technologies are very different from one another. But there is a lack of research on the business applications of blockchain-AI systems that gathers and evaluates the most recent discoveries. The current study employed a bibliometric-content analysis to close this gap and found five important discoveries. According to the report, blockchain and artificial intelligence (AI) are IR 4.0 technologies that were first mentioned in 2016. Early research combining the two technologies for commercial

application first appeared in 2017 and only really took off in 2019 and beyond. A plethora of research on the topic supports the study's conclusion that the combination of AI with blockchain holds significant promise for business applications. The second is the article by Liu et al. about blockchain and AI applications in healthcare. The paper on performance optimization for blockchain-enabled IoT systems, as well as work on a blockchain-based LSTM credit evaluation system. Prospective authors should be familiar with the field's fundamental works in order to position and organize future research in novel ways that deepen our comprehension of past findings. Thirdly, the analysis shows that "blockchain and machine learning," "blockchain and smart contracts," and "blockchain and security" are the three most popular research topics. To further emphasize the potential and importance of combining blockchain and AI in business, triangulation was used to find that "blockchain and machine learning" has the strongest association in the corpus and that machine learning is the AI technology that appears to be most relevant and salient. Fourth, the study deconstructs four major topic clusters—smart healthcare, safe transactions, finance and accounting, and IR 4.0 and supply chains—that form the conceptual basis of research on the integration of AI and blockchain for business. Two of the study's clusters, finance and accounting and smart healthcare, are distinct and industry-specific, while three of the clusters, supply chains, and IR 4.0, are general and cross-industry. Research on AI and blockchain integration for business is still in its infancy because there aren't many sizable topic clusters. Therefore, research that encourages the field's ongoing evolution to enhance existing clusters and encourage the emergence of new clusters is much appreciated. Fifth, the paper lists eleven companies for which earlier studies on the subject have suggested integrating blockchain with artificial intelligence. These industries include intellectual property rights, marketing, management, supply chain management, e-commerce, finance and accounting, and healthcare. I think this post has significantly advanced that goal in four different ways. This study first shows that the field is still developing and has plenty of opportunity for growth and additional research by mapping the publication productivity of AI and blockchain integration for business particular. Second, this article has made it possible for future study to expand on the ground-breaking discoveries it presents by presenting the key elements of the field's research. Third, by compiling the most well-liked topics and subjects about AI and blockchain integration for business, this website provides aspiring writers with an up-to-date summary of the literature in the field. Ultimately, ten business opportunities for integrating blockchain and AI have been identified by our research. Business executives wishing to use academic research to identify possible organizational transformation opportunities using the two IR 4.0 technologies should find these applications useful. A wide range of stakeholders, including corporate management, blockchain and AI technologists, IT vendors, and aspiring academics, will be significantly impacted by this essay. Developers working with blockchain and AI might have a better knowledge of how fusing these two technologies enhances organizational efficacy. Blockchain and AI developers may work together to create automated, decentralized business apps that give better client privacy and confidentiality protection, higher performance, and better governance. Additionally, IT providers will be better equipped to understand how to integrate AI and blockchain into organizations by recognizing the market for these business solutions and highlighting the advantages they bring. Lastly, future scholars will be able to advance knowledge in the field by expanding on the current overview of AI and blockchain integration in business and investigating new subjects that would create new research streams or enrich current research streams in the field. This article presents professionals and academics with cutting-edge views regarding the possibilities for combining blockchain technology and artificial intelligence to enhance the growth, robustness, and resilience

of business operations. However, this poem, like others, is conscious of its limitations. The quality and comprehensiveness of the source, in this case Scopus, is the main constraint on the data in this article. Recall that Scopus was not designed for bibliometric research, and as such, it is a scientific database that might contain (inadvertent) inaccuracies. As advised, the authors removed duplicates and incorrect entries from the bibliometric data they downloaded from Scopus in order to minimize any (unintentional) inaccuracies. Second, the industry has advanced revolutionarily with the integration of artificial intelligence and blockchain technology. Its application and integration in this field will probably rise significantly, which is likely to result in the creation of new research fields. Therefore, to stay up to date on recent advancements in the subject, prospective authors should utilize the supplied search keyword in addition to the review insights provided here. Future researchers on the business use of AI and blockchain integration are urged to concentrate their efforts on figuring out how such an integration might be applied from a business rather than an engineering lens, as the study presented here highlighted the lack of insights emerging from business research. In order to promote such research, this paper highlights the need for more studies that address the non-exhaustive research problems on AI and blockchain integration using a business lens generally and by cluster.

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