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Review

Imperative Role of Integrating Digitalization in the Firms Finance: A Technological Perspective

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Abstract: Financial management is a critical aspect of firms, and entails the strategic planning, direction, and control of financial endeavors. Risk assessment, fraud detection, wealth management, online transactions, customized bond scheme, customer retention, virtual assistant and so on, are a few of the critical areas where Industry 4.0 technologies intervention are highly required for managing firms' finance. It has been identified from the previous studies that they are limited studies that have addressed the significance and application of integrating of Industry 4.0 technologies such as Internet of Things (IoT), cloud computing, big data, robotic process automation (RPA), artificial intelligence (AI), Blockchain, Digital twin, and Metaverse. With the motivation from the above aspects, this study aims to discuss the role of these technologies in the area of financial management of a firm. Based up on the analysis, it has been concluded that these technologies assist to credit risk management based on real-time data; financial data analytics of risk assessment, digital finance, digital auditing, fraud detection, and AI- and IoT- based virtual assistants. This study recommended that digital technologies be deeply integrated into the financial sector to improve service quality and accessibility, as well as the creation of innovative rules that allow for healthy competition among market participants.

Keywords: risk assessment; financial analytics; digital auditing; firms finance; Industry 4.0

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1. Introduction

According to the World Bank and International Monetary Fund, increased development financing is necessary to meet all 17 Sustainable Development Goals (SDGs) [1]. Schumpeter conducted early research on the connection between financial prosperity and technological progress in 1912 [2]. No poverty (goal 1); decent work and economic growth (goal 8), responsible consumption and production (goal 12), and climate on action (Goal 13) are the key goals in the area of financial management. These goals empower adopting the digital technologies in the financial management for achieving digital finance, and sustainable finance. Currently Industry 4.0 digital technologies have already gained attention in achieving digitalization and sustainability in various fields [3]. Essentially, the financial management in a firm boosts the efficiency of money, growth and quality. The goal of finance, which is a derivative of the economy, is to support actual output. Initially, finance

focused mostly on the financing of trade and used conventional banking structures. Estimation of capital requirement; procurement and allocation of funds, maintaining financial control and procurement and allocation of funds are a few of the basic benefits of financial management [4]. Money is now active in the public imagination as a new kind of digital valuation with the emergence of physical finance and the third wave of the scientific and technological revolution. Over the past ten years, research in digital finance has moved quickly [5]. Risk assessment, fraud detection, wealth management, online transactions, customized bond scheme, customer retention, virtual assistant and so on, are already a few of the critical areas where Industry 4.0 digital technologies intervention are highly required for financial management [6]. Additionally, the application of blockchain in the agri-food supply chain can guarantee complete food traceability, uphold market prices, protect workers' rights, limit the impact of supply chain middlemen, and provide incentive systems to encourage the expansion of sustainable initiatives [7]. IoT, cloud computing, robotic process automation (RPA), AI, and Blockchain are some of the digital technologies of Industry 4.0. Currently blockchain has made it possible to use cyber-currencies. It is a bottom-up system in terms of structure, which theoretically allows for official oversight to be avoided. Cybercurrencies and tokens have made international transactions even simpler while forcing the globe to transition from a unipolar to a multi-polar economy in which various reserve currencies compete for commerce and value storage. In the context of the Industry 4.0 paradigm, artificial intelligence (AI) is being viewed as one of the key technologies to achieve advanced self-capabilities like self-optimization, self-awareness, and self-monitoring and to disruptively redefine the structure of manufacturing processes and business models [8]. Banks and financial institutions must reposition themselves as service organisations that prioritize investing in digital transformation above traditional services in order to retain stability in the face of intense competition and, subsequently, shifting market conditions [9]. It has been identified from the previous studies that they are limited studies that have addressed the significance and application of integrating of Industry 4.0 digital technologies in financial management. The main contributions of the study are as follows:

- Addressed the areas in which the financial sector needs to adopt the digital technologies for inclining towards Industry 4.0 and sustainability.
- The significance of individual digital technologies' assimilation in the financial sector are detailed and discussed with applications and innovation.
- On the basis of analysis, the study suggested major recommendations for wide adoption and enhancement of financial sector with these digital technologies.
- The vital recommendations are big data and AI technology for the prospect of an automated personal assistant that can analyze financial markets and make smart financial decisions. IoT and blockchain with smart contracts to secure management of documents. Risk management and anti-fraud detection system using IoT and AI. Digital twins with AI for risk estimation and prediction.

The organization of the study is as follows: Section 2 discusses an overview of the inclination of firm's finance towards Industry 4.0, Section 3 discusses Industry 4.0 technologies for firm's finance and Section 4 address the discussion and recommendations.

2. Methodology

The present work focus on the benefits received from the innovation in technologies and its positive outcomes on the finance firms. The goal of our study is to review and analyze the advancements of the fourth industrial revolution in a methodical manner in order to provide a more appropriate solution to the stated major research issue. As the initial output of a wider project, this paper will present this thorough literature evaluation within the field of firm's finance. Three research sub-questions are expressly specified as follows:

(1) What are the enabling technologies of digitalization in firm's finance?
(2) What are the primary research directions and the areas of current study?

Based upon this research questions, the study has utilized keywords to select the articles in Scopus database. The logical operators "AND" and "OR" are utilized during article search to form Boolean combinations. The Boolean combinations are "Keyword of A AND and Keyword of B". The articles in this study are included on the basis of following parameters such as: Articles that are journal and review; articles published in English language; articles that merely focused on 'firms finance', 'financial management', 'Industry 4.0', 'IoT', 'artificial intelligence', 'cloud computing', 'digital twin', 'robotic process automation', 'SDGs', 'sustainability' and 'digitalization'. Based upon the elements of abstract, the articles that were not merely focused on the analyzed topic were eliminated for final selection. In the final phase, the complete article is reviewed by considering the framed research questions. Finally, a total of 61 papers were considered in this study for the analysis Industry 4.0 impact for management of finance in firms. Figure 1 illustrates the PRISM diagram of the literature considered in this study.

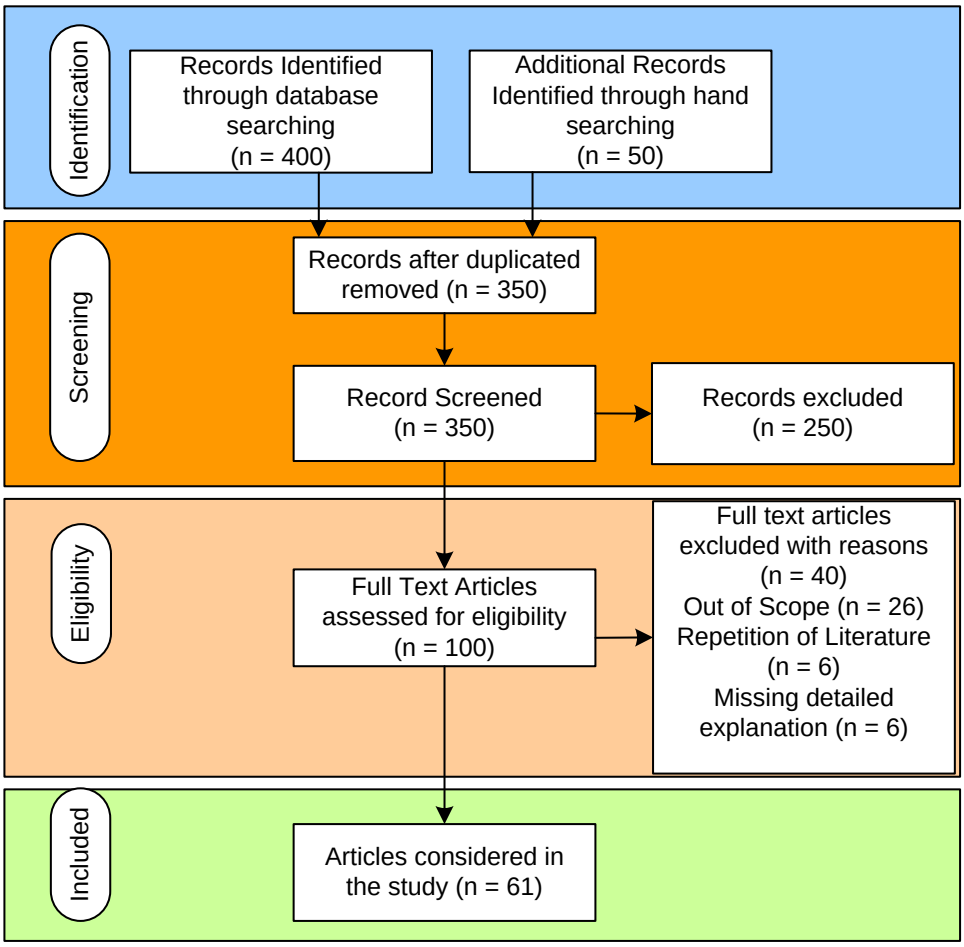

Figure 1. PRISMA diagram.

3. Overview of Firm's Finance Inclination towards Industry 4.0

Emergent and disruptive information and intelligence technologies gave birth to the fourth industrial revolution, commonly known as Industry 4.0. The production efficiency that these new technologies enable is increasing at an exponential rate. They could also have a significant impact on environmental and social sustainability. The contribution of Industry 4.0 technology to sustainability must be taken into account by firms [10]. The current trend in automation and data exchange in enterprises is known as "Industry 4.0" [11]. Industry 4.0, the fourth industrial revolution, presents businesses and entrepreneurs in developing nations with a unique mix of opportunities and difficulties [12]. Many experts believe that this technology has immense potential and will have a trillion-dollar influence on the world's economy. When the term "Industry 4.0" was originally used, 4G was still

being developed, and AI was still mostly a research project. With the widespread adoption of cloud computing, AI, the advent of 5G, and other technological advancements, many businesses and functions are about to undergo a significant transformation.

In the era of Industry 4.0, digitalization and virtualization change the nature of finance and market contact. Numerous financial services have been moved online, fostering the growth of alternative finance—the practice of borrowing money and raising finances through online channels [13]. In the areas of risk identification, measurement, and management, AI has a big impact on digital financial inclusion by tackling the problem of information asymmetry, offering customer support and helpdesk through chatbots, fraud detection, and cyber security [14]. With affordable and stable finance entrepreneurs, companies can reevaluate their business models to make them more competitive, sustainable, and interconnected with other economic sectors.

Industry 4.0 practices are a concoction of productive industrial processes and technological advancements made possible by processing automation. Green finance is a strategy that unifies the financial sector with national economic development while taking the environment's advantages into account for sustainable growth [15]. Due to dependent technologies that affect process inputs and outputs, companies that transform their businesses and operations in accordance with Industry 4.0 concepts face complex processes and costly budgets. Additionally, since the Industry 4.0 transition alters how businesses operate and how they value their customers, it becomes a very essential idea that needs the backing of top management for projects and investments [16]. Our daily lives and the way businesses are conducted are undergoing major changes as a result of automation and data. In this regard, the capabilities of artificial intelligence and robotic process operations to support business models in the digital age is examined in the banking sector. These two emerging technologies are called upon to revolutionize business processes [17].

The underlying technology of Bitcoin, known as blockchain, is essentially a distributed ledger that cannot be altered. It also introduces a new distributed infrastructure and computing paradigm. AI has a big impact on digital financial inclusion by tackling the problem of information asymmetry, offering customer support and helpdesk through chatbots, fraud detection, and cyber security [18]. Blockchain will hasten the adoption of new digital technologies like big data, the Internet of Things, and artificial intelligence. To facilitate the growth of blockchain technology and applications as well as to widen the application space, next-generation information technologies such as big data, the Internet of Things, artificial intelligence, and others are required. While waiting for the next wave of the information technology industry to emerge, the development of blockchain technology and applications is essential [19]. Rapid growth in mobile internet has given rise to the sharing economy, a new business model centered on big data, cloud computing, and third-party payment. Traditional retailers are to be eliminated as part of the sharing economy, and digitization is what makes this happen. Digital technology enables engagement in the transaction process as a point-to-point link, increasing service availability, reducing transaction costs, and providing clients with access to the advantages of productive services [20].

IoT has the potential to fundamentally alter the way we communicate, conduct business, and satisfy the needs of the general population. Despite the fact that the potential benefits of IoT for economic growth and social welfare seem to be beyond question, there are a number of technological, social, legal, and regulatory policy issues that need to be addressed. These issues range from interoperability and spectrum availability to cyber security and privacy. These problems may and should be resolved via the combined efforts of numerous different public and private sector parties [21]. Industries have the chance to adopt AI-driven innovation, but how successful they are will depend heavily on the value the innovative technology creates for various corporate stakeholder groups. Since businesses usually need to adapt both internal processes and services to customers in order to comprehend the benefits of AI, this in turn depends on how management can adopt these tactics and change. AI research is expanding, with the present focus being on technology and technique modeling [22].

Big data has emerged in recent years as a whole new paradigm that provides a plethora of data and opportunities to improve and/or enable research and decision-support applications with unmatched value for digital earth applications in the business, scientific, and engineering areas. Digital Earth finds it more challenging to store, transfer, analyze, mine, and provide the data as a result of big data. Big data discoveries have been made possible by using these resources, and cloud computing offers fundamental support for dealing with the issues with shared computing resources, such as processing, storage, networking, and analytical software [23]. The expansion of Digital Twins into the sectors of society and the human race is known as the Metaverse. Despite the Metaverse having existed for ten years previous to the development of Digital Twins, their application is widespread in several sectors and academic fields. To expand autonomously, the Metaverse, which resides side-by-side with the real world, requires mature and secure Digital Twins technology [24]. Nowadays, information technology (IT) is a part of practically all sectors of the economy, and companies who are unable to adapt to new technologies risk going out of business. Professional accounting and auditing firms can perform better thanks to RPA, as they are experts in some tasks and excel in others. RPA can also simplify the process so that it meets with the requirements set forth by professional standards at a significantly lower cost, which can assist in raising the credibility of the accounting profession [25]. Table 1 presents the comparative analysis of the previous studies. In the table, we have considered three parameters such as objective, methodology and findings. Most studies emphasized adoption of Industry 4.0 for the finance and also discussed the AI implementation in the financial. However, there are limited studies identified in the previous literature, in which the significance and discussion of different Industry 4.0 enabling technologies with in one study has not yet presented. The current study presents the review of different enabling technologies such as IoT, AI, cloud computing, big data, metaverse, digital twin and robotic process automation. Moreover, this study presents the challenges and future scope.

Table 1. Comparative analysis of previous studies.

Ref	Objective	Methodology	Findings
[11]	Essential components for evaluating an organization's preparedness for Industry 4.0, the linkages that exist between these readiness variables	the systematic literature review (SLR) technique of Tranfield et al. (2003) was used. The final thematic analysis included 68 articles in total.	Six major themes of preparedness factors were produced by the SLR results. These factors' interrelationship mechanism was found.
[12]	An Unprecedented Time for Entrepreneurial Finance upon the Arrival of Industry 4.0	Examined the sources of corporate funding, the financial factors influencing firm performance, the trends in cross-border mergers and acquisitions (CBMAs), and the sustainability of economic growth.	Without including the stock market and the mechanics of private equity returns, any research on entrepreneurship financing would be incomplete.
[13]	As an alternative to conventional financial intermediaries, the authors examine the pros and cons of online financing services.	The method of correlation analysis	The study's findings revealed: (1) a significant relationship between a nation's economic growth and the level of alternative finance development; (2) a strong direct relationship between a nation's level of innovation and financial inclusion and the amount of alternative finance produced; and (3) a lack of a direct relationship between information technology and the growth of the alternative finance market.

Table 1. *Cont.*

Ref	Objective	Methodology	Findings
[14]	investigate the impact of AI on digital financial inclusion.	To evaluate the effect of AI on digital financial inclusion, this study used conceptual and documentary analysis of peer-reviewed journals, papers, and other authoritative publications.	In the areas of risk identification, measurement, and management, addressing the issue of information asymmetry, providing customer support and helpdesk through chatbots, fraud detection, and cybersecurity, AI has a significant impact on digital financial inclusion.
[17]	In order to assess the viability of their business models in the digital age, artificial intelligence and robotic process operations in the financial sector are examined.	The effectiveness of changing financial institutions' business models to take advantage of these two advancements is assessed in this paper, and a use-case involving a bank is provided.	The customer service model and internal operational procedures in the financial sector will change as a result of these two developing technologies, with potential effects for the present and the future.
[18]	The author examines how technical innovation, and the trend of digital finance are being applied to economic growth, the green economy, and sustainable development.	The experimental data used to support the findings of this study are available from the corresponding author upon request.	The author of this paper first introduces the fundamental ideas and key economic structures of the digital economy and financial sector. The technology economy's application trend is then examined. Finally, they thoroughly examine several examples of technological innovation and digital finance, such as the sharing economy, smart cities, digital healthcare, and personalized education.

4. Role of Industry 4.0 Enabling Technologies in the Firm's Finance

In this section, the significance and application of Industry 4.0 enabling technologies are discussed in detailed. Here, the discussion is presented on the basis of individual technologies.

4.1. IoT

There are many potential uses for the "Internet of Things", which refers to the internet-based communication of everyday objects, in the world of finance, particularly in the banking industry [26]. Customers' changing usage patterns and behaviors, as well as the abundance of data already available, mean that the Bank's stakeholders must undergo inevitable digital reforms [27]. Therefore, new developments in the digital world are what motivate the digital transformation of any institution, including those in the financial sector. IoT is one of the key pillars on which a bank may build its digital transformation. IoT that directly affect financial services, such as mobile banking, M-banking, crowd-based finance, virtual currency, high frequency trading firms, cybercrime, big data, and IT analytics, are therefore needed to help banks integrate IoT into their goods and services [28]. For business intelligence in corporate finance, the IoT-based Efficient Data Visualization Framework (IoT-EDVF) has been developed to strengthen the risk of leaks, analyze multiple data sources, and monitor data quality [29].

Figure 2 illustrates the implementation of IoT for firm's finance. IoT is implemented by interconnecting the wireless sensing devices, and communication protocol for real-time monitoring. Using IoT, collect real-time data on your clients' assets to improve credit risk management. It also assists in sending alerts and notifications to your sales and finance teams when dealing with high-risk customers. Financial institutions are popular targets for cybercriminals. IoT devices combined with ML applications aid in the detection of anomalies by collecting data from a variety of machines and web applications such as payment portals, servers, teller machines, and so on. Auditing is essential for detecting

irregularities in financial processes and uncovering fraud. All transactions can be tracked in real-time and sent to the accounting department with the help of IoT. Accounting firms can easily track the audit trails of all employees or business units using IoT, whether they make a purchase or receive money in real-time.

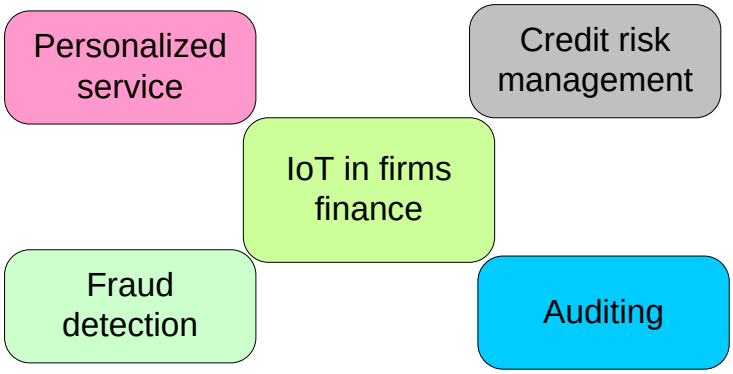

Figure 2. IoT for firm's finance.

4.2. Artificial Intelligence

The industrial revolution 4.0 has brought many changes in the field of technology, including financial technology. People need to absorb the right information, in order to make good financial decisions. With various technologies that provide digital financial information, people must have the knowledge and expertise in evaluating options to maximize their long-term financial well-being [30]. Financial intelligence has slowly developed the capacity to become a "financial brain" in our contemporary dynamic capital market. Financial intelligence exhibits a quick and accurate machine learning power to handle complex data. Four open issues, namely explainable financial agents and causality, perception and prediction under uncertainty, risk-sensitive and robust decision-making, and multi-agent game and mechanism design, have been introduced with the development of financial intelligence and review state-of-the-art techniques in wealth management, risk management, financial security, financial consulting, and block chain [31]. AI implementation in commercial banking could alter operational procedures and customer interactions, opening up new behavioral finance research possibilities. Commercial banks can improve client targeting, increase security when processing payments, and decrease loan losses by employing AI [32].

Figure 3 depicts the application of AI in finance and the financial market for forecasting, decision-making, bankruptcy prediction, credit rating, and concerns with fraud and accounting. Financial investors are interested in bankruptcy predictions utilizing machine learning to increase the predictive capacity, and AI-based decision-making is likely to function better where decisions are very specific. The most well-established AI fraud detection method is expert systems [33].

4.3. Cloud Computing

The concept of cloud computing emerges at a pivotal period in history as a result of the Internet's rapid development and inability of traditional Internet financial risk prediction methods to suit individual and corporate needs. Due to its distributed, dynamic, and autonomous properties, cloud computing has overturned the conventional method for predicting financial risk [34].

With the aid of cloud technology, banks may adopt a digital paradigm to provide new channels, shorten the time it takes to sell new products, meet customer expectations, and do all of this while spending less money [35]. The cloud computing has revolutionized business by increasing efficiency, scaling up capacity, ensuring transference and controlling cost (depicted in Figure 4).

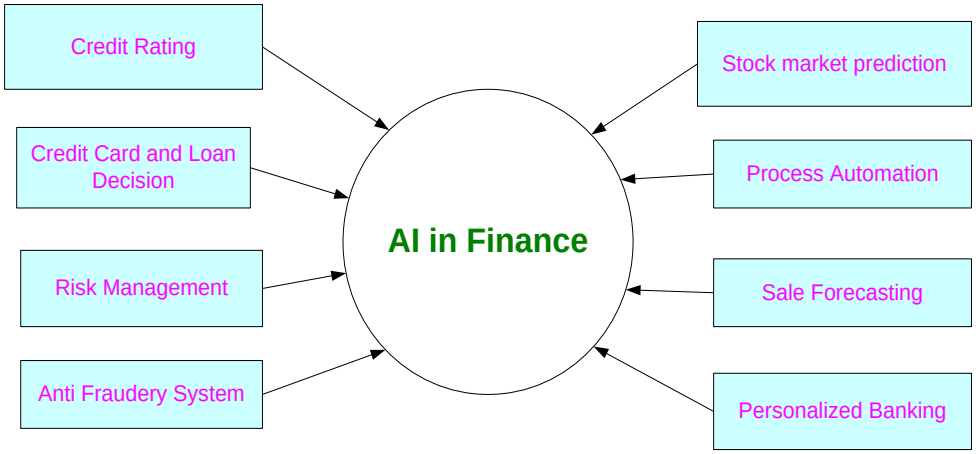

Figure 3. Artificial Intelligence in Finance.

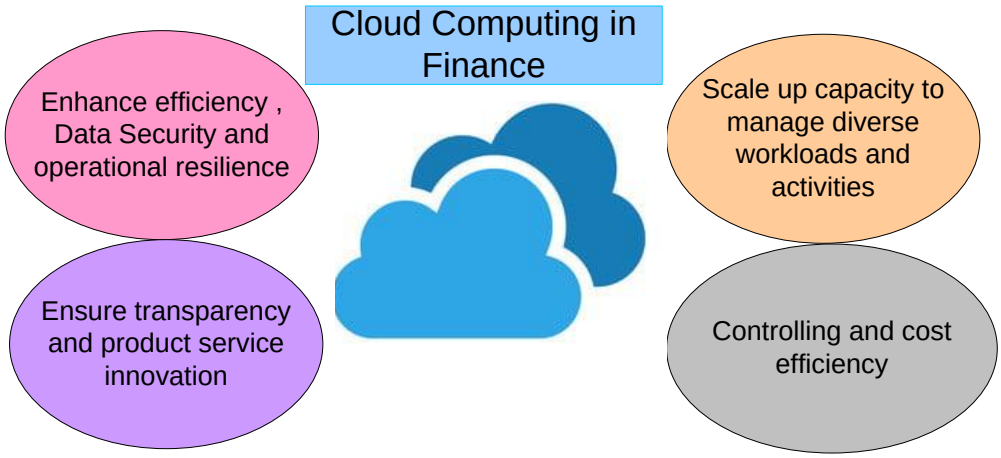

Figure 4. Cloud computing in Finance.

The enterprise financial control has undergone significant changes as a result of the emergence of big data and cloud computing [36]. Future financial institutions are changing as a result of cloud computing. These days, businesses employ a wide range of cloud-based software, including those for customer relationship management (CRM), enterprise resource planning (ERP), accounting, and even commerce [37].

4.4. Blockchain

High degrees of data protection, decentralization, an open and transparent network infrastructure, and low operational expenses are all provided by blockchain technology. These great qualities make blockchain an incredibly useful and popular option, even in the traditionally conservative world of finance, as well as in the limited banking industry Blockchain is one of the most important areas in banking and finance sectors [38].

Figure 5 depict application of blockchain in the finance is how the characteristics of blockchain make it perfect for financial applications. Blockchain enables secure, simple transactions and fosters confidence among business partners. Even the swift identification of people using digital IDs is possible.Blockchain technology enables transparent data storage and decentralized decision-making by dispersing the security risk throughout the network. The decentralized duplicated ledger technology known as blockchain, which underlies Bitcoin and other cryptocurrencies, offers a potentially appealing alternative method of structuring contemporary finance. At the moment, the financial system relies on a number of centralized trusted intermediaries [39]. Blockchain technology offers a great chance to democratize business. Initial coin offerings, or ICOs, are cutting-edge financing methods for entrepreneurs that make use of blockchain technology [40].

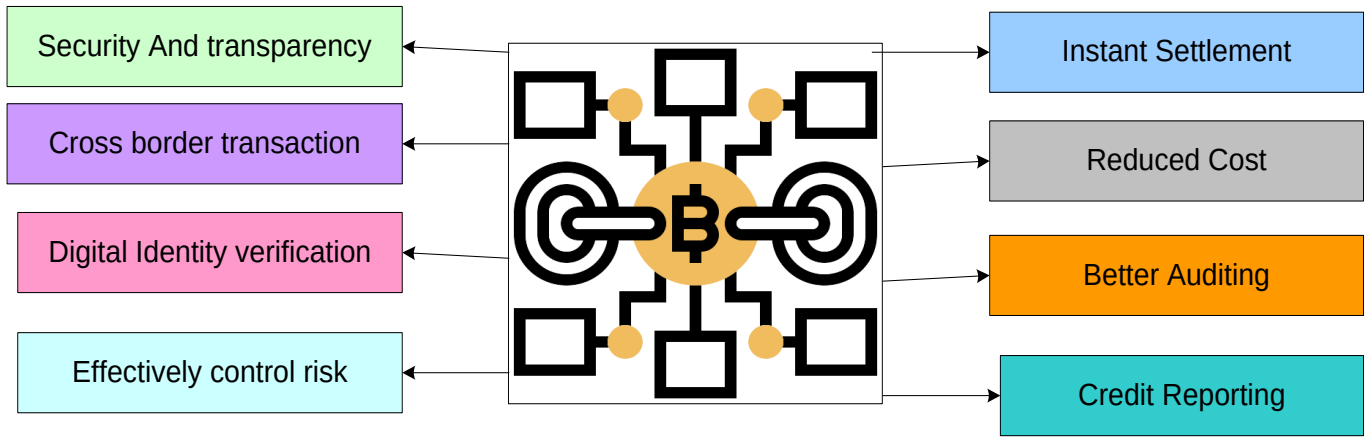

Figure 5. Application of Blockchain in Finance.

Regarding persistent trust concerns between trading partners in trade finance, blockchain technology has been proposed as a potential solution to enhance the trust relationship by boosting the predictability of trading partners, expanding the efficiency and quality of communication, allowing the expression of generosity, and improving the security of transactions and data transfers [41]. Asset-backed securitization (ABS) and blockchain are two examples of cutting-edge financial products and technologies that are used in supply chain finance (SCF), a combination of financing procedures and technology-based businesses that connect supply chain participants [42]. By utilizing important resources and carrying out appropriate procedures, the blockchain-driven SCF solution offers services to its clients, creating value for participants by satisfying their needs [43]. Additionally, the value of blockchain-enabled SCF enterprises is influenced by their participation in blockchain consortiums and the advancement of blockchain implementation. The market's uncertainty is decreased by investors' confidence in blockchain [44].

4.5. Big Data

Big data is a term for vast amounts of data of different types that must be collected, managed, and analyzed using certain tools. Big data platforms and analytics for the banking aid businesses in gaining insightful knowledge about how customers utilize their goods and services.New technologies like cloud computing and artificial intelligence are evolving daily with the onset of the big data era. A new era of wealth and financial market development is being tremendously aided by the increasing application of science and technology to the financial sector [45]. It's getting harder to interpret data as businesses get it from a growing number of sources, including websites, applications, social networks, IoT devices, and sensors. Big data is used in this situation since current technology cannot keep up with the information. People may have diverse conceptions of the term big data, which is very ambiguous. In the finance sector, big data can go in one of three paths Predictive analysis, Real-time analytics, or customer analytics. Predictive analysis based on social media is one example of how alternative data are used to forecast stock prices, identify various risk exposure and find new price movement indicators [46].

The application of big data tools as real-time analytics assist financial decision-making to solve real business problems and enhancing enterprise value [47]. Applications of big data on customer analytics in the field of Internet finance are used in order to provide various users with financing services such as platform finance, supply chain finance, and consumer finance. Internet finance platforms may rely on a significant amount of user data that have been acquired over time [48]. The complexity of data analytics in the financial services sector can only be handled by big data technologies. Big data is in high demand in the financial industry, and it is driven by a number of factors like absence of a personal relationship with customers, the rising presence of FinTech on social media,

changing consumer expectations, amounts of data that keep on increasing, and increasing competition in the FinTech sector.

Figure 6 depicts the importance of big data in firms to identify more effective ways of doing business. When a company needs to store a lot of data, big data platforms like Apache Hadoop, Spark, etc. can help cut costs. These technologies aid businesses in finding more efficient ways to conduct operations. Using real-time in-memory analytics, businesses can gather information from a variety of sources. Employing big data techniques, businesses can carry out sentiment analyses. These give them access to comments on their business, including who is saying what about it. It makes it possible for businesses to meet client expectations. The company's product line can be changed with the aid of big data analytics. It guarantees effective marketing campaigns.

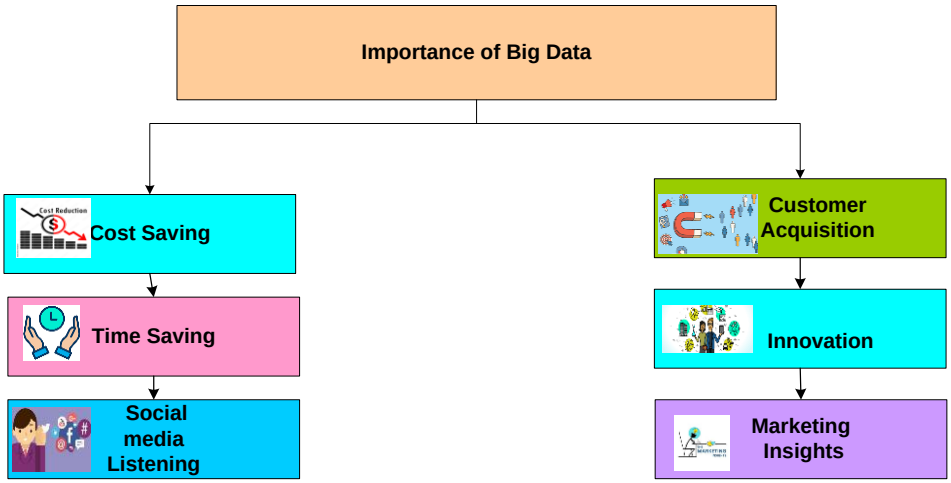

Figure 6. Importance of big data.

4.6. Metaverse and Digital Twin

One of the recent blockchain-based digital assets to be created is Metaverse. The term "metaverse" refers to an alternative virtual environment where people can create programs, interact with one another, and buy, sell, and share products and services using avatars (virtual representations) of themselves. Metacurrencies, or regional cryptocoins, are also utilized in the metaverse [49]. With either the widespread theft of cryptocurrencies from exchanges or the sale of fraudulent or questionable NFT and other financial goods that have lost a lot of value quickly, financial cybercrimes in the metaverse have dramatically expanded over the past several years [50]. The Metaverse is a concept for a fictitious "parallel virtual world" that embodies lifestyles for living and working in virtual cities as an alternative to future smart cities. Indeed, the Metaverse has the potential to redefine city designing activities and service provisioning in order to increase urban efficiencies, accountabilities, and quality performance. This is because emerging innovative technologies—such as Artificial Intelligence, Big Data, the IoT, and Digital Twins—provide rich datasets and advanced computational understandings of human behavior. There are still ethical, human, social, and cultural questions about how the Metaverse may affect how well people connect with one another and how it will potentially affect how well cities function in the future [51].

A digital twin (DT) is a virtual representation of an actual thing—a system, a person, a community, or even an entire city—that is constantly updated with information from the real thing and its surroundings. It serves as a link between virtual cyberspace and actual physical entities, and as such, is regarded as the foundation of Industry 4.0 and the engine of future innovation [52]. The financial sector can reinvent itself using digital twin technology for an uncertain future in a globalized world. Digital twins, which are exact clones of the real thing, can aid with decision-making based on the actual interactions of complex systems. Rather than just making educated assumptions, they can offer fact-based insights.

In order to discover the inventory and cash replenishment procedures that minimize the impact of disruptions on supply chain performance, the digital twin framework integrates machine learning (ML) and simulation [53]. The need to concentrate on enhancing customer satisfaction via online channels is becoming more and more important every year as a result of the significant consumer shift toward accessing financial services via mobile or desktop devices. Financial institutions are working with third party organizations to collect data about how customers interact with their service online in order to develop a customer relationship management and fulfilment solution that would replace the requirement to hire support personnel. This will give important information on how digital twins can be used to fully exploit this third-party data and create simulations utilizing the virtual platform to produce virtual assistants that can aid customers with their difficulties.

4.7. Robotic Process Automation

A relatively recent development that primarily emerged in response to the 2008 financial crisis is digitalization in the banking industry [54]. Since that time, banks have been looking for substitutes to help them adjust to innovative changes in order to create new sources of wealth. Banking organizations can continuously rethink their tactics by utilizing RPA [55]. Robotic Process Automation (RPA) is a virtual workforce that is managed by a company's operations team [56]. Companies utilize this technology to replace a number of standardized and rule-based procedures and duties [57]. It enables the business to delegate some jobs while concentrating more on those involving people. The phrase technology that deals with the application of machines and computers to the production of goods and services is related to the concept of automation in RPA [58]. RPA is created to deal with complex calculations and to take over a part of the decision making. RPA is also able to deal with dynamic and fast changing circumstances. The use of RPA within a company will have an impact on both the employees and on the company itself [59].

RPA technology and the usage of robots in business operations are spreading throughout the world's enterprises. Robotic process automation can immediately improve key business operations like payroll, employee status changes, new hire recruitment and onboarding, accounts receivable and payable, invoice processing, inventory management, report creation, software installations, data migration, and vendor on boarding [60]. RPA is a software robot technology created to carry out business operations that are governed by rules by imitating human interactions in a variety of applications. The next generation of RPA bots are known as cognitive robotic process automation (CRPA)or intelligent process automation (IPA), which combines RPA and AI. By making the main financial activities significantly more effective and enabling banks to customize services for consumers while simultaneously enhancing safety and security, it has been revolutionizing the banking sector. Intelligent automation has created hurdles for protecting consumer interests and the stability of the financial system, even though technology is allowing banks to rethink how they operate [61]. Figure 7 depict how banks are getting benefit from RPA and retain their competitive advantage in the race to digital transformation.

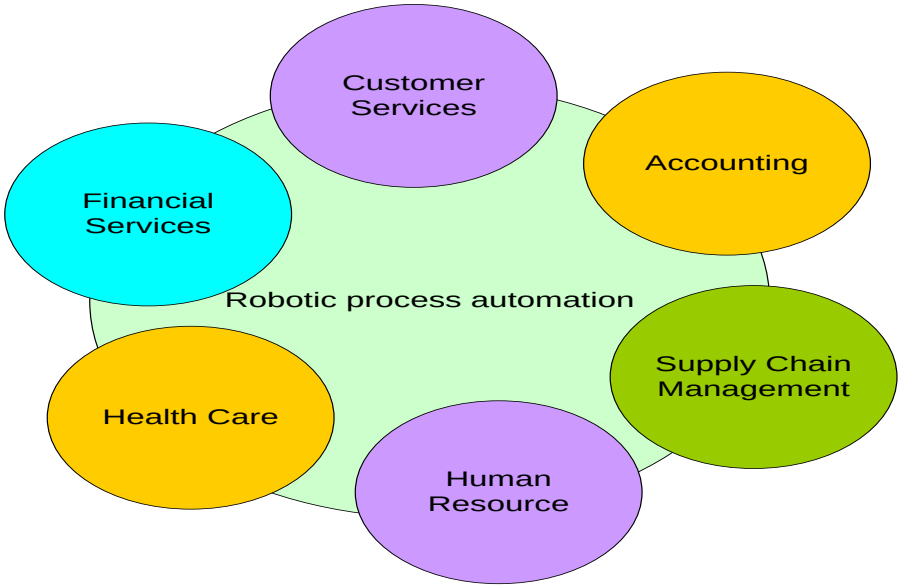

Figure 7. Robotic process automation.

5. Discussion and Recommendations

Based on the above analysis regarding the assimilation of Industry 4.0 digital technologies in the financial sector, here we have discussed the future recommendations for wide adoption and digitalization of financial management (Figure 8).

- Recent developments in big data and AI technology have raised the prospect of an automated personal assistant that can analyze financial markets and make smart financial decisions. Such systems are viewed as a potential means of offering the public tailored financial advice. Here the ML can be integrated with robotics for delivering the analytics based on real-time data. Deep learning in the robot based personal assistant empowers to record the emotion of the customers visiting the financial firms.
- Integration of IoT and blockchain for the financial sector enables to implement secured management of documents that are generated on the basis of sensor and vision data. This approach enables the scenario of releasing the finance on the basis of agreement. Here blockchain creates a smart contract and based on IoT data it secures the data in the ledger and initiates the finance when conditions are fulfilled.
- Risk management and anti-fraud detection systems are having a significant impact in the area of finance, where they help the user to be attentive with the measures, or they are implemented for managing their money. Here the IoT- and DL- based system have a possibility to realize these two requirements of the user.
- Climate change and pandemic are the two elements that disturbs the flow of financial management of a firm. This leads to changes in various strategies to organize, control finance. However digital twins with AI have the potential to create an environment with real-time data, where it shows the challenges and situations in which the financial sector will be changed.

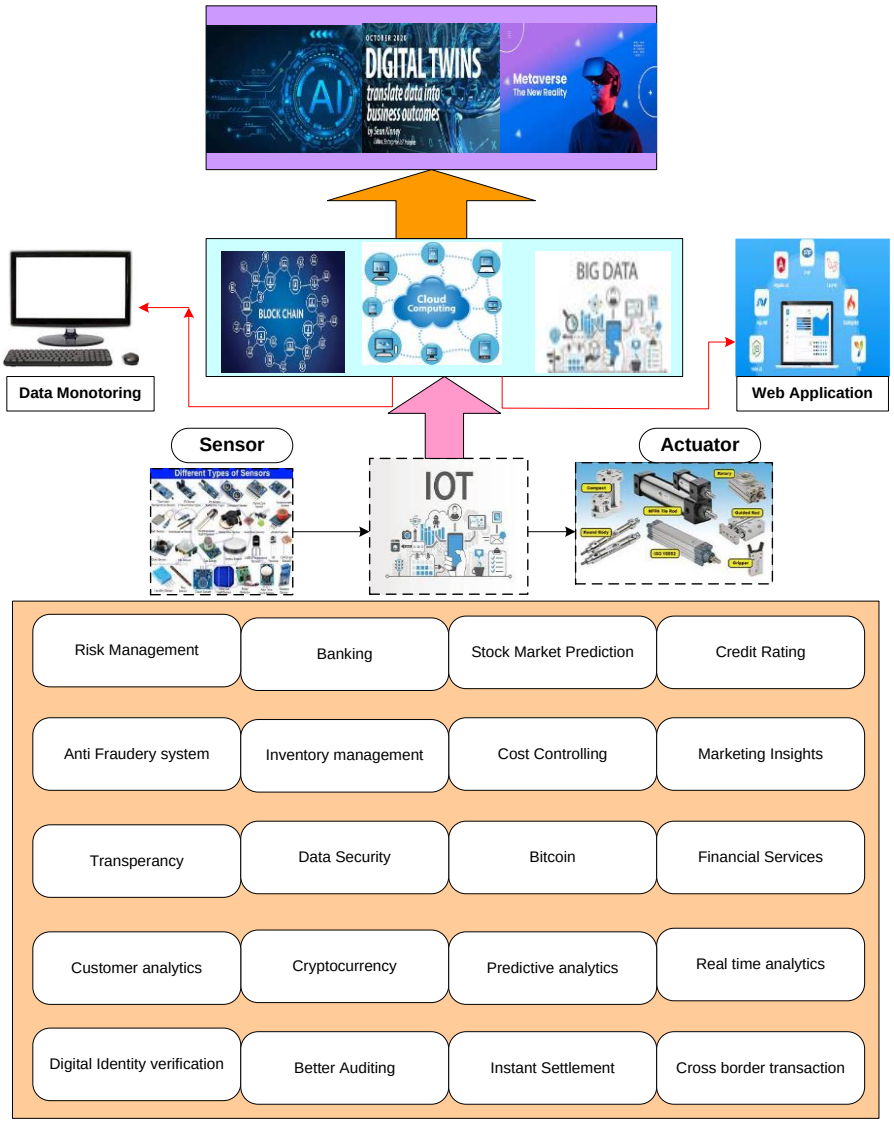

Figure 8. Framework of Industry 4.0 in the financial sector.

6. Conclusions

Management of finance is a critical aspect of firms that entails the strategic planning, direction, and control of financial endeavors. In the current scenario, there are a multitude areas of in which the financial sector can be strengthened with Industry 4.0 digital technologies. Inspired by these facts, this study discussed the significance of Industry 4.0 in the financial sector. Additionally this study addressed the different applications of digital technologies implementation in financial sector such as real-time finance analytics, risk assessment, antifraud system, and risk management, etc. However the financial sector is undergoing tremendous change. Every industry is subject to upheaval as a result of new technology, but the financial services sector has been completely transformed by financial technology. IT problems are becoming a bigger worry in the financial world, even if operational problems with client retention and competitiveness will always exist. The financial sector must consider IT to function in the current tech-focused world, which includes cybersecurity threats and regulatory updates.

Followed by this study , we suggest vital recommendations that can be adopted for strengthening the financial sector for future scope in order to realize the intelligent and virtual ecosystem. The vital recommendations are big data and AI technology for the prospect of an automated personal assistant that can analyze financial markets and make smart financial decisions. IoT and blockchain with smart contracts to secure financial

documents. Risk management and anti-fraud detection system using IoT and AI and digital twins with AI for risk estimation and prediction. Future academics are also advised to evaluate diverse developing financial technologies according to their legal and regulatory frameworks.

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