The Fourth Industrial Revolution (Industry 4.0) and Its Impact on the Banking and Financial Industry

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Abstract

In the current global scenario, the fourth industrial revolution (4.0) and the digital transformation that lies beneath it. This is faster than they have ever advanced in the past and now progressing at record clip.The digital revolution is dramatically altering the social and professional contexts in which people live and work. This article highlights the role that various technological advancements have played in the progress that has been made toward sustainability in the banking and financial sector. This is accomplished through the investigation of technical trends associated with Industry 4.0 as well as the presentation of the roles and functions that these trends play in the development of Industry 4.0.Since this is a reviewed article, many review papers were culled from sources like Springer, MDPI, WOS, Scopus Database, Elsevier, and Emerald. According to this article, there is a great deal of published research on topics like Blockchain, AI, machine learning, and cloud computing, but on the other hand, there are only a few papers that investigate the impact that emerging technologies such as robotics, metaverses, and digital twins have on industry 4.0, investment, and the financial market. Therefore, the purpose of this research was to provide an in-depth examination of the many technologies available today, their various roles and functions, and the challenges faced by various industries as they attempt to implement these technologies.

Keywords: Industry Revolution, Banking and Financial Sector, Emerging Technologies, Sustainable Development

INTRODUCTION

Every day, we see further and further technological advancements that raise the bar for the modern world. If we are to have a chance at survival and creating a better, more sustainable future, everyone needs to evolve as technology does and adapt to a new technological environment.Despite technology's immense potential to contribute to the achievement of the sustainable development goals (SDGs). Nanotechnology, drones, 3D printing, virtual reality, robotics, and other things related to artificial intelligence like machine learning, deep learning, and AI are causing widespread concern across all sectors and industries, especially the technical ones.These methods are making waves in the technological community because of their potential utility in a wide variety of contexts, including data mining, image analysis, and predictive analysis.

Researchers in the fields of technology and finance have studied the effects of numerous innovations like the Internet of Things (IoT), Cloud Computing (Cloud), Big Data (Big Data), Machine Learning (ML), Artificial Intelligence (AI), Blockchain (Blockchain), and the Metaverse (Metaverse). There are still many obstacles to integrating these technologies into the financial and investment sectors. There has been a lot of buzz about the IoT recently because it is seen as the future of the internet and an ecosystem of interconnected devices. Poor internet connectivity, high costs, a longer payback period, and a lack of standardization are just some of the problems that the industry faces when trying to implement this technology in the Indian context[1].

Cloud computing is not a new concept, but it does offer a variety of services to businesses and organizations across industries via internet. These services include computation and storage. Protecting user data, reducing operational risk, and gaining customers' trust are the main factors that stand in the way of widespread adoption of cloud computing. [2]. Traditional approaches to data management and handling are being phased out in favour of Big data analytics because of their ability to efficiently process massive data sets. [3].Blockchain, a potentially disruptive technology, could make it easier to trade digital currencies like bitcoin automatically. However, in order to fully implement industry 4.0, new features and supplementary values from the blockchain technology are still necessary. [4,5].Artificial intelligence methods allow machines to solve complex problems like humans. Machine learning algorithms can help find application and system security vulnerabilities. Machine learning can also help identify input data patterns without manual intervention. [6].

OBJECTIVES OF THE ARTICLE:

Emerging technologies are being put to use in the process of developing, implementing, and creating industry 4.0 in the banking and financial sector. These technologies are currently being utilized in the creation of industry 4.0. These include the Internet of Things (IoT), Blockchain (Blockchain), Big Data (Big Data), Machine Learning (ML), Artificial Intelligence (AI), and Cloud Computing (Cloud) and (Metaverse).**The following will serve as an overview of the article's objectives and contributions in their respective categories:**

- This study aims to shed light on the many positive aspects of IoT in the financial sector. In addition, it provides suggestions for how academics and business executives can improve the productivity of their fields through the adoption and implementation of this technology.
- The author also will also try to spread awareness about cloud computing, a relatively new technology that plays an important part in many industries, including finance, investment, marketing, smart manufacturing, and many others.
- This article will discuss the various services that can be provided by artificial intelligence and machine learning technologies and the challenges that businesses face when attempting to implement them.
- The author of this piece discusses blockchain, a relatively new technology, and attempts to outline its benefits while also illuminating the challenges the industry faces in adopting and implementing it.

REVIEW OF LITERATURE

The digital transformation driving Industry 4.0, also known as the fourth industrial revolution, is occurring at a significantly faster rate than in the past. The prospects for environmental sustainability that this revolution will bring have people feeling very hopeful. People's everyday lives and livelihoods are being radically altered by this revolution. [7].The "4.0" Industrial Revolution in technology has led to newfound prosperity for numerous industries, including manufacturing, the management of large data sets, the financial sector, and many more.[8].

Without Industry 4.0, many businesses would fail. Management, healthcare, financial markets, agriculture, smart manufacturing, marketing maturity, human resource management, aerospace, and many other sectors are growing gloomy [9]. With the advent of mobile money, electronic currency has largely supplanted physical bills and coins, rendering

counterfeiting and petty theft obsolete. Most business owners have started using this method, which involves paying vendors with mobile money, to better manage their trade credit. [10].fintech companies are tapping into the wide range of possibilities presented by AIto open the mainstream financial market to people with lower incomes, the poor, women, young people, and small businesses. [11].

Investment and financial markets have grown concurrently with the expansion of the so-called "Internet of things" (IoT) [12]. IoT is particularly excelling in variety of fields like in data mining, emerging finance, finance and operations management, and financial decision making [13].Moreover, cloud computing technology is thriving as a tool for managing money and facilitating macroeconomic analysis and forecasts of the financial markets and their instruments[14].Big data analytics is another successful technology in the financial sector. It influences the many different aspects of the financial markets, such as investment returns, stock market predictions, risk and return analyses, index management, and portfolio management.[15, 16]. Artificial intelligence (AI) and machine learning (MI) are two great technologies that are widely used by financial institutions to foresee market movements, forecast risky positions, and inform approval decisions. [17].Blockchain, another technology, has tremendous potential in the banking and finance industries. Smart contracts, securities trading, and international money transfers are all examples of uses for blockchain technology in the financial sector[18].

The Relationship Between New Technologies, Investments, and the Financial System:

- **IoT (Internet of Things) and cloud computing assistance in Investment and Financial Markets**

The Internet of Things, relatively new archetype technology is based on the idea that radios, actuators, mobile phones, and many other electronic devices are always present in our surroundings. This is the primary support structure for the Internet of things idea. The primary objective of the Internet of Things is to make it easier for a wide range of technologies and modes of communication to work together [19]. Interoperability between IoT devices is the end goal. This field is expanding rapidly, and in the not-too-distant future, billions of smart communication gadgets will be built. [20].

Cloud computing, another technology is incredibly helpful for people all over the galaxy. Many businesses are adjusting their strategies to take advantage of this widely publicized phenomenon. By doing ROI calculations in the cloud, businesses can save resources and get a more accurate picture of their financial standing.[21]. Due to the flexibility, scalability, and speed of cloud computing, small and medium-sized businesses (also known as SMEs) can reap significant benefits from its use. [22].

- **Big Data technology assistance in Investment and Financial Markets**

Big data does not simply refer to a large quantity of data; rather, "Big Data" refers to information that is both copious and dynamic. Big data presents unique challenges for every sector. The field of big data analytics has emerged as a possible solution because of its utility in so many decision-making contexts. [23].Data collection in today's financial markets is relatively straightforward, but the efficient management of this data is essential because it guides trading operations. Big data algorithms that assist corporate banks, financial institutions, financial markets, and clients in monitoring trading activities are ideally suited to this task.[24].

- **Machine Learning (ML) and Artificial Intelligence (AI)assistancein Investment and Financial Markets**

Machine learning is not a form of magic; rather, it is a method that employs mathematical equations to mechanically establish new rules for machines to adhere to. This technology automates the creation of new machine rules using mathematical equations. Machine learning allows computers to learn and reasons on their own without being taught to do so. Machine learning teaches computers how to handle complex data and recognize patterns. Machine learning instructs computers[25]. While effective use of machine learning and AI technologies has been seen in the oversight of the financial markets, there are still issues that need to be addressed. If developed further, machine learning technology has the potential to protect the financial sector from fraud and mitigate its effects. [26].

Machine Learning Networks are also developed to predict the fluctuation in stock markets and regional related markets, as well as predict the accuracy and profit performance by utilising a variety of machine learning tactics and approaches. This can be done both globally and regionally [27]. K-means cluster and Data Mining algorithms are examples of Machine Learning algorithms analyse intelligent investments and help investors choose funds that increase returns and reduce risks. Similar methods can evaluate other smart investment products. [28].

- **Blockchain technology assistanceinInvestment and Financial Markets**

The term "blockchain", a form of distributed ledger technology, is used to describe a specific kind of data storage technology that either saves data in discrete pieces or organizes data into blocks [29].Thanks to blockchain technology, a buyer or seller can verify a transaction without the need for a third-party clearinghouse. Consequently, the person exercises more command over his or her personal finances. The educational system also stands to gain from this development, as do those working in the financial sector. It's a novel concept in the world

of academia, but it has enormous potential to improve the field as a whole [30]. Bitcoin, the most well-known cryptocurrency, is not immune to the growing interest in blockchain technology. In 2008, when Satoshi Nakamoto introduced the world to the concept of Bitcoin, the Blockchain technology was effectively used to issue the cryptocurrency. More specifically, the Bank of America hopes to save billions of dollars a year on international transfers by adopting Ripple's XRP token. The unique characteristics of blockchain technology make this a reality. [31].

- **Digital Twin and Metaversein Investment and Financial Markets**

In the realm of smart manufacturing, a technological revolution known as the digital twin is currently taking placein the context of the Internet of Things.Digital twins have many potential applications, but some of the most foundational ones include healthcare, maritime and shipping industry design customization, smart manufacturing and product development, smart city simulation, and future aircraft flaw analysis [32]. Despite widespread belief to the contrary, the global financial markets are not immune to the effects of the current era of rapid technological advancement and innovation. Numerous applications, including the metaverse and NFT markets, are being developed to improve the efficacy of many sectors. Production and distribution of goods and services are both possible for businesses in the Metaverse. Games, file sharing, bitcoin, and other cryptocurrency transactions are among its many other activities.[33].

FINDINGS, RECOMMENDATIONS AND DISCUSSION

In light of all the various technologies discussed so far, the author hopes to make the following suggestions for how these technologies can be improved for use in the investment and financial sectors:

- IoT has shaped banking and finance. . Business struggles with IoT rollout costs, internet connectivity, and standardization. Thus, for FSIs and IoTs to work together, industry participants and leaders must identify the opportunities and risks of internet of things technology in investment and finance.
- Cloud computing is a source of concern not just in the banking and finance industries, but in many others as well. With this technology, banks will have an easier time speeding up transactions and keeping track of relevant data. With its many advantages, including increased data security, decreased operating costs, improved operational agility, and the capacity for rapid reorganization, cloud computing is gaining traction in the financial sector. Financial institutions have been slow to adopt cloud computing due to security, privacy, and compliance fears.

But cloud computing is just getting started. It is recommended that businesses work to alleviate these issues and realize the benefits of cloud computing.

- The banking, insurance, and investment industries produce a plethora of data. Included are extensive descriptions of the clients' preferences, needs, and property. There is simply too much data for them to process at once. The financial industry has seen fewer data management issues since the introduction of big data technology. The financial services sector can gain valuable insight into their customers and enhance the quality of their offerings with the help of fintech tools. If a company is serious about making use of big data, its finance and investment departments need to adopt this strategy.
- The financial sector is also seeing significant progress thanks to AI and Machine Learning. By building the statistical model required to generate forecasts in several areas, including trading activity, fraud detection, current market trends, and customers' use of social media, it can help businesses improve the investment decisions they make for their investors. AI and ML can benefited the financial sector by providing various services such as elimination of mundane tasks, the provision of a frictionless payment solution, and many others. Because of the tremendous amount of work that has gone into developing these technologies, it is absolutely necessary for all financial institutions to implement them.
- Blockchain technology is being used by many banks and other financial institutions. This innovation allows for the transfer of funds while ensuring their security and dependability. Real-time verification lessens the possibility of fraud, mitigates operational risks, and speeds up settlement times. If financial institutions and their clients are to benefit from increased safety, security, and payment transparency, the investment and financing industry must adopt blockchain technology.
- Digital twins and metaverses technologies are effectively using in banking and financial sector. New metaverse protection products must give customers a digital avatar that matches their real body. However, these technologies are still absent in this industry due to a lack of understanding of robots' benefits, a lack of investment capital and qualified human capital within the company, a lack of a digital transformation strategy, and others. As the sector expands rapidly, policymakers should address these challenges and establish regulations that push all financial institutions in this direction.

CONCLUSION:

Because of the ongoing progress of the Fourth Industrial Revolution (4.0), all commercial organizations are obligated to adopt technological developments to enhance their business operations. Any modern business that aspires to be successful must, first and foremost, adopt and adapt to the technological realities of the marketplace. Since the article aims to inform its readers about recent technological advancements and encourages them to put those advancements into practice, it can be useful to all sectors of the economy. This article introduces and advocates for the use of cutting-edge technologies such as Blockchain, AI and ML, Metaverse, digital twin, and Robotic Process Automation (RPA) among industry leaders. Finally, policies should be drafted in a way that makes it possible to overcome challenges encountered as these technologies are implemented in their respective fields of study.

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