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Efficient Large-Scale Data based on Big Data Framework using Critical Influences on Financial Landscape

Bhanu Prakash Paruchuri

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Abstract: One of the most recent commercial and technological concerns in the technological era is big data. Hundreds of millions of events occur on an ongoing basis. The financial sector is significantly involved in the computation of big data events. As a result, hundreds of millions of financial transactions occur in the financial industry each day. Financial practitioners and analysts perceive it as an emerging challenge in the data administration and analytics of a variety of financial products and services. In addition, financial services and products are significantly affected by big data. Determining the financial concerns that big data significantly affects is, thus, an important topic to research with the impacts. This paper used these concepts to show the current state of finance and how big data affects financial markets, institutions, internet finance, financial management, internet credit service companies, fraud detection, risk analysis, financial application management, and more. The connection between big data and economic aspects can be better understood by doing an exploratory literature review of secondary data sources. Because big data in finance is a relatively new concept, further research directions will be proposed at the end of this study.

Keywords: *Devops, Transformation, Industry 4.0. Big Data, Artificial Intelligence.*

I. INTRODUCTION

Data is regarded as one of the most valuable commodities for operating automation systems [1] in the era of technological innovation, where various categories of data are accessible due to the development of information technologies. In this way, financial markets and technology growth have grown inextricably linked to every human activity in the last several decades. Big data technology has become an essential component of the financial services industry and will drive future innovation [2]. Financial innovations are seen as the financial services issue that is developing most quickly. They span a range of financial enterprises, including online peer-to-peer lending, crowd-funding platforms, SME finance, wealth management and asset management platforms, trading management, crypto currency, money/remittance transfer, mobile payments systems, and so on. Daily, each of these services generates thousands of data items. Therefore, In this age of technological innovation, numerous types of data are available thanks to the advancement of information technology; data is recognised as one of the most valuable commodities in the management of automation systems [3]. Managing this data is seen as the most crucial component of these services. Any data loss could result in significant issues for that particular financial sector. Financial experts now use outside and alternative data to help them decide which investments to make.**[9]**

Additionally, financial sectors employ big data to build elaborate decision-making models by running numerous prediction analyses and tracking diverse expenditure trends. The industries can choose which financial products to offer in this way [4]. Financial companies exchange millions of pieces of data. Big data is therefore getting more attention in the financial services industry, where information has a significant impact on key production and success aspects. It has become increasingly crucial in consolidating our understanding of financial markets [5], and the financial industry is continually utilizing trillions of bits of data in everyday choices. It is crucial to the evolution of the financial services industry, especially in the areas of trade and investment, tax reform, fraud investigation and detection, risk analysis, and automation. Additionally, it has transformed the financial sector by surmounting obstacles and gathering insightful knowledge to enhance client happiness and the whole banking experience [6].

IT DevOps Engineer, Virginia, USA.
bhanuscric@gmail.com

Big data is altering finance in five ways, according to Razin [65], including transparency, risk analysis, algorithmic trading, consumer data exploitation, and cultural change. Furthermore, big data has a substantial impact on economic analysis and economic modelling.

The opinions of various academics, researchers, and others on big data and financial activities have been gathered and studied for this study. This study not only seeks to evaluate the existing theory but also to get an in-depth comprehension of the research through qualitative data. However, research on big data in financial services is not as comprehensive as in other financial sectors. There aren't many studies that specifically address big data in various financial research scenarios. Extensive views of big data in financial services have not yet been done, even though some studies have done this for some specific themes. Thus, the requirement to pinpoint the financial domains where big data has a substantial impact is addressed. The research on big data and financial challenges is also rather recent.

This study thus provides previously unpublished emergent financial concerns where big data has a substantial impact. The originality of this research lies in its examination of the impact of big data on financial services. The current state of big data in financial services is examined in this study. This report specifically stresses the impact of big data on online banking, financial markets, and financial service management. This study also offers a paradigm that will make it easier to understand how big data affects finance. Other finance-related services are also included here to demonstrate the broad scope of big data in financial services. These are the additions this study makes to the body of literature. Each of the study's intended audiences will come away with a more complete understanding of big data's applications in finance thanks to this work's contributions to the current literature. Additionally, this study is significant for researchers who are pursuing this field of study. Here, the topic of big data has been examined from many financial angles to give readers a thorough understanding. This study seeks to describe the current state of big data technology in the financial services industry. In addition, efforts have been made to examine the influence of big data on the finance sector from many angles.

II. LITERATURE SURVEY

The idea of big data in finance was borrowed from earlier literature, where certain investigations were published in reputable scholarly journals. The majority of business sectors are currently connected to big data. It significantly affects many business perspectives, including business process management, human resources management, R&D management, business analytics, B2B business processes, marketing, and sales, industrial manufacturing processes, enterprise operational performance measurement, policy making, and supply chain management, decision, and performance, among others [7]. Specifically, [8] cited big data as a significant element of business process management as well as the human resources process to support decision-making. This study also discussed three complex forms of analytics methodologies, such as descriptive analytics, predictive analytics, and prescriptive analytics, in order to improve the standard data analytics process.

[9], [10], [11], and [12] also investigated the importance of big data in business analytics. Big data, which covers any method to collect, store, transfer, and process data, aids in the resolution of corporate issues and data management. [13] discovered that top-performing organizations use analytics about five times more than lower performers. Gaining superior analytics-driven insights requires strong collaboration between business strategy and analytics. [14] Talked about companies like Apple, Facebook, Google, Amazon, and eBay that regularly use digitised transaction data, such as storing the transaction time, purchase quantities, product prices, and customer credentials on a regular basis to estimate the state of their market for improving their business operations. [15] Demonstrated the theoretical and practical contributions of big data in business. This study concluded that B2B relationships may be deduced from consumer search behavior, which is used to assess and gauge competitors' online performance in the US airline market. Furthermore, big data can assist in boosting B2B sales through customer data analytics. Utilizing large datasets from customers leads to much higher sales growth (financial performance results) and improved customer relationship performance (non-financial performance outcomes). It also relates to market innovation with diverse prospects. Indicators of an

organization's capacity for innovation to take advantage of market opportunities include big data, analytics, and applications [16].

Big data has an impact on industrial manufacturing processes as well, giving manufacturers a competitive edge. After examining a case study of two companies, [17] concluded that "NAPC aims for a qualitative leap with digital and big-data analytics to enable industrial teams to develop or even duplicate models of turnkey factories in Africa." This study also defined an overall framework of BDA capabilities in the manufacturing process and noted some benefits of big data analytics for the industry, including increased knowledge, improved performance, and increased transparency. The four most common big data applications (monitoring, prediction, ICT framework, and data analytics) utilized in manufacturing were also noted. To implement the smart manufacturing process, they are necessary. [18] argued that employee ambidexterity is significant because big data management skills and ambidexterity are essential for EMMNEs to meet the needs of global consumers. Big data has also emerged as a frontier of potential in terms of boosting corporate performance. Big data use should improve business performance, according to hypothesis.

That study also said that policymakers, governments, and companies can make well-informed decisions when they use big data. Velocity, variety, and volume have a big impact on supply chain management, according to [19]. For instance, velocity initially presents the greatest chance to increase the effectiveness of the supply chain's procedures. Furthermore, variety supports many forms of data volume in supply chains, which is primarily new. After that, the volume is likewise of greater interest for the multistage supply chains as opposed to the two-stage supply chains. Developed a new model, Supply Chain Operations Reference (SCOR), by combining SCM and big data. This model demonstrates how implementing big data technologies both benefits the sector financially and offers considerable value. This model is suitable for assessing the financial efficiency of supply chains. Additionally, it serves as a useful tool for environmental assessment and comparing various choice alternatives along the chain.

According to [20], who concentrated on the supply chain's decision-making process, data-driven decision-making is becoming increasingly important for managing logistics operations, process improvement, cost reduction, and better inventory management. The relationship between cyber-physical systems and the stream processing platform for Industry 4.0 was demonstrated. In the era of Industry 4.0, big data and the Internet of Things are seen as major influencing factors. These also aid in achieving the two most important objectives of Industry 4.0 applications (increasing productivity while reducing production costs and ensuring optimum uptime throughout the production chain). Issues with proactive diagnosis and maintenance (PD&M), safety & risk analysis (S&RA), and quality & process control (Q&PC) as manufacturing process difficulties. Noted that one of the most difficult difficulties in the field of big data is finding innovative ways to store and handle various sorts of data.

Furthermore, big data encompasses more unstructured data than structured data for both data storage and data analytics approaches, according to [21]. Examples of this include text, graph, and time-series data. Identified two significant hurdles for combining internal and external data for big data analytics. These are connecting datasets from different sources of evidence and choosing useful data for analysis. Identified four challenges in PSM as methods paradigms: precision and relevance for tiny data-based frames of reference, challenges adapting to dynamic production systems, urgent need for forecasting-based research, and difficulty determining causal relationships quickly and economically. The debate above was based on various business sectors. Regardless, a few studies, including concentrated on various viewpoints of financial services. However, the contribution to this field is not increased. The current trends of big data in finance have been identified in the findings section based on those studies.

III. PROPSOED METHODOLOGY

Finding scholarly research on the topics of big data and finance is the goal of this project. In order to complete this research, secondary data sources [22] were utilized to acquire pertinent data. The study used the online databases Scopus, the web of

science, and Google scholar to find additional data [23]. Big data finance, big data and finance, big data and the stock market, big data in banking, big data management, and big data and FinTech are the keywords of this study. The researcher occasionally looked at publications on the Internet that had not been published in academic or peer-reviewed journals, but the search was primarily limited to those. Search engine information can occasionally aid in understanding a subject. Big data has already been studied, but the amount of data on it in finance is not as great. For this reason, we did not restrict our search to a specific time frame, as doing so could have narrowed the field of this study's study.

After reviewing the literature, this study discovered that big data is largely associated with the financial market, specifically Internet finance. Credit Service Company, financial service administration, financial software, etc. The four main categories of the financial industry—financial markets, online marketplaces, lending companies, and banks—are the focus of the statistics. These businesses generate billions of pieces of data every day as a result of their regular transactions, user accounts, data updates, account modifications, and other operations. These businesses analyses zettabytes of data and utilise it to forecast customer preferences based on past behaviour as well as the degree of credit risk associated with each user. On the basis of these data, financial institutions aid in decision-making [24]. However, various financial institutions are processing big data and receiving assistance for verification and collection, predicting credit risk, and detecting fraud. As billions of data are being generated from many sources, missing data, data quality, and data reliability are all critical issues. Regardless, the concept of the significance of economic large-scale data is starting to shape [25], in which the sources of financial market information are cited as stock market data (e.g., stock prices, stock trading volume, interest rates, etc.), social media (e.g., Facebook, Twitter, newspapers, advertising, television, etc.). Market return prediction, volatility forecasting, position valuation, spotting excessive trading volume, risk analysis, stock price changes, option pricing, algorithmic trading, idiosyncratic volatility, and many other financial market applications rely heavily on this information.

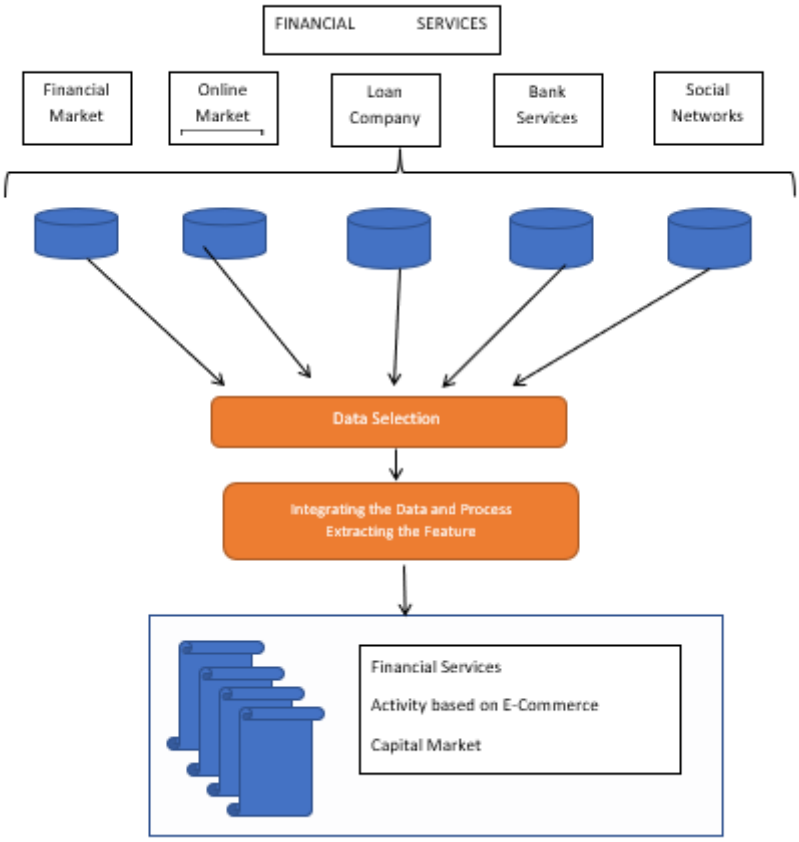


Figure 1. Financial Data Processing

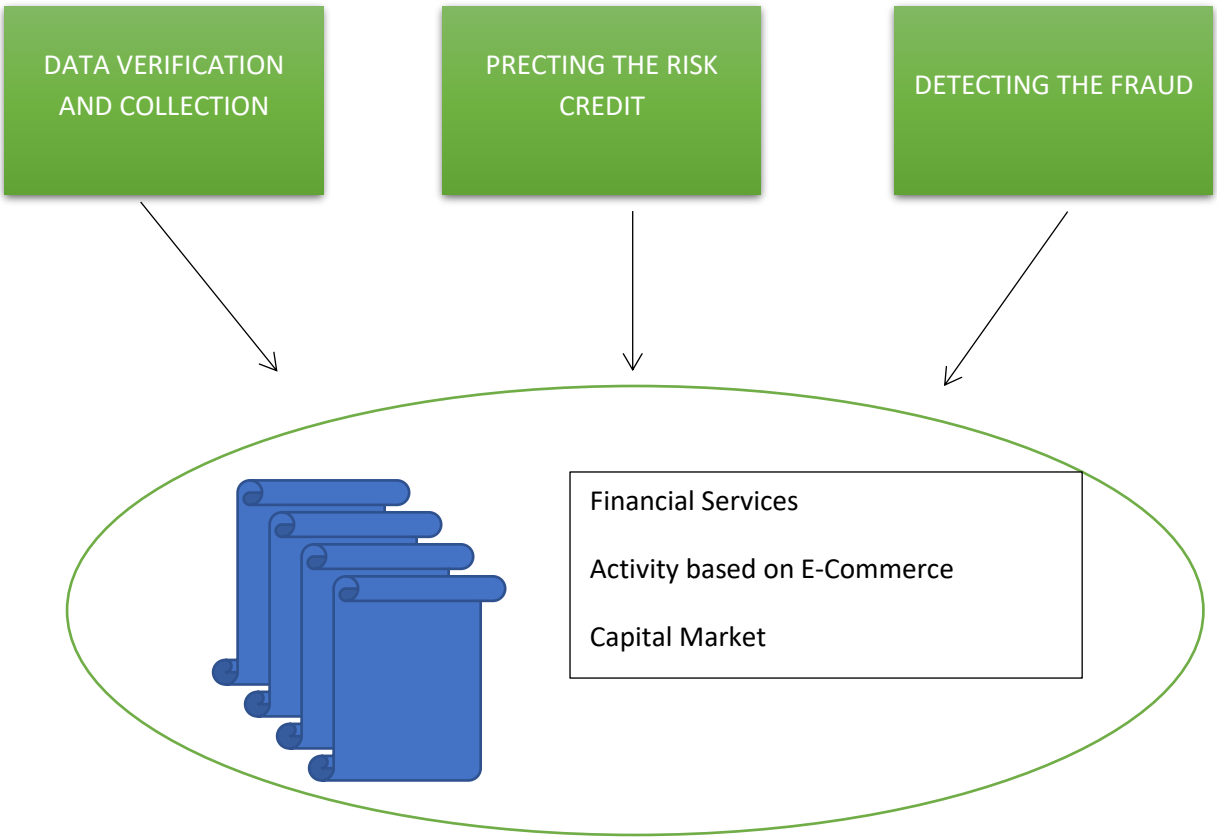
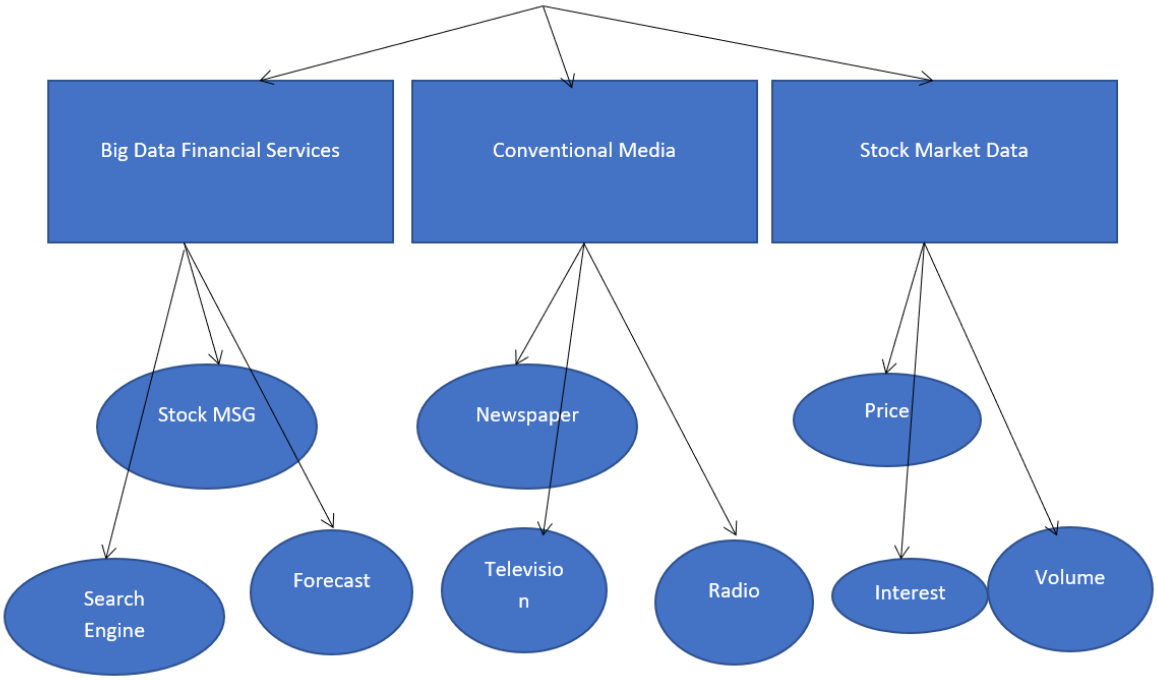


Figure 2. Financial Services Offered



Based on the Figure 1 and 2, some financial outcomes are identified and summarized below,

- Trading Algorithmic
- Pricing Option
- Analysis the Risk
- Evaluating the Market
- Forecast the Financial
- Managing the portfolio

IV. RESULT AND DISCUSSION

Massive amounts of data and increasingly complex technologies are altering how businesses compete and function. The financial sector is also utilizing these massive data sets. It has had a significant impact on the finance sector in addition to having an impact on numerous scientific and social disciplines. This study discovered various financial fields that are directly related to big data after studying the literature, including financial markets, internet credit service providers and internet finance, financial management, analysis, and applications, credit banking risk management, and so forth. These topics are categorized into three groups here: big data implications for financial markets and company financial growth; big data implications for internet finance and value creation in internet credit-service companies; and big data in financial management, risk management, financial analysis, and applications. Big data in these financial domains is the study's contribution. Also, these are seen as the new landscape of big data in banking in this study.

A. The effects of big data on financial markets

Technology is sought by financial markets for many activities, particularly those with favourable influence and transformative impacts. [26] explain that the efficiency of financial markets is primarily attributable to the quantity and diffusion of information. In this regard, social media unquestionably plays an important role in financial markets. It is viewed as one of the most influencing forces on people in this sense. It generates millions of information items daily in global financial markets [27]. Big data primarily affects financial markets through algorithmic trading, index performance, return forecasts, volatility forecasts, market valuations, excess trade volumes, risk evaluations, and portfolio management.

Both the efficient market hypothesis and market dynamics are impacted by this phenomenon. Impact on the efficient market hypothesis can be measured by looking at things like how often specific stock names are referenced, how easily sentiment can be gleaned from material, and how often certain keywords are searched for. A frequent illustration of how the efficient market hypothesis is impacted is Yahoo Finance. The impact of financial big data, however, typically depends on specific financial theories. It aids in sentiment analysis in the financial markets, which is a well-known machine learning technique with large datasets, Address the hypothesis that huge enterprises, due to their extensive economic activities and longer firm histories, oddly gain from big data.

Even large companies often generate more data than tiny companies. Big data also impacts corporate finance in various ways, including by attracting more financial analysis, lowering equity uncertainty, lowering a company's cost of capital, and lowering the expenses of investors anticipating in relation to a financial choice. It lowers the cost of capital as investors' process more data, allowing major enterprises to expand. Financial markets can digest more data, earnings reports, macro announcements, export market demand statistics, rivals' performance measurements, and forecasts of future returns thanks to widespread and transformational information technology. By forecasting future returns, investors can reduce uncertainty regarding investment outcomes. Statement that "More data processing lowers uncertainty, which reduces risk premia and the cost of capital, making investments more attractive," is indicative of this.

B. Impacts of big data on online finance and value generation at an online credit service provider

The way banks and FinTech companies deliver their services has undergone a dramatic change as a result of technological improvements. When considering how big data affects the financial industry and its services, the procedure might be emphasized as a contemporary improvement to financial access. Particularly, online transactions, banking software, and Internet banking generate millions of data points every day. Consequently, managing these millions of data is an essential topic. Because controlling these online lending providers has significant effects on the financial markets. Emphasize data volume, service variety, information protection, and predictive correctness in this study to illustrate the connection between information technology, e-commerce, and finance. Big data enhances risk-based pricing and management to reduce knowledge asymmetry and increase efficiency.

Additionally, it aids in data collection and verification, forecasting credit risk, and fraud detection [28]. Data mining technology is essential for risk management and fraud detection. Big data has a big impact on Internet credit service providers as well. The ability to evaluate more borrowers, including those with poor financial situations, is the first effect.

Big data is essential for credit rating bureaus as well. For instance, just 0.3 billion people's financial records are available from China's two national credit agencies. Other individuals only have identity and demographic data (such as an ID, name, age, marital status, and level of education) and it is not conceivable to derive accurate credit risk projections using conventional methods. This situation severely restricts financial organisations' ability to reach out to potential customers [28]. Big data helps in this situation by enabling unrestricted data access. In order to deal with credit risk successfully, financial systems use clear ways to share information. By fusing the benefits of cloud computing with information technology, big data can have an impact on both businesses and people's market-based credit systems. The use of cloud computing and big data services by mobile internet technology has created a crystal pricing formation process in conventional financial transactions that are not internet-based. This is another driving force. Along with informing lenders and borrowers, it fosters goodwill among the regulatory agencies overseeing the banking and securities industries. When a corporation has a vast data set from several sources, it results in multi-dimensional variables. However, handling these large datasets is challenging; occasionally, if these datasets are maintained improperly, they may even appear to be a burden rather than a benefit. In this regard, the notion of data mining technology described to manage a large number of data about financial markets can help to alleviate these challenges. FinTech businesses may handle their information reliably, efficiently, effectively, and at a relatively cheaper cost than traditional financial institutions by managing enormous collections of data. They can conduct more thorough analyses and offer more client services. They can also profit from the evaluation and forecasting of systemic financial risks [29]. The fact that some people or small businesses might not be able to afford to access big data directly is a crucial concern.

In this situation, they can benefit from big data through a variety of information companies, including expert consulting firms, pertinent governmental organisations, pertinent commercial agencies, and so forth.

C. Handling financial services with big data

Big data is a growing problem in practically every sector of business. Specifically in finance, it impacts facilities like financial management, risk management, analysis, and data handling for financial applications. The business models of financial organisations and financial management are being dramatically altered by big data. Additionally, it is currently regarded as a fascinating area. In this fascinating area, scientists and experts are attempting to propose novel finance business models by taking into account big data techniques, particularly techniques for risk control, financial market analysis, creating new

finance sentiment indexes from social networks, and setting up information-based tools in various inventive ways [30]. The four Vs of big data. Volume (huge data scale), Variety (various data formats), Velocity (real-time data streaming), and Veracity (data uncertainty) are these. These features include a variety of management, analytical, financial, and application-specific issues. These difficulties include figuring out new business models, handling conventional financial problems, and effectively and efficiently administering the financial system. High-frequency trading, credit risk, attitudes, financial analysis, regulation, and risk management are conventional financial topics.

Every day, financial companies acquire billions of pieces of data, but they rarely use them all at once. The data assists firms in analysing risk, which is regarded as the most influential element influencing profit maximization. Systemic risk modelling was mentioned as one of the most crucial aspects of financial risk management. It primarily places emphasis on estimating how closely related financial institutions are. Additionally, it aids in managing operational and integrated risk.

By improving the models' quality, especially when applying the application and behaviour scorecards, it has an impact on risk management. Additionally, it elaborates and interprets the results of the risk analysis considerably more quickly than conventional methods. Furthermore, it aids in the detection of fraud [31] by minimizing manual efforts in issues such as money laundering, credit card fraud, and so on. By empowering risk analysts to do preliminary data checks and create a repair strategy tailored to each market risk, it also aids in improving computational performance, handling data storage, constructing a visualization toolkit, and developing a sanity-check toolbox. According to [32], "Finance is a technology of control, a point illustrated by the use of financial documents, data, models, and measures in management, ownership claims, planning, accountability, and resource allocation."

Furthermore, big data methods support the measurement of credit banking risk in home equity loans. Every day, millions of financial transactions contribute to the expansion of company databases [33, 34].

These large datasets might be challenging to manage at times. An automated assessment of credit status and risk metrics is required to address those issues within an acceptable amount of time. The assessment of credit risk and the management of financial databases are issues that bankers are currently having. Using big data practises, financial records are managed so that different risk groups can be set up [35]. Big data is also particularly beneficial for banks in their efforts to adhere to legal and regulatory standards in the areas of credit risk and integrity risk. Big data strategies must constantly be used to manage a large dataset in order to provide quicker and more accurate estimators. Financial institutions gain from more precise and enhanced credit risk assessment. By doing this, financial institutions run less of a risk when estimating a client's capacity to repay a loan. As a result, more people have access to credit loans, while banks minimize their credit risks. Big data and additional financial concerns

The Internet, as one of the major data platforms, is playing an increasingly important role in people's everyday financial lives as well as in the global financial system as a whole. The data you get from the Internet is always important. The association between Internet message board activity and unusual stock returns and trade volume is examined by Tumarkin and Whitelaw [36, 37]. The study discovered that abnormal message activity in the Internet sector shares influences investors' opinions, industry-adjusted returns, and trading volume, as the Internet is the primary channel for information dissemination. As a result, investors are always looking for information online and elsewhere. Most of this material is found by using various search engines. Discovered that atypical information queries on search engines increase roughly two weeks before the earnings announcement.

According to this study, information diffusion does not occur immediately after the publication of earnings data but rather spreads out across the time before and after the

announcement. This study also found a further substantial correlation: information demand is positively correlated with media attention and news, but negatively correlated with investor distraction. The volatility of search volume has an effect on volatility that lasts for a long amount of time, and the volatility of search queries helps forecast future volatility Micro blogging has a large impact on the information environment, which in turn affects how the stock market behaves.

V. CONCLUSION

Big data, machine learning, artificial intelligence, and cloud computing are driving the finance industry's digitization. Large firms are adopting these technologies to implement digital transformation, enhance profitability, manage losses, and meet consumer demand. Most companies are gathering new and useful data, but it's not clear how this will impact the financial industry. In the future, all financial services will be exceptionally sophisticated and will regard data with the same importance as the circulation of blood.

The findings of this study provide sufficient evidence to assert that big data has fundamentally transformed the financial sector, specifically in terms of immediate stock market intelligence that has altered trading and investment approaches, the identification and prevention of fraudulent activities, and accurate risk assessment using machine learning. These services have a positive effect by increasing sales and customer satisfaction, improving the process of making a purchase, making workflow more efficient and reliable, analysing financial performance, and managing growth. There are still some significant big data issues in the finance sector, even with these revolutionary service transmissions. The protection of data privacy is a critical concern for big data services. In addition to data quality, regulatory regulations are often perceived as significant challenges. Even though many financial products and services use data, big data and finance research is still young. Given this, it becomes useful to examine this work in order to locate potential areas for further research. Future financial data management systems will need to overcome several types of technical difficulties while trying to realise the benefits of big data. Financial analysts and researchers should concentrate on the challenges of managing enormous data volumes when trying to produce game-changing solutions. Therefore, it is imperative to emphasise the importance of effectively handling extensive data sets for major corporations in contrast to small businesses. The persistent issue is that databases grow larger as industries grow. Managing such large data sets can be costly, and accessing them can frequently be extremely difficult. Oftentimes, small organisations and individuals lack direct access to large-scale datasets. Hence, future studies could focus on enhancing the accessibility of large datasets for small enterprises. It is crucial to prioritise the analysis of how big data impacts financial markets, products, and services. Further investigation is necessary into the security risks posed by big data in financial services. Furthermore, it is necessary to expand the formal and thorough procedure of implementing big data strategies in financial institutions. Specifically, the impact of big data on the stock market should be studied further. It is important to experimentally highlight the increasing concerns regarding big data in finance that were addressed in this study, in future research.

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