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Data Governance, Bias, and Ethical Risk in AI-Driven Financial Services

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Abstract: The use of Artificial Intelligence (AI) in financial services has really revolutionized decision-making in various sectors, such as credit scoring, fraud detection, risk management, customer services, and investment analysis. However, even though there have been tremendous developments, increased reliance on AI has sparked serious issues surrounding data governance, algorithmic biases, and ethical risks. In this paper, the link between data governance and ethical issues in AI is examined. Poor data quality, lack of data governance mechanisms, and biased data sets have been identified as sources of discrimination, lack of transparency, and unethical risks in financial services firms. This work examines other ways through which AI algorithms are biased in terms of their impacts on issues relating to financial inclusion, user trust, and governance. Furthermore, ethical challenges such as privacy intrusion, failure to provide any form of explainability in the process, and the black box phenomenon, among others, are identified. Using relevant literature and existing frameworks guiding the governance of AI systems, the research focuses on the importance of responsible AI practices that include fairness auditing, explainable AI, and effective data management, among others. From the above findings, it has become clear that effective data governance is crucial in addressing ethical challenges and making sure that AI technology operates in an ethical way within the banking industry. This paper reveals that there is a need for banks, regulators, and policymakers to implement effective governance frameworks and policies so as to achieve the right balance between innovation and responsibility.

Keywords: Artificial Intelligence; Data Governance; Algorithmic Bias; Ethical Risk; Financial Services;

1. Introduction

Undeniably, Artificial Intelligence has become one of the most discussed topics around the world. It is even believed to be the driving force behind the 4th industrial revolution. Just as was the case with earlier technologies, those countries able to harness the power of AI could have an upper hand and even economic dominance. Fast integration of AI into businesses and industries will lead to a significant transformation of all business processes and models, and thus, be the key driver of the global economy's future development. It goes without saying that all states and players try to do everything possible to implement AI [1]. Data plays a key role in the field of artificial intelligence (AI).

Data allows artificial intelligence to think, build, define, form, evolve, and test the reliability of AI systems. While data governance is not everything when it comes to regulating AI, it definitely plays a key role in defining AI. Autonomous system characteristics, therefore, can be fully explained in terms of the

data that is used in its creation, either training data, input data,

validation data, or test data [2]. The foundation of AI technology depends on big data that will then be used to make predictions. Therefore, data governance becomes vital in ensuring that AI is ethically and effectively implemented in business sectors.

Data governance involves policies, practices, and procedures aimed at protecting an organization's data resources. Data governance is necessary in business organizations. In order to protect patients' data, adequate Measures should be put in place [3]. Data governance is quickly emerging as an overarching concept that should be used for ensuring integrity in data management in response to present and future legal needs. Nevertheless, there are certain weaknesses in the typical practice of data governance in terms of adapting to the speed of modern enterprise settings and requiring totally new approaches [4]. In this paper, the importance of having a well-defined data governance framework as the key to implementing secure artificial intelligence technologies is addressed [5]. It is argued that, in addition to being about compliance, a governance framework is the key to linking innovations and managing risks. With governance embedded throughout the process of developing AI applications, its full potential can be realized.

2. Literature Review

This research highlights ethical threats to AI in finance by analysing problems such as bias and lack of transparency. The study shows that minority applicants for loans are 2.5 times more likely to be denied despite having the same financial profile as others [6].

The research combined bibliometric analysis with thematic analysis based on content to offer an all-inclusive overview of the existing literature on AI ethics in banking.

Four primary themes can be identified in the literature review conducted: Ethical governance, AI applications, Customer-centered AI solutions, and Risks and ethical decision-making.

The need for harmonization of regulatory instruments to cope with ethical challenges in using AI in banking is considered essential [7].

The article by [8] discussed the ethical issues that may arise when applying AI to the finance industry.

There is a need for a balance that promotes innovation without compromising equality and transparency. This is evident from case studies on the application of AI within the finance industry.

This paper by [9] suggested an approach to governance that would ensure increased compliance with AML and data protection legislation.

It employed an AI transaction monitoring system compliant with the COBIT 2019 governance model.

The suggested model enables real-time detection of anomalies and offers transparency through audit logs for ethical application of AI.

It also includes automated regulatory reporting, which reduces the risk of regulatory non-compliance.

Puneet Chopra [10] examined bias, transparency, and accountability in AI finance and also proposed strategies for mitigating ethical challenges in AI.

Eghaghe et al in their work [11] explored ethical implications of AI in AML practices. and they offered governance strategies to mitigate risks and ensure compliance.

This paper by [12] builds sound governance structures that will guide the use of artificial intelligence in risk management in the finance industry in an ethical way.

It improves human intervention by proposing 'human-in-the-loop' AI systems that will allow context and morality.

Ethics have been integrated into the AI systems in their designs and implementations.

This paper by [13] explored the ethical environment of AI in financial decision-making and brought out some of the main problems and areas that need improvement.

It deals with problems of bias, privacy, opacity, and accountability in using artificial intelligence in finance, which included the use of machine learning in credit assessment and algorithmic trading in finance.

This paper by [14] talked about how financial decision-making has been revolutionised by using artificial intelligence, which has helped in preventing fraud, risk assessments, and improved productivity.

The paper touched upon some very serious ethical problems related to the implementation of AI in the finance industry.

Specifically, the research focused on the unconscious transfer of biases from traditional finance methods into AI tools and systems.

The paper by [15] discussed advancing knowledge regarding the association between AI implementation and financial consequences through the prism of governance maturity.

The research presented a credible model that shows how governance maturity acts as a mediator in connecting AI implementation with financial decision-making quality.

This research stressed that having an effective algorithm alone does not help in guaranteeing the quality of decisions made.

2.1 Data Governance

Data Governance provides a framework for decision-making and accountability in Data Quality Management (DQM). This means that data governance involves defining and assigning roles to various decisions. Data governance ensures that there are standards and guidelines set in the organization for DQM that conform to corporate strategies and data regulations. Proposals have been made for managing DQM for firms to enhance corporate data quality. These address the accountability issue in DQM in terms of roles and responsibilities in DQM. Besides, some researchers have discussed the skills required by employees to undertake these roles [16]. From the literature on information technology governance, it is clear that the role-responsibility structure in IT management varies across firms contingent upon corporate governance structure or firm size. Such an analysis has not been carried out for DQM. Existing literature has made certain assumptions about data governance as an approach that is generalizable to all businesses, meaning that it can be applied to any business organization

without changes. This could explain why firms find it hard to develop structures within their organizations to ensure high-quality data.

2.2 Ethical AI and Risk Frameworks

Ethical AI is an approach where we ensure that our artificial intelligence aligns with global ethical values, where fairness, transparency, and the protection of autonomy are of paramount importance. On the other hand, responsible AI refers to translating ethical values into organizational structures, thus ensuring accountability and managing risks. The absence of responsible AI and algorithm fairness has caused problems for many companies. Ethical AI requires alignment with universally accepted moral values, emphasizing fairness, openness, and respecting individual freedom [17]. On the other hand, responsible AI refers to applying ethical considerations within practical organizational contexts, guaranteeing accountability, establishing trust, and reducing risks across all AI systems. The absence of responsible AI and fair algorithms led to numerous difficulties for various companies and organizations. However, while ethical AI represents 'the doing of what is morally right,' responsible AI makes this concept operational, integrating it into organizational processes and structure. Consequently, there is a critical requirement that organizations must take a dual-focused approach by combining ethical and responsible AI to address the rising issues regarding AI governance. However, how is this to be accomplished effectively within different sectors and nations? Therefore, there could be an immediate need for developing a circular model integrating these concepts with theoretical models such as Kantian ethics and Agency theory to solve the ethical problems related to the AI ecosystem. While Kantian ethics stresses fairness, transparency, and the rights of stakeholders, and agency theory examines the various issues of conflict of interest between the organizational principals and the agents, Kantianism underscores the importance of adhering to certain laws relating to individual privacy and the right to make decisions. Through a combined approach of these two theories, the article reveals how ethical standards can be applied to Responsible AI. According to agency theory, there is the issue of the principal-agent problem, which involves the conflict of interest between principals and agents, hindering the implementation of Responsible AI. The principals will concentrate on optimizing profits, while the agents will be interested in their positions. Responsible AI provides a mediating approach for resolving this dilemma by fostering. An inclusive and transparent decision-making process consistent with ethical obligations and organizational goals.

2.3 Overview of AI ethics in Finance.

The financial services sector represents just one of many sectors that are heavily affected by advances in AI. The way financial services are offered worldwide is changing with the advent of new AI technologies, which enable automation of routine processes and more intelligent decisions to be made. The application of AI in the financial sector provides some inappreciable advantages for financial services in such areas as credit rating, fraud detection, personalized banking, and investments. However, ethical issues emerged as more prominent when AI became a part of the process [18]. The introduction of artificial intelligence to the financial services sector raises concerns on the grounds of privacy, transparency, accountability, and justice; therefore, the field of AI ethics has emerged in the finance domain. Ethicalities should be developed for AI to be used correctly because the systems use vast amounts of personal and financial data, and it is impossible not to incorporate any bias or outcomes into the algorithms. This is not just an issue of biased financial gain but is a larger sphere of ethics where issues concerning finance and society, such as inequality and hazards, play a role. The ethical issues that need to be addressed when AI continues to be utilized arise out of its immense influence on the banking industry [19]. It pertains to how geopolitical factors such as the US, Europe, China, and India govern the regulation of AI in the finance industry. Every geopolitical region has its own theories of AI ethics with varying degrees of importance to consumer protection, privacy, algorithm explainability, and more.

3. Data Governance in AI-Financial

Financial decision-making is increasingly dependent on data-driven models, and therefore, there is a requirement for implementing data governance frameworks. The regulations, such as GDPR, Basel III, and SOX, have changed the entire landscape of data handling through their compliance requirements of accountability and audit trails [20]. There have been plenty of documented cases regarding inconsistent data, system fragmentation, and unclear lineages. This led to the embedding of AI within the governance framework to improve data integrity and regulation compliance. Even with this, the establishment of institutional trust is hampered by ethical, technical, and operational considerations. The relationship between the accuracy of algorithms and the sophistication of governance has therefore been seen as a critical factor affecting decision-making. There have been many fast advancements in the use of AI, particularly machine learning, natural language processing, and deep learning, within data-driven financial sectors. The applications of these AI tools include risk analysis

improvement, enhancement of analytics, anomaly detection, and compliance management. AI algorithms are now more efficient at handling complicated and unstructured data sets. Data classification has been automated, lineage tracking assured, and privacy and security measures strengthened by AI in governance structures. Nevertheless, discrepancies in implementation and differences across sectors have remained evident. The realization that technological advances need to be integrated into a governance perspective for effective decision intelligence is becoming more pronounced in the finance industry.

Data governance has not performed satisfactorily in several areas. This is because interoperability and decision quality have suffered due to data silos, legacy systems, and fragmentation. Scalability has been shown to be poor for traditional rule-based data governance approaches in dealing with the volume, variety, and velocity of today's financial data. The inadequacy of static systems in addressing evolution and changes in the data environment poses risks to compliance and operations. Therefore, AI has emerged as a solution to the inability of traditional systems to adapt and evolve; however, there has been less empirical evidence on how AI can help in governance. As a result, a comprehensive review needs to be done on the impact of AI on the development of governance. Governance, in general, entails the development of policies, standards, and frameworks that facilitate the management of data to ensure compliance and avoid any violations. In the instance of AI, data governance assumes greater importance since dealing with sensitive data must be compliant with the laws and ethical requirements. Data regulation guidelines stipulate the direction as far as data acquisition, processing, and security are concerned. Therefore, the importance of compliance cannot be underestimated since non-compliance would lead to significant problems such as lawsuits and reputational harm. Even with all the benefits offered by AI technology and digital transformation, Organizations face several difficulties in adopting AI.

In order to overcome these challenges, companies must adopt a strong approach towards data governance that not only satisfies regulatory standards but also enables ethical innovation in AI. With sound data management policies, organizations can harness the power of AI to achieve their business objectives while remaining compliant and reducing risk.

3.1 Data Lifecycle Management

With the advancement in technology, proper data lifecycle management has been made mandatory by many firms. They aim to remain competitive and comply with all the regulations. Data Lifecycle Management (DLM) includes the whole concept of data life cycle management from the creation of data till the time data is destroyed. These include different processes like the creation of data, the storage of data, and the utilization of data, archiving of data, and finally destroying the data. The significance of data retention and archiving can never be overstated. Businesses create large volumes of data every day, ranging from transactional information, customer details, financial documents, and much more. Data retention makes sure that all essential data is accessible whenever required for business purposes, compliance, and legal reasons. Data retention also helps in making the process of data retrieval faster, which in turn improves decision-making and increases efficiency. Similarly, archiving data also holds great importance because it helps to preserve unused but required data. However, poor data management will create dire consequences[21]. The absence of good data retention procedures can cause loss of critical data, thereby making it difficult to meet all compliance requirements. Poor compliance with data retention standards can bring about large fines and harm the reputation of the organization. Lack of proper archiving can increase storage costs and make data retrieval inefficient. Data breach is another serious risk brought about by poor data management processes.

The audit trail is an accounting concept that defines the documentation of all the amendments made to a transaction entry, their time stamp, the reasons for the amendment, and the individuals responsible for the amendment. Analogously, in clinical trials, Audit trails have been historically applied to ensure the integrity of the data in the trial by documenting all the changes in the data and their time stamps, thus enabling reconstruction of the trial database at any moment in the trial. When computerized storage of trial data was introduced, it became necessary to include audit trails in the software used to manage it. Various strategies have been adopted in the implementation of the audit trails in clinical trial data management systems, as well as in other trials.

The following are the data lifecycle management:

- 1.Data Creation:** Data is generated through a variety of sources, such as transactions, customers, sensors, and processes within the business.
- 2.Data Acquisition:** Data is collected from various sources to be used in the subsequent steps.
- 3.Data Storage:** Data collected is then stored in the form of databases, data warehouses, or cloud-based systems.
- 4.Data Processing:** Data is refined and structured to be useful and ready to be analyzed.
- 5.Data Management:** Procedures are established in order to control the data throughout its lifecycle.

6.Data Analysis: Data is then analyzed to uncover insights and information.

7.Data Visualization and Interpretation: The findings are communicated visually in order to make well-informed decisions.

8.Data Destruction: Unnecessary data is destroyed according to company policy.

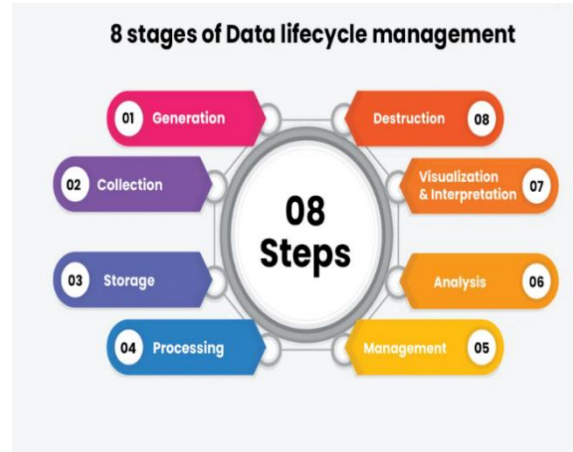


Figure Stages of Data lifecycle management

3.2 Governance Mechanisms

The term Artificial Intelligence (AI) came into existence after the Dartmouth Conference held in 1956. There have been numerous definitions of AI in the 60 years since then. In essence, AI is a machine or system designed to simulate human thought processes. It is a two-faced technology. On the one hand, AI has led to increased efficiency and disruption of various industries, from data mining, pattern recognition, machine learning, and AI platforms, with advancements made in the past six decades. The ChatGPT platform developed by OpenAI in 2022 is a good example of such disruptive technologies. The program gained popularity very quickly. Despite its benefits, there are many risks associated with AI [22]. Most AI models act like black boxes whose results cannot be traced or explained. This leads to an increased risk of the spread of misinformation, violation of privacy, and algorithmic biases that must be addressed. For instance, Google's facial recognition program misclassified some black people as gorillas. Yet, the rapid development of AI technology is making current information-processing techniques obsolete. The broad implementation of AI technology has resulted in several ethical, legal, and social problems. Responsible AI practices have also been found effective in improving financial performance because they mitigate risks and minimize uncertainty [23]. Tackling information bias, privacy concerns, and regulation compliance through responsible AI governance contributes to sustainable technology adoption, which further contributes to better market performance. Nevertheless, although extensive research has been conducted on the effect of AI on organizational performance, little empirical evidence has been provided about the multilevel impacts of responsible AI governance frameworks on organizational performance. Within highly digitized industries, the efficiency of financial governance becomes more dependent on infrastructures supported by information technology (IT). Financial statements, internal controls, risks, and audits are incorporated into enterprise information systems and data management platforms in such a way that both financial trustworthiness and technological reliability cannot be considered independent issues. However, most discussions regarding academic and regulatory perspectives still consider “financial governance” and “IT governance” as separate topics, which have their own theoretical models, performance metrics, and evaluation criteria. In this regard, the combination of financial and IT governance mechanisms, which affects institutional performance, is not adequately recognized. Meanwhile, a significant number of studies focus on the correlation between financial and corporate governance mechanisms (such as board structure, audit, and control committee; ownership; and governance indexes) and performance measures (accounting and market-based). Another line of research indicates that IT governance structures (such as COBIT and ISO/IEC 38500), IT board competence, and dynamic capabilities enabled by IT are linked to higher information quality, better risk management, and superior firm performance. Despite this, however, these two lines of research have developed largely independently, with research on financial governance paying little attention to IT governance, and vice versa, in that IT governance research seldom addresses different types of performance.

3.3 Challenges in Data Governance

(AI), and blockchain technologies are revolutionizing the way institutions produce, manage, and leverage data. These technologies offer opportunities for innovation, efficiency, and competitive advantages. Nonetheless, they pose challenges associated with the inherent challenges of data governance, such as ensuring data quality, data security, and data compliance with regulations. Without proper governance frameworks, institutions will be prone to inefficiencies, data breaches, and non-compliance with regulations that may prevent them from leveraging data to make decisions [24]. Despite the effects of BDG on organizations, its importance is often overlooked, especially within intelligent systems technologies. Most organizations encounter fragmented governance frameworks, unclear responsibilities and accountabilities, and inadequate mechanisms to gauge and improve their data governance maturity.

4. Future Trends

4.1 Emerging Tools

Yet, the field of data governance through AI is witnessing many changes, and several technologies can have an impact on how data governance will evolve in the business environment.

The latest technology of artificial intelligence is always changing, thus making the emergence of different possibilities for implementing data governance systems. This marks the paradigm shift for data governance in organisations. This is not merely a tweaking of the current processes; it is a wholesale departure from the traditional practices related to the usage of data. Important transformations are taking place in data management in various industries due to the development of technology [25]. Many organizations have started using AI technology that is able to operate independently to oversee and modify their data management processes with little human involvement. Organizations are also finding it easier to deal with their data, thanks to new language technology that makes it possible for any organization's employees to navigate through their data management processes through normal conversation with the system. Although still not fully developed for commercialization, quantum computing appears to be a promising solution to complex data problems. Edge computing, coupled with the Internet of Things (IoT), creates new possibilities in processing information at its source. At the same time, blockchain technology is gaining prominence as a valuable tool in data management and security with immutable data and automatic policy enforcement[26]. Along with the progress in analytics and machine learning, this opens new possibilities for organizations to monitor trends and predict issues.

4.2 Future Outlook

The rate of change of data governance in modern times continues to grow as corporations adopt the integration of AI and other technologies into their systems. Corporate leaders have observed that more technologies are becoming capable of functioning independently, more choices exist regarding the security of individuals' data, and there are better ways to integrate two systems together. Companies have found ways to handle their data as they continue incorporating artificial intelligence and other emerging technologies such as quantum computing, blockchain, and edge computing[27]. Yet, such developments come with further complications and problems that must be addressed ahead of time, regarding their data. What's more, the first important thing that they must do is to sit down and look at the data systems that they have and find out how AI can help them. They have to figure out their needs both currently and in the future regarding their data. What is more, the most important thing that they need to do in order to start using AI successfully is sit down and examine the current state of their data management and see how AI can be used to improve it. However, moving towards greater innovation in data governance does not just entail acquiring more technology; it involves changing how organizations view their information. Those at the forefront of doing so are already seeing the advantages of cost savings, rational decision-making, and risk management.

5. Conclusion

The emergence of artificial intelligence (AI) has revolutionized financial services through increased efficiency and improved decisions relating to credit scoring, fraud detection, risk analysis, and customer service. However, the implementation of AI technologies in financial institutions has introduced several issues with regard to data governance, bias in algorithms, transparency, accountability, and data privacy protection.

It is apparent from the literature reviewed here that data governance strategies play an integral role in ensuring the responsible use of AI technologies in financial institutions. Data governance activities, such as ensuring data quality, compliance, auditability, accountability, and ongoing monitoring, help in minimizing ethical and operational risks

associated with AI implementations. Nonetheless, bias in algorithms continues to be a critical issue in AI technologies since AI programs are dependent on historical datasets, which may contain inherent bias against certain social groups. In addition, it is crucial to adopt ethical AI principles such as fairness, transparency, explainability, and accountability, in designing AI-based financial systems.

Using techniques for explainable AI, processes for assessing fairness, and good governance tools can assist organizations in recognizing and addressing their ethical considerations and increasing compliance.

In general, this review highlights the importance of working together between financial institutions, companies, organizations regulators, policy makers, and AI technologies developers to develop governance structures to ensure the effective use of AI in finance. It is important to enhance data governance measures and include ethics considerations in AI governance to address problems such as bias, promote transparency, and ensure compliance.

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