Forum for Economic and Financial Studies 2024, 2(2), 1758.
https://doi.org/10.59400/fefs1758

Opinion

Opportunities and challenges of AI in financial risk management: A brief labour-centric analysis

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CITATION

Kanupriya. Opportunities and challenges of AI in financial risk management: A brief labour-centric analysis. Forum for Economic and Financial Studies. 2024; 2(2): 1758. https://doi.org/10.59400/fefs1758

ARTICLE INFO

Received: 26 April 2024
Accepted: 18 June 2024
Available online: 30 June 2024

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Abstract: This study examines the significant impact of artificial intelligence (AI) on financial risk management. As financial markets become more interconnected, AI adoption has become an essential requirement. AI-driven risk management systems enable financial institutions to streamline operations, adhere to regulatory standards and navigate the complexities of the financial environment. The study uses existing literature on AI's opportunities and challenges; primarily corporate study reports and journal articles to discuss future policy implications. AI's impact extends beyond quantitative evaluations, permeating a culture of innovation and adaptability within financial organizations. The use of natural language processing, machine learning and predictive analytics allows banks to revolutionize risk management strategies. AI enables proactively predicting potential challenges, enhancing the precision and efficacy of risk evaluations. This proactive approach is vital for sustaining growth and resilience in an ever-evolving financial landscape. Investing in AI technologies not only safeguards operations against uncertainties but also redefines the future of the finance and banking industries. The seamless integration of AI into risk management processes positions the financial sector as more secure, efficient and innovative. Cultivating a workplace culture that equips employees with the necessary skills and expertise to leverage AI technologies effectively is crucial. This study highlights the crucial role of AI in financial risk management and its role in securing the future of financial systems, with labour welfare in the centre.

Keywords: artificial intelligence; efficiency; financial risk management; innovation; labour welfare

1. Introduction

Financial services sector especially, the banking industry is increasingly leveraging artificial intelligence (AI) for a variety of applications, ranging from chat bots to fraud detection. These technologies are not only automating processes and optimizing operations in both front and back offices but are also significantly improving the customer experience. With their sophisticated predictive techniques and ability to analyze vast amounts of data, AI tools are becoming essential in Financial Risk Management (FRM), facilitating faster and more effective decision-making in areas such as credit, investment and business operations. Quite understandably, AI and FRM share an intricate relationship [1].

AI has several uses for FRM. In the realm of FRM, AI has become integral to enhancing efficiency and productivity while simultaneously decreasing costs. This advancement is attributed to the technology's proficiency in processing and analyzing extensive amounts of unstructured data at accelerated rates, with significantly reduced human involvement. Furthermore, this technology has empowered banks and financial institutions to minimize operational, regulatory and compliance expenses, all while enhancing the accuracy of credit decision-making processes. Consequently, AI

solutions are capable of producing substantial volumes of timely and precise data, which enables financial institutions to develop expertise in customer intelligence. This capability facilitates the effective execution of strategies and mitigates potential losses. Additionally, AI-driven risk management solutions can be employed for model risk management, including back-testing and model validation, as well as stress testing, in accordance with the requirements set forth by global prudential regulators [1].

This viewpoint is divided into the following sections. First, an introduction to the theme is given. Second, uses and opportunities of AI in FRM are elicited. Third, key challenges of AI in FRM are discussed. Fourth, skill gaps and workforce training are explained in the context of AI-driven FRM strategies. Last, conclusion and future policy implications of the study are explained.

2. Uses and opportunities of AI in FRM

Prior to discussing the uses and opportunities of AI in FRM, it is pertinent to briefly argue on the adoption of AI in the financial sector. Fraud detection remains the primary application of AI in the finance industry. MasterCard, for example, leverages transaction and authorization data to enhance the accuracy and speed of fraud detection and prediction. By minimizing false positives, the number of legitimate transactions that are halted is reduced, thereby enhancing the overall customer experience. The other major application is in predicting credit risk and personalization of customer services. In the wake of early financial AI innovators like the Chinese e-commerce leader Alibaba, an increasing number of companies are harnessing data derived from customers' online activities. The application of machine learning methodologies facilitates real-time assessment of customer transactions, enabling precise calculations of default risks. Consequently, this capability empowers banks to provide more affordable loan options. In 2020, Barclays collaborated with Amazon in Germany to extend credit to consumers at the point of sale, utilizing AI-driven analysis of online behaviour to grant loan approvals instantaneously. Apart from this, AI is also being used for optimizing and streamlining IT operations, boosting digital marketing and enhancing customer and investor experience [2].

2.1. Enhanced forecasting precision

Conventional regression models often fall short in accurately representing the non-linear dynamics between the macroeconomic environment and a company's financial performance, particularly under stressed conditions. In contrast, AI techniques provide enhanced forecasting precision, as these models are adept at identifying and analyzing non-linear interactions among scenario variables and risk factors [1,3].

2.2. Streamlined variable selection methodology

The process of feature or variable extraction can be time-consuming for risk models employed in internal decision-making. However, AI algorithms, when integrated with Big Data analytics platforms, are capable of processing vast amounts of data and identifying numerous variables. A comprehensive feature set that encompasses a broad range of risk factors can contribute to the development of robust,

data-driven risk models suitable for stress testing [1,3].

2.3. Advanced data segmentation

Effective granularity and segmentation are essential for adapting to shifts in portfolio composition. AI algorithms facilitate superior segmentation by taking into account various attributes of the segmented data. The application of unsupervised AI algorithms allows for the integration of distance and density-based clustering methods, ultimately enhancing model accuracy and explanatory capability [1,3].

2.4. Credit risk modelling

Traditionally, banks have relied on conventional credit risk models to forecast categorical, continuous, or binary outcome variables, such as default and non-default scenarios. The complexity and interpretability challenges associated with AI models often hinder their adoption for regulatory compliance. However, these advanced models can still play a significant role in optimizing parameters and enhancing the variable selection processes within existing regulatory frameworks. Techniques based on AI, particularly decision tree methodologies, can yield clear and logical decision rules, even when dealing with non-linear relationships. Unsupervised learning approaches can be employed to analyze data pertinent to traditional credit risk modelling, while classification techniques, including support vector machines, can effectively predict essential credit risk metrics such as Probability of Default (PD) and Loss Given Default (LGD) for various loans (Probability of Default (PD) is a financial term that indicates the probability of a borrower failing to meet their debt obligations over a specific timeframe and is utilized in various credit analyses and risk management frameworks; whereas, Loss Given Default (LGD) is the estimated financial loss a bank or financial institution incurs when a borrower defaults on a loan, calculated as a percentage of total exposure at the time of default or a single dollar value of potential loss, after reviewing all outstanding loans) [4].

Moreover, financial services organizations are increasingly engaging external consultants who utilize deep learning techniques to construct revenue forecasting models that account for stress scenarios [1,3].

2.5. Fraud detection

For many years, banks have implemented AI techniques to manage credit card portfolios, as credit card transactions provide a substantial dataset for training and processing unsupervised learning algorithms. These algorithms have demonstrated a high level of accuracy in detecting credit card fraud, owing to their capacity to develop, train and validate extensive datasets. Credit card payment systems are integrated with workflow engines that continuously monitor transactions to evaluate the potential for fraudulent activity. The comprehensive transaction history associated with credit card portfolios enables banks to identify distinguishing features between fraudulent and legitimate transactions effectively [1,3].

2.6. Traders' conduct

Is currently facing increased examination owing to the utilization of sophisticated

technologies such as natural language processing (NLP) and text mining. These technologies are utilized to identify occurrences of illicit trading, insider trading and market manipulation by absorbing and interpreting meanings from unstructured datasets. NLP, in particular, is widely used in finance for risk management and fraud detection. It allows financial institutions to analyze large amounts of textual data from sources like news articles and financial reports, assessing market sentiment, identifying risks and gauging credit risk. This allows for informed decisions and proactively mitigates risks [5].

By analyzing email correspondence, calendar schedules, attendance records and call durations alongside trading portfolio data, systems can accurately evaluate the probability of unethical trading activities. This anticipatory strategy aids financial institutions in reducing potential reputational and market risks, thereby safeguarding millions in value [1,3].

2.7. Improved customer experience

Incorporation of predictive analytics significantly improves the customer experience, enabling banks to deliver customized solutions that align with each individual's financial requirements and preferences. By acquiring a more profound insight into customer behaviour and inclination, banks can offer more focused and personalized financial guidance, thereby, enhancing customer relationships and fostering loyalty. Additionally, ethical considerations are paramount, especially concerning AI applications. Issues related to customer data ethics, biases in AI and the potential impact on employment represent essential ethical challenges that require a thorough examination [3,6].

3. Challenges of AI in FRM

3.1. Data security, privacy concerns and change aversion

The protection of financial information is of utmost importance, making data security and privacy the foremost challenge. By data security, one refers to the safeguarding of digital data, like database records, from unauthorized access and destructive forces, including cyber-attacks or data breaches. This concept covers the entirety of information security. It incorporates the physical security of hardware and storage devices, alongside administrative and access control mechanisms. Moreover, it addresses the logical security of software applications and the organizational policies and procedures that govern them [7]. Privacy is another vital component associated with financial information. Also known as 'information privacy', data privacy is a principle asserting that individuals should maintain control over their personal data. This encompasses the ability to dictate the methods by which organizations collect, store and employ such information. Data privacy and data security are interconnected fields that are crucial for a company's data governance framework. Data privacy focuses on the rights of data subjects, requiring organizations to establish policies and procedures that enable users to manage their data in compliance with privacy laws. Data security, on the other hand, aims to protect data against unauthorized access and exploitation, implementing measures to prevent threats from hackers and internal

actors. The relationship between these two fields is symbiotic, with data security enhancing privacy by restricting access to personal information to authorized individuals for legitimate purposes and data privacy clarifying who qualifies for access to specific data [8].

As financial institutions adopt cutting-edge technologies, safeguarding customer data against cyber threats is becoming ever more critical. These concerns often result in a reluctance to change within the organization. Employees who are familiar with conventional practices may oppose the integration of new technologies due to apprehensions about altering their established workflows. This resistance, which highlights the human element in the process of technological adoption, can hinder essential transformations [3,9].

3.2. Costs of implementation

Implementation of advanced technologies demands substantial investments in both infrastructure and training. These expenditures can sometimes conflict with budget limitations, compelling banks to strike a careful balance between innovation and financial prudence. Additionally, the intricacies of integration present further challenges. Many banks depend on legacy systems, which complicates the process of achieving seamless integration with emerging technologies. These challenges are further compounded by the need for regulatory compliance. The financial/ banking sector operates under a stringent regulatory framework, requiring strict adherence to guidelines even as technological advancements occur. This compliance not only requires thorough planning but also shapes the direction of technological initiatives [3,10].

3.3. Ethical implications

Furthermore, incorporation of predictive analytics significantly improves the customer experience, enabling banks to deliver customized solutions that align with each individual's financial requirements and preferences. By acquiring a more profound insight into customer behaviour and inclinations, banks can offer more focused and personalized financial guidance, thereby, enhancing customer relationships and fostering loyalty. Additionally, ethical considerations are paramount, especially concerning AI applications. Issues related to customer data ethics, biases in AI and the potential impact on employment represent essential ethical challenges that might require a thorough examination [3,6].

3.4. Regulatory compliance

A significant concern that emerges is the disparity in skills and the need for workforce training. As technological advancements continue, financial institutions must guarantee that their employees possess the requisite skills to utilize these innovations effectively. To bridge this gap, it is essential to implement comprehensive training initiatives that cultivate a workforce adept at navigating the digital environment. These challenges are interconnected, highlighting the complex nature of the financial/banking sector's technological transformation. Tackling them requires not only technical expertise but also a holistic strategy that harmonizes innovation,

ethical considerations, regulatory compliance, and employee adaptability. Effectively addressing these issues is vital for optimizing the advantages of artificial intelligence in risk management. Establishing trust in AI-driven risk management solutions is paramount. Stakeholders must have confidence in the reliability and security of AI algorithms. The use of transparent AI models, coupled with robust cyber security measures, plays a crucial role in mitigating trust and security concerns, thereby enhancing stakeholder confidence in AI applications [3].

Table 1 summarizes the uses/opportunities and challenges of AI in FRM.

Table 1. Uses/Opportunities and challenges of AI in FRM.

Uses & Opportunities of AI in FRM	Challenges of AI in FRM
Enhanced Forecasting Precision	Data Security
Streamlined Variable Selection Methodology	Privacy
Advanced Data Segmentation	Change Aversion
Credit Risk Modelling	Costs of Implementation
Fraud Detection	Ethical Implications
Traders' Conduct	Regulations
Improved Customer Experience	Compliance

4. Skill gap and workforce training: Impact of AI-driven FRM strategies on labour welfare

a) Organizations have various methods at their disposal to evaluate the skill gaps present within their workforce. It is essential to take into account both external influences, such as industry trends and market requirements, as well as specific functionalities of implemented AI systems to ascertain the skills necessary for effectively utilizing AI within organizations. Skill gap analysis serves as a valuable technique to achieve this goal. This process involves identifying the skills required for particular roles or industries and comparing them to the skills currently held by employees in those areas [11,12]. By pinpointing the discrepancies between the required and existing skills, organizations can make informed decisions regarding employee training and development. Identifying these skill gaps allows organizations to customize training programs to meet specific needs, while individuals can focus their learning and development efforts to enhance their job performance, ultimately facilitating career advancement. Several approaches can be employed to conduct a skill gap analysis, including: (1) Surveying employees and managers to collect data on the skills necessary for specific roles or industries, alongside the skills currently possessed by the workforce; (2) Analyzing job advertisements and descriptions to identify the most commonly referenced skills and qualifications; (3) Conducting focus groups or interviews with employees and managers to obtain more comprehensive insights into the skills required for specific roles or industries; and (4) Comparing the findings of the analysis against industry standards or benchmarks to assess the magnitude of any skill gaps [13].

b) Recent research has underscored the significant advantages of upskilling and reskilling for both individuals and organizations encountering skill mismatches. First, these initiatives enhance productivity; by equipping employees with the essential skills required for their roles, companies can boost workforce efficiency [14]. Second, they promote competitiveness; upskilling and reskilling enable organizations to maintain their competitive edge by ensuring a skilled and adaptable workforce capable of addressing the evolving demands of the business [15]. Last, they contribute to improved employee satisfaction; by facilitating opportunities for learning and development, organizations can enhance job satisfaction and engagement, ultimately leading to better employee retention and reduced turnover [16]. The development of innovative methodologies is essential for the introduction of new skills and the reduction of skill gaps. Specifically, after identifying the required skills, it is imperative to establish a comprehensive long-term strategy and methodology aimed at cultivating new competencies and bridging the divide between organizations and their existing workforce. This strategy should encompass tools designed to attract new talent, structured training initiatives for current employees, and the reengineering of work processes. Numerous training and development solutions exist to facilitate and support the upskilling and reskilling of workforce capabilities [17].

5. Conclusion and future policy implications

The integration of artificial intelligence (AI) into financial institutions' risk management framework has significantly transformed the industry. In today's interconnected financial markets, AI adoption is essential for streamlining operations, ensuring regulatory adherence and navigating the complexities of the financial sector. AI's impact extends beyond quantitative analysis, fostering innovation and adaptability within institutions. Utilizing natural language processing, machine learning and predictive analytics, banks can revolutionize risk management strategies and anticipate potential challenges proactively, enhancing risk evaluation precision and efficiency. This proactive approach is crucial for sustaining growth and resilience in an ever-evolving financial environment. The integration of AI into risk management is a strategic imperative, as it not only safeguards operations against uncertainties but also rewrites the future landscape of finance and banking. The seamless integration of AI into risk management processes positions the financial sector for greater security, efficiency and innovation [13].

The research emphasizes the importance of financial institutions fostering a culture of continuous learning and adaptability to stay competitive in the ever-evolving financial sector. AI solutions are just the beginning of this journey, and fostering a workplace environment where employees possess the necessary skills is crucial. Investment in training initiatives, collaboration with AI specialists, and innovation can help adopt AI-driven advancements. The transformative potential of AI extends beyond finance, with studies in retail and construction industries showing similar progress. AI algorithms in construction improve resource allocation, streamline project timelines and cost management, leading to more sustainable and efficient building practices [18]. AI-powered data analytics in retail improve customer

experience, tailor marketing strategies and accelerate supply chain operations [19]. This analysis provides a framework for effectively integrating AI technologies, serving as a reference for other researchers and financial institutions [13].

It is essential to recognize the limitations inherent in this study prior to its conclusion. Rapid advancements in AI could introduce new factors and considerations that this research has not addressed. Additionally, while the paper offers recommendations, it does not thoroughly examine the challenges and costs associated with implementation of advanced AI systems, owing to it being an opinion paper. Future studies could delve deeper into these practical issues, providing a more comprehensive understanding of the obstacles encountered during the AI integration processes. Notwithstanding these limitations, this research establishes a vital foundation for subsequent exploration and enhancement of AI integration within the banking/financial sector(s). By acknowledging both its limitations and strengths, this study contributes to the ongoing discourse and sets the stage for future inquiries, thereby facilitating progress at the dynamic intersection of artificial intelligence, financial risk management and labour welfare [13].

Conflict of interest: The author declares no conflict of interest.

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