

Analysis of the Impact of Artificial Intelligence on Financial Management from a Game Theory Perspective

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Abstract: With the rapid progress of science and technology and the booming economy, artificial intelligence technology has been widely used in all walks of life, and its application in the field of enterprise financial management has also become increasingly widespread, greatly changing the way of financial work. However, many enterprises still have a series of problems in the process of promoting the construction of information technology. This paper takes artificial intelligence as the background, firstly, analyzes the various preconditions for its application in financial management, such as the need for enterprises to have a perfect data system, sufficient technical basis and relevant talents, etc., secondly, explores the impact mechanism of artificial intelligence on the financial management of the enterprise, and carries out research in the three aspects of improving the quality of information, enhancing the efficiency of management and assisting in decision-making, and finally, from the perspective of the game theory, analyzes the internal top management team, business department and IT department of the enterprise. Finally, from the perspective of game theory, This study analyses the relationships between AI and humans, identify the risks that may be brought about by AI's participation in financial management, and finally explore how human beings can collaborate and cooperate with AI to form a stronger intelligent assisted decision-making.

Keywords: Artificial intelligence, Game theory, Financial management.

1. Introduction

Since the twenty-first century, the world has made remarkable development achievements in the field of artificial intelligence(AI). The advancement of AI technology has been significantly bolstered by the robust policy support and strategic planning of numerous nations. These initiatives have not only accelerated the development of AI technologies but also contributed to a notable enhancement of scientific research capabilities across various domains. Globally, the popularity of 5G networks and high-speed optical fibre has provided a solid infrastructure for the development and application of new technologies in AI. Several countries rank among the world's leaders in terms of the number of papers published and the number of talents in the field of AI, and international cooperation has become increasingly active.

Artificial intelligence is being applied in an increasingly wide range of fields, from smart healthcare and autonomous driving to industrial manufacturing intelligence, AI technology is gradually penetrating all levels of society and economy, driving industrial upgrades and lifestyle changes. In addition, AI technology also has a wide range of application prospects in many fields

such as finance, education, urban management and agriculture. In the field of finance, the application of AI helps the intelligence of risk management, credit approval and investment decision-making; in the field of education, intelligent teaching assistance systems can provide personalised learning experiences; in urban management, AI technology helps to improve the efficiency of urban operation and the quality of life of residents; in the field of agriculture, intelligent agricultural equipment and systems can improve the accuracy and sustainability of agricultural production.

However, with the rapid development of AI technology comes a series of challenges, including data security, privacy protection, ethics and morality. The world is actively building a corresponding system of laws and regulations, strengthening AI ethical research, and ensuring the harmonious unity of technological development and social values. For example, the EU has passed the world's first AI regulatory law, the Artificial Intelligence Act, which aims to establish a unified set of norms and regulatory frameworks to ensure that the development and application of AI technology can follow the principles of fairness, transparency and credibility.

This paper takes AI technology as the basis to analyse the prerequisites for AI technology to be able to be applied to enterprise financial management, and on this basis, actively explores the impact mechanism of AI technology on enterprise financial control and value creation, and analyses what aspects of resistance may be encountered in the implementation process based on the game theory perspective, and finally forms a conclusion, as well as an outlook for further research in the future.

2. Literature Review

2.1. Artificial intelligence and financial management

According to studies on AI in the finance sector, the technology has advanced significantly in facilitating the development of expert financial applications that have reshaped the sector[1]. By using this method, AI has enhanced human capacities. In making certain that clients have access to top-notch services, large global organizations use AI tools to identify anomalies that result in the creation of ideal financial tactics. According to a study on AI applications, suggestions that trading algorithms and other advances should be used to integrate information about the shifting price points and market conditions[2]. This is attainable thanks to the patented algorithms that facilitate quick and efficient trading. The financial management team should make sure that the primary responsibilities, which include risk recognition, evaluation, and prevention, are recognized and recorded in the system for better market improvements before introducing the AI features within the company. These distinct aspects have contributed to the excellent interventions that the financial sector has used to expand the provision of contemporary, customer-focused services. The capitalists understand that they need strong techniques to handle financial processes because there is a progress of digitalization from a global standpoint. The primary factor is that when it comes to investing in a variety of technical applications, banks and private businesses should identify the business's emerging sectors.

2.2. Financial management and risk

According to Ross, westerfield, Jordan, financial risk is a company's business activities, a large amount of debt and debt service risk caused by the inability to repay at maturity[3]. Gleason suggests that the main way for enterprises to reasonably predict and avoid financial risks is to set up a special risk control department to make timely response strategies to the occurrence of financial risks[4]. The main way to reasonably predict and avoid financial risks is to set up a special risk control department to make timely response strategies to the occurrence of financial risks. James points out that financial risk identification, financial risk evaluation and the financial risk measures as financial risk management of the three important aspects, to ensure controllability of corporate finance financial risk level[5]. Van Horne believes that the study of the origin of financial risk is important for the

identification of financial risk as well as the response to financial risk has an important role, so this paper focuses on the causes of financial risk, analyses the risk impact factors in detail, and eliminates the factors that have no impact on financial risk[6]. Galyna Osypenko proposes a combination of risk and mathematical models of risk evaluation, management measures, using mathematical analysis methods to quantitatively carry out financial risk[7].

2.3. Game theory and artificial intelligence

Game theory and AI have a rich history of interaction, with AI providing the computational power to analyze and solve complex game-theoretic problems, while game theory offers a framework for understanding strategic interactions in AI systems[8]. The integration of game theory into AI has led to advancements in various applications, such as economic modeling, social interactions, and decision-making processes. AI's role in decision-making processes has far-reaching implications for individuals and society, enhancing accessibility and convenience, creating new career opportunities, and raising ethical considerations[9]. The ethical and human rights implications of biased AI are multifaceted, with biased systems violating the right to non-discrimination and privacy, and highlighting the need for transparency and accountability[10]. Addressing algorithmic bias requires a multidisciplinary approach, combining literature reviews, case studies, and ethical analyses to develop fair and transparent AI technologies that respect individual rights.

3. Conditions for the application of artificial intelligence to financial management

3.1. Data systems

First of all, if AI is only used for some specific financial processing links, such as automated account reconciliation or data entry, it can usually be achieved through existing tools such as robotic process automation (RPA) software, which is actually not more difficult. However, if you want to fully introduce AI into the financial management of an enterprise, this paper argues that the enterprise must build a data system that can support advanced analyses and decision-making. This system should have a high degree of data integration capabilities, and be able to integrate financial and non-financial data from different sources to provide rich data resources for AI[11].

In addition, this data system should support real-time processing and analysis of data, enabling the AI to respond quickly to market changes and make dynamic financial decisions. At the same time, the system needs to have strong predictive analytics capabilities to predict financial trends and potential risks through machine learning and deep learning technologies, providing support for long-term planning and strategic decision-making. The construction of the data system should also take into account compliance requirements to ensure that the data processing and analysis process complies with relevant regulations and standards, and enhances the transparency and credibility of the enterprise[12].

3.2. Technical basis

If you want to fully introduce artificial intelligence technology into enterprise financial management, the technology must be able to meet the conditions. First, enterprises need a powerful data integration platform that can integrate data from different sources and systems, including internal transaction data, market data, macroeconomic indicators, etc., to provide a comprehensive view of data for AI. Second, AI technology must be equipped with advanced analytical tools, including predictive analytics, trend analysis, anomaly detection, etc., to support complex financial analyses and decision-making. Third, AI systems for financial management need to be able to process real-time data streams in order to respond quickly to market changes and make timely financial decisions. Fourth, AI

systems must have the ability to self-learn and optimise, and continuously optimise models through machine learning and deep learning algorithms to improve the accuracy of predictions and decisions. Fifth, AI systems for enterprise financial management must meet the highest security standards to ensure the security and privacy of financial data and prevent data leakage and unauthorised access. And it complies with relevant laws, regulations and industry standards, while being highly transparent to facilitate audits and compliance checks[13].

3.3. Expertise

For enterprises to land AI technology, it is inevitable that the support of professional talents is indispensable. Both talents in the field of AI technology and talents in financial management are crucial. And it is important to have composite talents who understand both to manage.

The implementation of AI technology needs to rely on professionals with deep technical backgrounds, including data scientists, machine learning engineers, and deep learning experts. These talents not only need to master AI-related programming languages, algorithm design and data analysis skills, but also have the ability to solve practical problems.

In the process of combining AI technology with financial management, talents with a financial background are equally crucial. They need to have a deep understanding of an organisation's financial processes, regulatory requirements, and business objectives, and they need to combine this knowledge with AI technology to achieve optimisation and innovation in financial management.

And the effective application of AI technology requires close collaboration between technology specialists and financial management talent. Therefore, cultivating talents with interdisciplinary capabilities who can understand the principles and applications of AI technology as well as grasp the core elements of financial management is key to the successful implementation of AI technology in enterprises.

4. Mechanisms of the impact of artificial intelligence on corporate financial control

4.1. Enhancing Information Quality

The quality of information required for enterprise management can be significantly enhanced by introducing artificial intelligence into the financial management of an enterprise. AI technology is capable of extracting valuable insights from massive amounts of financial data and transforming them into precise business insights through advanced data mining and analytical tools[14]. This capability not only enhances the accuracy and reliability of the data, but also improves the timeliness and relevance of the information, providing solid data support for corporate decision-making.

The application of the AI system also enables real-time monitoring and dynamic analysis of financial data, ensuring that corporate management has timely access to the latest financial conditions and market trends. This real-time data analysis and report generation provides the possibility for enterprises to quickly respond to market changes, optimise resource allocation and adjust strategic direction[15].

In addition, another important contribution of AI in improving the quality of information is its predictive capability. Through machine learning and deep learning algorithms, AI is able to predict future financial performance and market trends, helping enterprises with long-term planning and risk assessment. This predictive analytics provides businesses with a forward-looking perspective, enabling them to manage their financials more proactively, rather than just reactively.

Finally, AI technology can also assist businesses in becoming better at complying with regulations and standards. Automated compliance checking and report generation reduces human error and ensures transparency and compliance in an organisation's financial activities, as well as enhancing its social credibility and market image.

4.2. Management Efficiency

The impact of artificial intelligence technology on enterprise financial management is first manifested in the significant improvement of financial management efficiency. In the traditional financial management model, basic financial tasks, such as bookkeeping, reimbursement, data statistics and accounting, are usually performed manually. These tasks are highly repetitive, have a large workload, and have relatively low added value. This not only increases the human resource costs of an enterprise, but also often makes it difficult to ensure the quality and efficiency of financial work.

With the introduction of AI technology, intelligent financial robots have begun to replace manual execution of these basic tasks, enabling automation, speed and precision processing of processes. The AI system's advanced data analysis capabilities, forecasting and planning functions, risk identification and management, compliance checking, and decision-making support not only help enterprises save costs and improve efficiency, but also enhance the accuracy and foresight of financial management[16].

In addition, AI's self-learning and adaptive capabilities ensure continuous optimisation of its performance, while finance staff are freed from tedious basic tasks and put more resources into more strategic and creative tasks, thus enhancing the overall financial strategy capability of the enterprise. In summary, the application of artificial intelligence technology in enterprise financial management has brought far-reaching positive impacts to enterprises, improved efficiency, reduced costs, and provided support for enterprises to maintain advantages in market competition.

4.3. Assisted decision-making

In fact, the reason for the comprehensive introduction of artificial intelligence into the financial management system of enterprises is that a very important point is to value its ability to rely on big data to assist in the financial decision-making of enterprises. In today's era of information explosion, the amount of data generated by enterprises has increased dramatically, and these data contain deep information and potential value of enterprise operations. By analysing this massive amount of data, AI technology is able to reveal complex patterns and trends, providing a more accurate and scientific basis for financial decision-making.

Firstly, AI is able to process and analyse large amounts of complex data, quickly identify key trends, patterns and anomalies, and provide data support for corporate decision-making.

Secondly, AI technology has advanced predictive analytics capabilities, which can predict future market trends, consumer behaviour and financial indicators based on historical data and market information, helping companies with long-term planning and strategic deployment. In addition, AI systems continuously optimise their algorithms through machine learning and deep learning to improve the accuracy and adaptability of decision-making models and ensure that decision-making recommendations are up-to-date. AI is also able to automate the execution of certain decision-making processes, reducing human error and improving decision-making efficiency. At the same time, AI-assisted decision support systems are able to provide personalised advice and solutions, tailoring decision-making options to an organisation's specific business needs and financial situation[17].

Finally, AI technology also plays a key role in risk management and compliance checking, ensuring that corporate decisions are in line with legal and regulatory requirements and reducing potential risks through real-time monitoring and automated reporting. Combined, these capabilities make AI an important aid in the decision-making process, helping organisations make more informed and efficient decisions in a complex and changing business environment.

5. Relationships between artificial intelligence and humans in financial management based on game theory perspective

As entering the 21st century, with the development of the Internet, the Internet of Things, and in particular artificial intelligence and generalised big model technologies, many traditional occupations are at risk of being replaced by intelligence, and a series of conflicts have arisen as a result. Typical cases include protests over the reduction of customer service representative jobs due to the use of chatbots and virtual assistants to handle customer enquiries; incidents of related employee dissatisfaction and protests over the reduction of demand for cashiers due to the popularity of automated checkout systems; and the decline in the income of traditional taxi and online taxi drivers due to the drop in income of traditional taxis and online taxi drivers as a result of Baidu's deployment of turnip-fast driverless cars in cities such as Wuhan Controversies, etc. It is worth noting that the current new generation of AI-led human-machine systems is completely different from the previous human-machine relationship during the Industrial Revolution, with machine intelligence gradually taking on the characteristics of human intelligence, and even having the momentum of surpassing it, and thus the human-machine relationship has become increasingly tense[18].

Despite this, technology seems to be moving forward all the time. The history of centuries of technological development shows that some machines have successfully replaced human jobs, while others have achieved some degree of symbiosis with humans. There is no doubt that the variety of human occupations today has changed significantly from what it was a few hundred years ago, not only in terms of the emergence of new types of jobs and the demise or transformation and upgrading of traditional ones, but also in terms of changes in occupational structure, changes in the way of working, and increases in the demands placed on occupations. Although human beings have certain expectations of the occupational changes brought about by technology, given that it is difficult for individual workers to learn skills at a pace that matches the speed of development of new technologies, many people still deeply feel the pain of their own occupational development in the midst of technological development, and to a certain extent, they have developed a panic of competence. Therefore, whether the purpose of technological development is to replace human beings or to coexist with human beings has naturally become a hot topic.

In the author's opinion, the substitution may lead to fluctuations in the accounting job market in the short term, but in the long term, it may also create new job opportunities and economic growth points in the field of accounting, such as the creation of new positions like big data analysts and intelligent financial analysts, and the increase of the development opportunities of the R&D and consulting market related to the intelligent financial system, etc. It is important to know how to balance the demand for job stability in the transition period of technological substitution with technological innovation. In contrast to substitution, symbiosis is a good human-machine relationship that can continuously support technological development while taking into account human employment. In essence, symbiosis is also a state of dynamic equilibrium in the process of progressive substitution, because the intelligent system in symbiosis continues to evolve, while the role of human beings in symbiosis continues to evolve, and human beings continue to search for a new position for themselves in symbiosis in the process of progressive substitution. In the human-machine symbiotic relationship, humans and machines should play to their respective strengths, machines should be used for work that is fast, precise, monotonous and repetitive, continuous over time, complex, high-speed computing, and in harsh environments, and humans should be used for work that is creative, situationally varied, non-simplistic and repetitive, requires emotion and empathy, and the instruction of the machine system's work programmes arrangement and programming, as well as supervising and controlling the operation of computer systems and other types of work[19]. In the human-machine symbiosis model, machines augment human capabilities, and humans are responsible for supervising,

making decisions, and engaging in creative work; ultimately, humans and machines work together to achieve greater efficiency and better outcomes than they could on their own.

6. Discussions and proposals

According to the arguments mentioned above, this paper suggests that in order to achieve complementarity between humans and machines, human-machine symbiosis needs to meet the requirements of complementarity, enhancement, flexibility, transparency and adaptability. Among them: complementarity refers to giving full play to the respective capabilities that machines and humans are good at, such as using AI big models to carry out financial statement-assisted analyses, and retaining the human's final decision-making power while the big models provide reference results; augmentation refers to the fact that, on the one hand, machines should be fully utilised to help humans augment their own capabilities, such as through intelligent tools to improve the human's work efficiency, risk control and big data processing capabilities, etc.

On the other hand, humans can guide machines to better understand complex situations and adjust their behaviours according to specific circumstances, thus enhancing their intelligence; Flexibility means that the human-machine symbiosis system can flexibly adjust the roles and responsibilities of humans and machines according to the task requirements and environmental changes, such as changes in accounting regulations, changes in supply chain, and changes in the international market; Transparency means that in order to achieve effective human-machine symbiosis, it is necessary to establish a trusting relationship between the two parties, especially in the decision-making process. Transparency means that in order to achieve effective human-machine symbiosis, it is necessary to establish a relationship of trust between the two parties, especially in the decision-making process, the behaviour of the machine needs to be transparent and interpretable, so that the financial experts can understand the basis for decision-making and validate the results of the machine's decision-making[20]; Adaptability refers to the fact that the human-machine symbiosis system should be able to learn and adapt to the new information, skills, and environmental changes, which should be reflected not only in the level of the human being and the machine, but also in the forms of human-machine interactions and information exchanges. In short, the goal of human-machine symbiosis is to create greater value by combining human intelligence and machine power, rather than simply replacing human work with machines.

7. Conclusion

With the development of intelligent financial systems, machine replacement of human part of the financial position will continue to occur, and the nature of the position to be replaced from those relatively simple basic work penetration into the more complex management and decision-making positions, those who were once thought that only humans can complete the work that the machine can not be redefined. At the same time, in view of the inherent limitations of machine intelligence and the rigorous and standardised characteristics of financial work, complete reliance on intelligent systems is not feasible, at least in the short term. In the throes of constant substitution, an effective response is to guide the development of intelligent finance to the track of human-machine symbiosis, and to give full play to the common role of humans and machines through in-depth exploration and practice of the human-machine symbiosis model. Even if the trend of intelligent systems replacing human beings is unstoppable, this process will take more than enough time to complete, and from the perspective of the formation of the accounting ecosystem, it will take a certain amount of time for society to adapt to this change in order to cultivate new skills, management models and values. Of course, with the development of technology, the State needs to formulate appropriate laws and regulations to protect the personal rights and interests of tens of millions of financial personnel and

social justice, to help everyone gradually adapt to the changes in technology, and at the same time to ensure that the development of relevant technology can serve the overall interests of mankind.

The future of human-computer symbiosis in the field of smart finance will develop in the direction of greater efficiency, intelligence and humanity. With the continuous progress of technology and social acceptance of the human-machine co-operative symbiosis model, it is foreseeable that smart financial systems will become more popular and powerful in the coming years. At the same time, it also means that finance staff need to continuously upgrade their knowledge base and skills to adapt to this new way of working.

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