

Research and Outlook on the Role of Artificial Intelligence in Enterprise Operations and Management

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Abstract. The continuous advancement of science and technology has led to the emergence of artificial intelligence (AI) as a pivotal force in the operation and management of enterprises. This paper aims to examine the role of AI in enhancing the efficiency of enterprise operations and management, with a particular focus on the perspectives of large companies and small and medium-sized enterprises (SMEs). The rapid evolution of AI technology has brought about significant impacts and opportunities for the operation and management of enterprises. The competitive market and changing global environment present challenges to large companies, which must find new operational models to enhance their competitiveness. Artificial intelligence (AI) can assist large companies in addressing risk management and cost control by identifying potential risk factors and providing more reliable data support through data analysis and predictive modeling. Furthermore, AI can improve management efficiency in large companies by automating tedious transactional work and optimizing internal communication processes and teamwork efficiency. Small and medium-sized enterprises (SMEs) are facing challenges due to insufficient specialized human resource management capabilities and lack of risk control. Artificial intelligence (AI) plays an important role in HR management for SMEs, helping to improve the quality and efficiency of the recruitment process, automate HR processes, and reduce costs. Furthermore, AI can identify potential risk factors through data analytics and model predictions, thereby assisting SMEs in reducing losses from risks. In summary, the implementation of AI technology can assist organizations in enhancing operational management efficiency, optimizing existing operational processes, and developing novel business models and growth opportunities. Studying the application and impact mechanisms of AI in different fields can provide theoretical support for enterprises to formulate more effective strategies and management tactics. Furthermore, it can help them to better understand and apply AI technology, thus enabling them to better cope with the market competition and uncertainty environment. Ultimately, this will facilitate continuous innovation and development.

Keywords: Artificial intelligence, Operational management efficiency, Automation, Risk control, Innovation capability.

1. Introduction

With the rapid change of technology, artificial intelligence (AI) has been deeply integrated into our daily life in. The concept of AI, which is the ability of machines to communicate with humans and their simulation of human abilities, has been widely discussed since 1990 (Schutzer, 1990) [1]. As time passed, the use of AI in enterprises has become widespread and has had a profound impact on all aspects of the organization (Toorajipour et al, 2021) [2]. In recent decades, the rapid development of AI technology has brought unprecedented impacts and opportunities for enterprise operations and management. Facing the increasingly fierce market competition and the ever-changing global environment, enterprises urgently need to find new operation modes to enhance their competitiveness (Waheed et al, 2019) [3]. In such an era, AI technology has become an important tool for the transformation and upgrading for enterprises. It can not only optimise the existing operational processes and improve efficiency, but also create new business models and growth opportunities for enterprises. Nowadays, AI technology has been widely used in various fields of enterprises, bringing significant benefits to enterprises.

There have been many studies focusing on AI and business operations. Hansen conducted a comprehensive survey on the use and prevalence of AI in SMEs. It was concluded that AI can help

SMEs to better adapt to future trends of economic growth and recovery as well as address related challenges [4]. Kulkov found that AI has a significant impact on companies of different sizes in the areas of production, research and development, and management by conducting qualitative interview studies with a certain number of large, medium, and small pharmaceutical companies, respectively [5]. Hemalatha et al. examined how AI affects the recruitment process of companies based on four capabilities of AI dealing with natural language, machine-based visual perception, automated processes, and enhancement. The study shows that AI benefits organizations by improving recruitment efficiency and accuracy, saving costs and eliminating bias [6].

According to Taguimdje et al., the data collected from the database website of solution providers of AI shows that AI plays an important role in improving the management capabilities of organizations [7]. Lu et al. systematically combed through a series of relevant research findings published since the COVID-19 outbreak in 2019. They discussed in depth the various challenges faced by AI in the transformation of the small and micro medical field and pointed out a clear direction for future research based on the current technical difficulties and external environmental threats. The study found that emerging technologies such as AI can help small and medium-sized businesses gain a competitive advantage or provide a means of survival in a wide range of areas, including manufacturing, e-commerce, accounting, human resources, marketing, and customer relationship management. However, the introduction of these technologies also means that SMEs may face new challenges in terms of human resources, financial support, and physical resources [8]. Davenport et al. In their 2020 study, they found that AI plays a pivotal role in predicting customer purchasing power as well as planning promotional campaigns. However, they also pointed out an important issue with AI, namely data privacy. As a result of this issue, it is important for policymakers to thoroughly consider the possible impact of AI when using it and to ensure that AI technology is used rationally and effectively while respecting user privacy [9].

Li et al. draw important conclusions from an in-depth study of the impact of AI on firms' innovation efficiency, utilizing recent data from thousands of listed firms over nearly 20 years. They find that increased competition in the external market and the flattening of internal organizational structures play a central role in the reallocation of innovation resources and the significant increase in regulatory efficiency. In addition, the higher the degree of AI development in the industry and region in which the firm is located, the more significant its contribution to innovation efficiency. Further mechanistic analysis reveals that firms' adoption of AI not only directly enhances innovation efficiency, but also acts indirectly by influencing market competition and organizational structure. This enhanced market competition promotes the optimal allocation of corporate resources, thus reinforcing the positive correlation between AI and joint stock companies in terms of innovation efficiency. This finding provides valuable insights into how firms can effectively utilize AI to enhance innovation efficiency in the current competitive market [10]. Khan et al. provide insights into the synergies between blockchain, AI and industrial IoT in driving the digitalization process of SMEs. Through the combined use of these three technologies, enterprises can establish a secure and reliable distributed framework, B-SMEs, which not only helps to improve enterprise ledger management and optimize resource consumption but also provides a secure and stable transaction environment, that can effectively promote the digital transformation process of SMEs [11].

This essay aims to provide an analysis of the role of AI in improving the efficiency of operations management in enterprises. To this end, existing literature and case studies will be synthesized. The essay will focus on large companies and small and medium-sized enterprises, to gain a comprehensive understanding of the application of AI technology in various fields and how it can change and optimize the way enterprises manage their operations. The study will examine the potential role of AI in production, supply chain management, and other operational areas, as well as its practical application in enterprises of varying sizes.

2. Problems and Reasons in Modern Enterprise Operation and Management

2.1. Big Companies

2.1.1. Financial Management Risks

At present, the development of various industries has entered a mature stage, and the relative saturation of the market has greatly increased so that competition among enterprises is very intense. In addition, the impact of global epidemics has further hindered the normal development of companies. Some of the problems with risk management in large companies not only affect the daily operations of the company but also have a direct impact on the long-term strategic development of the company. As they grow, large companies often face increasingly complex cost structures. It has become a challenge to control costs effectively, especially in a competitive market environment. For example, General Electric (GE) has been reducing costs and debt by selling assets and laying off employees over the past few years. Cash flow management is also an issue that large companies need to consider; cash flow is a lifeline for companies of any size. Large companies can face cash flow constraints due to high fixed costs, large amounts of debt financing, or long collection cycles for accounts receivable. For example, the famous retail giant J.C. Penney filed for bankruptcy protection during the pandemic because of cash flow problems. Meanwhile, compared with small companies, large companies face more financial risks, including exchange rate risk, interest rate risk, and credit risk. How to effectively manage these risks and prevent potential financial losses are key issues that large companies need to address.

2.1.2. Supply chain risk

Supply chain management (SCM) refers to the coordination and optimization of the various links in the supply chain to achieve long-term performance improvement of the enterprise and the entire supply chain and is an integral and important part of business operations. It involves systematic and strategic coordination, integration of business functions, cross-firm and cross-functional coordination, and long-term performance improvement, also including the procurement of raw materials, manufacturing of products, and sales of products, which are related to the operational ability, efficiency, and competitiveness of the enterprise directly [12].

The traditional supply chain management approach has many problems, such as the waste of human resources and poor information transfer. Lacking smart and automated methods, traditional supply chain management methods usually need to employ numerous humans for managing and monitoring. This not only increases the operating costs of the enterprise but also may adversely affect the production and sales of the enterprise due to poor information transfer and errors caused by human factors. In addition, the traditional management method also has the problem that it is difficult to grasp the overall operation of the supply chain timely, which makes it difficult for enterprises to make the right decisions at the first time.

2.1.3. Organizational Efficiency Issues

Larger companies have greater scale and management levels, so decision-making and management processes are often overly complex. The traditional personnel management method focuses too much on transaction work, causing a huge waste of energy and time for the human resources department, making it difficult for the department to carry out more meaningful human resource planning, employee competency assessment, and career development work. This makes it difficult to utilize the various resources within the organization effectively and there is no accurate and comprehensive data to support the organization's formulation of strategic decisions, which is negative to the long-term development of the organization in a competitive market. This can lead to missed market opportunities, increased internal communication costs as well as reduced employee motivation. In the aftermath of the outbreak, large companies face additional challenges in organizational efficiency, particularly in adapting to remote working patterns, employee welfare, and healthcare, and rapidly changing market demands. For example, Google quickly implemented a remote work policy in the

early days of the pandemic, but over time, the company found that maintaining teamwork and innovation became more difficult. Additionally, companies like Amazon, while experiencing a dramatic increase in business during the epidemic, also faced logistical efficiency challenges and worker health and safety concerns. These issues highlight the pressures on large companies in terms of resourcing, employee management and adapting to new work environments, which need to be addressed through improved internal communication mechanisms and increased flexibility.

2.2. SMEs

2.2.1. Human resource management

Small and medium-sized enterprises (SMEs) face many challenges in human resource management. With limited resources, these enterprises may lack a professional human resources management team, resulting in a lack of professional guidance and support in areas such as recruitment, training and staff development. High staff turnover is also a common problem. Unable to offer benefits and development opportunities comparable to those offered by large enterprises, high staff turnover may affect team stability and business continuity. In addition, the lack of an effective performance management system, poor communication and inefficient decision-making, as well as insufficient awareness of the risks associated with legal compliance, may affect the operational efficiency and growth prospects of the business. Therefore, SMEs need to strengthen their professional human resource management capabilities and establish sound systems and processes to improve employee satisfaction, reduce staff turnover and meet the challenges of market competition and sustainable development.

2.2.2. Risk control

The development and management of small and medium-sized enterprises have the characteristics of high speed and lightweight, lacking a sound internal control system. Therefore, managers and employees in small and medium-sized enterprises generally lack risk awareness. Therefore, it may lead to improper risk management in the development process of small and medium-sized enterprises. Small and medium-sized enterprises are small in scale, with limited material, human, and financial resources. They lack the core competitiveness to operate various products and the robustness to resist market risks, and their production conditions are much worse than those of large enterprises.

3. Advantages of AI and Its Application in Enterprise Management

3.1. Big Companies

3.1.1. Risk management and control

Artificial intelligence plays an important role in the risk management and control of large enterprises. Firstly, AI can identify potential risk factors through data analysis and predictive modeling, which can help enterprises identify possible risks and take appropriate measures promptly. Second, AI can provide more reliable data in enterprise risk control, which can enable automated risk assessment and monitoring, improve the efficiency and accuracy of risk management, and reduce errors caused by human factors [13].

In addition, Arshi found that AI can assess and manage the various risks faced by an organization by analyzing a large amount of data and models, identifying correlations and trends between risk events, and informing organizations to develop more effective risk response strategies [14]. With the help of AI, enterprises can identify and assess risks more accurately and take corresponding measures to manage and control them, providing important support for enterprises to secure sound development.

3.1.2. Supply chain management

With the accelerated evolution of the globalization process, there are many changes in the market, demand, management, etc., which put new demands on the supply chain capabilities of enterprises, which need to take active measures to avoid uncertainty and maintain their competitiveness. Research

by Dash et al. shows that Artificial Intelligence can efficiently process, deeply analyze, and accurately forecast data to provide accurate and precise demand forecasts, helping companies optimize their purchasing and order processing [15]. The application of this technology not only helps to reduce transport-related costs but also improves warehouse management and the overall effectiveness of the supply chain. Additionally, AI can discover trends and patterns to help SMEs design more scientific retail and manufacturing strategies. Riahi et al. also confirmed the ability of AI to autonomously make decisions and automate tasks, which greatly improves the efficiency of supply chain management [16]. Through the application of AI technology, supply chain management can be intelligent and automated, reducing the reliance on human resources. At the same time, artificial intelligence technology can grasp the operation of the supply chain at an actual time through data analysis and mining, helping enterprises make more scientific and accurate decisions as well. In addition, AI technology can also improve the efficiency and effectiveness of the supply chain using prediction and optimization, creating more value for enterprises.

3.1.3. Improve management efficiency

AI plays an important role in helping large corporations to address organizational inefficiencies. AI can automate tedious transactional tasks, thereby freeing up the time and energy of the human resources department, enabling employees to engage in creative work, facilitating creative processes, and helping to enrich a company's knowledge base and innovations [17]. At the same time, AI can collect, analyze and mine large amounts of data, extract them and make predictions, providing companies with accurate and comprehensive data support to help make strategic decisions [18]. By optimizing internal communication processes and improving the efficiency of team collaboration, AI can also help organizations meet the challenges of remote working patterns and foster innovation and teamwork. AI can also help organizations to adapt to remote working patterns and improve team collaboration and innovation. For example, virtual meetings and collaboration tools are used to facilitate communication and cooperation among remote teams, while data analysis and feedback systems are used to monitor team performance and mood and adjust work strategies promptly.

3.2. SMEs

The ability of small and medium-sized enterprises (SMEs) to adopt AI technologies is crucial as the market becomes increasingly competitive. Due to the evolving social, environmental and technological scenarios, managers of these companies must increasingly focus on integrating new tools such as AI into the management of company operations to enjoy the benefits of AI.

3.2.1. Human resource management

Parry and Battista found that AI has played an important role in improving the efficiency of human resource management in an organization and provides a great help in assisting human resource personnel, employees and organizations [19]. AI can help organizations automate many tedious HR processes such as CV screening, employee attendance management, payroll accounting, etc., thus saving time and labor costs. AI can be applied to all aspects of the recruitment process to help organizations improve the quality and efficiency of the recruitment process while reducing human error and eliminating bias as AI can use big data and machine learning algorithms to analyze a candidate's skills, experience, and background to match the candidate more accurately with the job requirements.

3.2.2. Risk and cost control

AI also has a positive impact on the risk and cost control of SMEs. Firstly, AI can identify potential risk factors through data analysis and model prediction, helping enterprises to identify and respond to possible risk events promptly, thus reducing the losses caused by risks. Second, AI technology can automate enterprise processes and decision-making to improve efficiency and reduce operating costs. In addition, AI can improve customer satisfaction, increase sales and reduce marketing costs through intelligent customer service and marketing systems. Taken together, the application of AI technology

can help SMEs achieve effective control of risks and costs, and improve their competitiveness and sustainability.

4. Conclusion

Overall, AI is playing an increasingly important role in business operations and management, and its applications are broad and deep. By using AI technology, companies can significantly improve operational and management efficiency, optimizing and upgrading existing operational processes. This optimization is not only reflected in all aspects of daily operations but also through intelligent analysis and forecasting, which can open new business models and growth opportunities for enterprises. In-depth research into the use cases and impact mechanisms of AI in different fields is crucial to understanding its underlying logic and potential. This provides suggestions and references for enterprises when formulating strategies and management tactics. Enterprise decision-makers and managers need to keep pace with the times and continuously deepen their understanding and ability to apply AI technology to better integrate it into their daily operations and long-term development planning. However, the application of AI is not always smooth and faces many challenges. Among them, data privacy and security issues are particularly prominent, and organizations must pay great attention to and take appropriate protection measures when applying AI technologies. In addition, technology costs and staff training are also factors that cannot be ignored. Enterprises need to invest many resources in technology research and development and talent training to ensure the smooth implementation and effective application of AI technology. Therefore, when applying AI technology, enterprises need to consider various factors and formulate appropriate strategies and measures. Through reasonable planning and layout, enterprises can maximize the advantages of AI technology, enhance overall competitiveness, and cope with market competition and an uncertainty environment. At the same time, enterprises also need to continue to innovate and develop, explore more AI application scenarios and business models, and inject new impetus into the sustainable development of enterprises.

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