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Applications of artificial intelligence in corporate strategic management

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Abstract. The rapid development of artificial intelligence (AI) is reshaping corporate strategic management. In today's dynamic global environment, organizations face increasing challenges in decision-making, resource allocation, and operational efficiency. Against this background, AI offers significant potential to enhance the speed, accuracy, and effectiveness of strategic management practices. This study examines the applications of AI in corporate strategy, with a focus on how technologies such as machine learning, natural language processing, and automation contribute to improving strategic decision-making. The research employs a non-empirical design, combining literature review and conceptual analysis. The study objects include enterprises across manufacturing, high-tech industries, and SMEs, as represented in existing scholarly works and industry reports. Analytical tools are theoretical models of AI integration, and data sources consist mainly of secondary materials such as peer-reviewed articles, case documentation, and industry analyses. The findings indicate that AI improves strategic accuracy and efficiency, but challenges remain regarding data quality, organizational resistance, and ethical concerns. The study concludes that successful adoption requires aligning technological advances with organizational adaptation. Furthermore, the integration of AI with big data, cloud computing, and blockchain is expected to play a central role in shaping the future of strategic management.

Keywords: artificial intelligence, corporate strategy, machine learning, predictive analytics, intelligent decision support

1. Introduction

1.1. The rise of artificial intelligence and research background

Artificial intelligence (AI), as one of the most disruptive technologies of our time, has profoundly transformed enterprise management models and competitive landscapes. From speech recognition and natural language processing to machine learning and predictive analytics, AI has been widely applied in strategic decision-making, financial management, marketing, and human resources [1,2]. Its powerful data processing and modeling capabilities enable enterprises to quickly identify risks and opportunities in a dynamic market environment, thereby accelerating digital and intelligent transformation [3,4].

1.2. The importance of strategic management

Strategic management is a key tool for enterprises to maintain long-term competitiveness. It emphasizes environmental analysis, internal resource integration, and forward-looking strategic planning [5]. However, traditional strategic management often relies on experiential judgment and static data, which is insufficient for today's dynamic and complex markets [6,7]. With the empowerment of AI, strategic management is experiencing unprecedented opportunities for innovation and improvement.

1.3. Integration of artificial intelligence and strategic management

The integration of AI and strategic management can be reflected in three main aspects. First, machine learning enables large-scale data modeling to support market forecasting and customer analysis [2,8]. Second, predictive analytics establishes risk warning systems and scenario simulations, enhancing the scientific and forward-looking nature of strategic decisions [9,10]. Third, intelligent decision-support systems based on deep learning and explainable AI optimize resource allocation and improve execution efficiency [11,12]. Together, these functions support the creation of more adaptive and dynamic strategic systems.

1.4. Research objectives and methods

This paper aims to explore the application and optimization paths of AI in strategic management, focusing on machine learning, predictive analytics, and intelligent decision support. The research methodology combines literature review and case analysis, systematically reviewing domestic and international studies and incorporating cases from manufacturing and high-tech industries for in-depth analysis [13,14]. The significance of this study lies in revealing the value and challenges of AI-enabled strategic management and in providing theoretical references and practical recommendations for enterprises' digital transformation and intelligent strategy formulation in the future [15-18].

2. Literature review and theoretical foundation

2.1. Basic concepts and traditional approaches to strategic management

Strategic management refers to the process by which enterprises analyze internal and external environments, formulate long-term objectives, and implement decisions to maintain sustainable competitiveness [1]. Traditional approaches emphasize tools such as SWOT analysis, Porter's Five Forces, and Ansoff's Growth Matrix, which provide structured frameworks for understanding resources, competition, and market dynamics [2]. However, these conventional methods are overly reliant on historical data and managerial intuition, making them less effective in addressing dynamic and uncertain environments [3,4]. Scholars argue that while such frameworks remain valuable in theory and practice, they are increasingly insufficient in the digital era's complex competitive landscapes [5].

2.2. Current applications of artificial intelligence in management research

The development of artificial intelligence has significantly broadened its applications in management. In financial management, AI systems automate accounting, improve forecasting, and enhance risk evaluation [6,7]. In marketing, machine learning and predictive analytics enable real-time customer segmentation and personalized recommendations, strengthening competitiveness [8]. In human resource management, AI supports recruitment, performance evaluation, and talent development [9]. Recently, scholars have emphasized how AI reshapes decision-making by increasing data-driven precision and reducing human biases [10,11]. However, much of the existing literature still focuses on isolated functional applications, with relatively fewer studies addressing the systemic integration of AI into strategic management frameworks [12].

2.3. The role of data and analytics in strategic management

Data and analytics form the foundation of AI-enabled strategic management. Big data technologies and predictive models allow enterprises to better identify market trends, simulate competitive scenarios, and anticipate risks [13]. Predictive analytics enables managers to evaluate alternative strategies under different conditions, thereby improving resilience and adaptability [2,14]. Furthermore, AI-powered decision support systems can transform unstructured data, such as social media comments and customer feedback, into actionable strategic insights [15]. Nevertheless, challenges remain regarding data quality, algorithm transparency, and ethical concerns, which may hinder the effective adoption of AI in strategic decision-making [16-18]. Therefore, while data analytics has become indispensable for modern strategic management, further research is required to balance technological efficiency with managerial accountability.

3. Applications of AI in strategic management

3.1. Machine learning: market forecasting and customer analysis

Machine learning (ML) provides enterprises with powerful tools to conduct market forecasting and customer behavior analysis. By leveraging algorithms such as neural networks and decision trees, ML systems can identify hidden patterns in historical and real-time data, enabling managers to predict market demand, segment customers, and design targeted strategies [2,3]. For example, text-mining approaches and customer data modeling allow firms to anticipate consumer preferences, optimize pricing models, and refine product offerings [4]. Compared with traditional statistical models, ML can handle complex, non-linear relationships, which significantly enhances the accuracy of forecasts and supports data-driven strategic decision-making [8]. Beyond manufacturing, ML is widely applied in the financial industry to detect fraudulent transactions and in retail to forecast demand for seasonal products, demonstrating its cross-industry versatility.

3.2. Predictive analytics: strategic risk and future trends

Predictive analytics, grounded in big data and AI algorithms, assists enterprises in identifying potential risks and simulating multiple future scenarios. By building forecasting models, companies can test the implications of various strategic options under different conditions, thereby improving resilience and adaptability [9]. For instance, predictive analytics in financial planning enables firms to evaluate long-term investment risks, anticipate market fluctuations, and develop robust contingency strategies [1,13]. Moreover, predictive tools can help managers assess the impacts of emerging technologies or policy changes on corporate strategies, ensuring that firms remain competitive in uncertain environments [10]. Despite these benefits, challenges such as data quality, model transparency, and ethical considerations remain critical issues requiring careful management [16-18].

3.3. Intelligent decision support: strategic planning and optimization

Intelligent decision-support systems integrate deep learning, explainable AI, and scenario simulation to assist senior managers in strategic planning and optimization. Unlike traditional decision models that rely on static assumptions, AI-driven systems can dynamically update strategies based on real-time market inputs and enterprise performance indicators [11,12]. These systems enable multi-scenario analysis, resource allocation optimization, and risk assessment, helping enterprises formulate more scientific and robust strategies [5,7]. In practice, intelligent decision support has been applied to supply chain optimization, talent management, and competitive intelligence, improving efficiency and reducing uncertainty in execution [6,15]. However, overreliance on opaque "black-box" models may undermine managerial confidence, highlighting the need for explainable and transparent AI frameworks in strategic management [17].

In addition to manufacturing, machine learning has transformed the retail and financial sectors. Retailers such as Walmart and Amazon leverage ML algorithms for demand forecasting, inventory optimization, and personalized recommendations, thereby reducing waste and improving customer satisfaction. In finance, ML-based fraud detection systems analyze millions of transactions in real time, detecting suspicious activity far more effectively than rule-based systems. Credit scoring models powered by AI also extend financial services to underbanked populations, enhancing financial inclusion.

As shown in Figure 1 adoption of Generative AI varies by business function, with IT leading at 28%, followed by operations, marketing, and customer service [19].

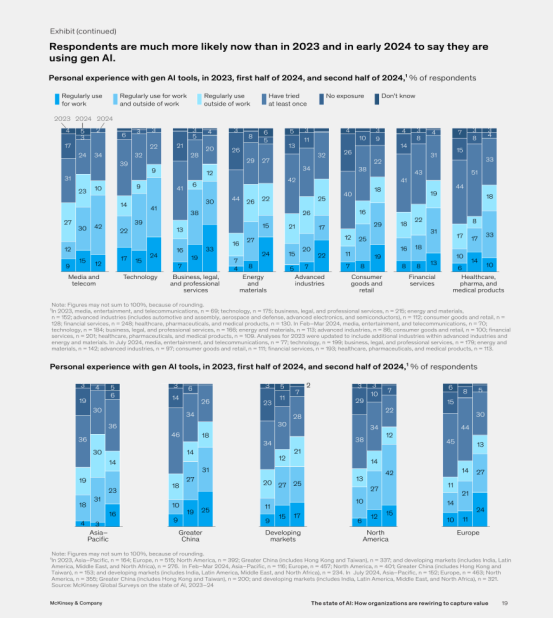

Figure 1. GenAI adoption across functions [19]

4. Case studies and discussion

4.1. AI applications in manufacturing

Manufacturing is one of the most prominent sectors for AI applications. With machine learning and predictive analytics, firms optimize production planning, predictive maintenance, and supply chain management [2,8]. For instance, Toyota's adoption of

AI-driven predictive maintenance systems has significantly reduced downtime, while Amazon applies AI to streamline its supply chain and warehouse management, achieving cost savings and efficiency gains [12].

4.2. Strategic transformation in high-tech industries

In high-tech industries, AI functions not only as a strategic tool but also as a key source of competitive advantage. It is applied in product development, market forecasting, and user behavior modeling, enabling rapid responses to market shifts and innovation [3,9]. For example, Google's DeepMind has explored AI-based resource optimization and strategic planning, reshaping decision-making in the high-tech field [10].

4.3. Opportunities and challenges for SMEs

Small and medium-sized enterprises (SMEs) face unique opportunities and challenges in applying AI to strategic management. On one hand, AI tools provide cost-effective access to market analysis and financial forecasting, strengthening competitiveness [13,14]. On the other hand, SMEs often struggle with financial, technical, and talent constraints, making AI implementation more difficult and with uncertain returns [15]. Additionally, the lack of supportive policies and digital ecosystems further restricts SMEs compared with large enterprises operating in mature digital environments.

4.4. Key challenges: technical, organizational, and ethical

Despite AI's potential in strategic management, challenges persist in technology, organization, and ethics. Technical challenges involve data quality and algorithm transparency; organizational issues include cross-departmental collaboration and talent shortages [16]; ethical concerns focus on data privacy and algorithmic bias [17,18]. Therefore, firms must establish robust governance systems when adopting AI to ensure compliance, accountability, and stakeholder trust.

As shown in Figure 2, the main barriers to Generative AI adoption include regulatory uncertainty, risk management, lack of strategy, and technical challenges [19].

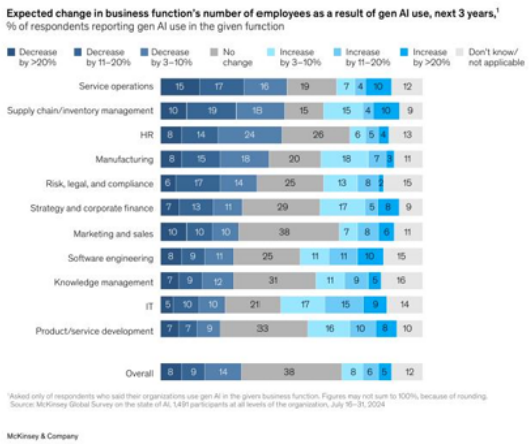

Figure 2. Barriers to GenAI deployment [19]

4.5. Comparison with traditional strategic approaches

Compared with traditional strategic approaches that rely on experiential judgment and static models, AI-driven strategic management offers advantages of data-driven insights, dynamic adaptability, and forward-looking predictions [1,5]. By leveraging real-time data processing and predictive analytics, enterprises can more quickly identify market trends and adjust strategies, maintaining a competitive advantage in highly uncertain environments.

However, overreliance on "black-box" models may undermine managerial and stakeholder trust in decision-making [7,11]. A black-box model refers to an AI system in which the inputs and outputs are observable, but the internal decision-making process is opaque or difficult to interpret. Typical examples include deep neural networks, complex ensemble methods (such as Random Forest and XGBoost), and reinforcement learning algorithms. While these models excel in prediction and optimization, their decision logic is often inaccessible or non-intuitive for users.

This opacity generates three key risks: first, managers may question AI-generated recommendations without understanding the rationale; second, biased input data may lead to unfair or flawed outcomes, which are difficult to detect; third, compliance

and ethical concerns, especially regarding data privacy and social responsibility, may intensify.

Therefore, scholars and practitioners advocate for hybrid strategic management models that combine the efficiency and predictive power of AI with the interpretability of traditional methods. Furthermore, the advancement of explainable artificial intelligence (XAI) offers a promising solution by using visualization, rule extraction, and model simplification to make AI's decision-making logic more transparent, thereby enhancing managerial confidence in AI-driven strategies.

Toyota's smart manufacturing initiatives illustrate how predictive maintenance combined with robotics reduces downtime and optimizes production schedules. Similarly, Amazon's extensive use of AI in supply chain logistics, including warehouse robotics and route optimization, highlights how firms can simultaneously lower costs and enhance customer experience through intelligent automation.

5. Conclusion

This study reviews the applications and development pathways of artificial intelligence in corporate strategic management. Findings suggest that machine learning effectively supports market forecasting and customer analysis [2,3]; predictive analytics demonstrates strong foresight in strategic risk identification and future trend simulations [9,10]; and intelligent decision-support systems play a crucial role in strategic planning and resource optimization [11,12]. Compared with traditional approaches that rely on experience and static data, AI-enabled strategic management offers greater scientific rigor, dynamism, and adaptability [1,5].

From a practical perspective, the introduction of AI enhances the efficiency and accuracy of strategy formulation and execution in complex environments. Large manufacturing and high-tech enterprises can leverage AI to build intelligent strategic management systems that strengthen competitiveness [8,9]. SMEs, on the other hand, can adopt cost-effective predictive tools to support strategic analysis, though they must balance technological investment with associated risks [13,14]. Moreover, firms should pay attention to data governance and ethical concerns, avoiding excessive reliance on opaque "black-box" models that may undermine trust among managers and stakeholders [16-18].

This paper primarily relies on literature review and case studies, without empirical validation, which limits the generalizability of its conclusions. Future research may proceed in three directions: first, conducting cross-industry empirical studies to test the practical effects of AI in strategic management; second, advancing research on explainable AI (XAI) to address the trust issues associated with "black-box" models; and third, examining the interaction between AI, organizational culture, and policy environments to promote sustainable and intelligent strategic management systems [7,11].

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