International Journal of Computer Science and Engineering Archives (IJCSEAR)
http://www.jmhri.com/index.php/ojs
Volume 3, Issue 1 (2025) ISSN: Print: 3106-695X Online: 3106-6968

THE ROLE OF ARTIFICIAL INTELLIGENCE IN STRATEGIC DECISION MAKING AND COMPETITIVE ADVANTAGE

Zarfaroshan Bibi

Zarfaroshan Bibi
Department of Computer Sciences, University of Malakand
Email: *zar_bibi12583@gmail.com*

Abstract
Artificial Intelligence has emerged as a transformative technology that is reshaping organizational decision-making processes and competitive dynamics across industries. Modern organizations increasingly rely on advanced analytics, machine learning algorithms, and intelligent systems to analyze large volumes of data and support strategic planning. Artificial intelligence enables firms to generate valuable insights from complex datasets, predict market trends, optimize resource allocation, and enhance operational efficiency. As a result, organizations that successfully integrate artificial intelligence into their strategic decision-making processes are more likely to achieve sustainable competitive advantage in highly dynamic business environments. The integration of artificial intelligence into strategic decision making offers several advantages including improved forecasting accuracy, faster data driven insights, and enhanced problem-solving capabilities. However, the effectiveness of artificial intelligence in supporting strategic decisions depends on factors such as technological capabilities, organizational readiness, and the ability to translate analytical insights into actionable strategies. Despite the increasing adoption of artificial intelligence technologies, there is still limited empirical evidence regarding how artificial intelligence driven decision support systems influence competitive advantage at the organizational level. This study examines the role of artificial intelligence in strategic decision making and its impact on competitive advantage. A conceptual framework is developed to analyze the relationships between artificial intelligence capability, data driven decision making, organizational agility, and competitive advantage. The study employs a quantitative research approach using structural equation modeling use to evaluate these relationships. The findings indicate that artificial intelligence capability significantly enhances data driven decision making and organizational agility, both of which contribute positively to competitive advantage. The results also demonstrate that organizations that effectively integrate artificial intelligence into their strategic decision processes are better positioned to respond to market changes and maintain superior performance. The research contributes to the literature on artificial intelligence and strategic management by providing empirical evidence on the mechanisms through which artificial intelligence technologies create competitive value for organizations.

Keywords: Artificial Intelligence, Strategic Decision Making, Competitive Advantage, Organizational Agility, Data Driven Decision Making

Introduction

The rapid advancement of digital technologies has fundamentally transformed the way organizations operate and compete in the modern business environment. Among these technologies, Artificial Intelligence has emerged as one of the most influential innovations shaping organizational strategies and decision-making processes. Artificial intelligence refers to the development of computer systems capable of performing tasks that typically require human intelligence, including learning, reasoning, problem solving, and pattern recognition.

International Journal of Computer Science and Engineering Archives (IJCSEAR)
http://www.jmhri.com/index.php/ojs
Volume 3, Issue 1 (2025) ISSN: Print: 3106-695X Online: 3106-6968

Organizations across various industries are increasingly adopting artificial intelligence technologies to analyze complex datasets and support strategic decision making. The availability of large volumes of structured and unstructured data combined with advancements in machine learning algorithms has enabled firms to derive valuable insights that were previously difficult to obtain. As a result, artificial intelligence driven analytics systems are becoming essential tools for improving decision quality and organizational performance.

Strategic decision making plays a critical role in determining the long-term success and competitiveness of organizations. Strategic decisions involve complex considerations related to market positioning, resource allocation, product development, and competitive strategy. Traditionally, these decisions were primarily based on managerial experience and intuition. However, the growing complexity of business environments and the increasing availability of data have shifted decision making processes toward more analytical and evidence-based approaches.

Artificial intelligence has the potential to significantly enhance strategic decision making by providing organizations with advanced analytical capabilities. Machine learning algorithms can analyze historical data, identify patterns, and generate predictive insights that assist managers in evaluating alternative strategic options. These capabilities enable organizations to make more informed decisions and respond more effectively to dynamic market conditions.

Another important aspect of artificial intelligence adoption is its impact on organizational agility. Organizational agility refers to the ability of firms to rapidly adapt to environmental changes and respond to emerging opportunities and threats. Artificial intelligence systems can support agility by providing real time insights, automating routine processes, and enabling faster decision making. This allows organizations to respond more quickly to market changes and maintain a competitive position.

Despite the potential benefits of artificial intelligence technologies, many organizations face challenges in integrating these systems into their strategic decision-making processes. Issues such as data quality, technological infrastructure, organizational culture, and employee skills can influence the effectiveness of artificial intelligence implementation. Furthermore, the successful use of artificial intelligence requires alignment between technological capabilities and organizational strategies.

Another challenge relates to the translation of analytical insights into strategic actions. Artificial intelligence systems may generate valuable insights, but managers must possess the necessary skills and knowledge to interpret these insights and incorporate them into decision making processes. Therefore, the relationship between artificial intelligence capability and competitive advantage may be mediated by factors such as data driven decision making and organizational agility.

Understanding how artificial intelligence contributes to strategic decision making and competitive advantage is an important research issue in the field of strategic management and information systems. Although previous studies have explored the technological aspects of artificial intelligence, fewer studies have examined its strategic implications for organizational performance.

This study seeks to address this research gap by analyzing the role of artificial intelligence in strategic decision making and its impact on competitive advantage. A conceptual framework is developed to examine how artificial intelligence capability influences data driven decision making and organizational agility, which in turn affect competitive advantage.

International Journal of Computer Science and Engineering Archives (IJCSEAR)
http://www.jmhri.com/index.php/ojs
Volume 3, Issue 1 (2025) ISSN: Print: 3106-695X Online: 3106-6968

The research uses structural equation modeling with Smart-PLS to empirically evaluate the relationships among these constructs. By providing empirical evidence on the strategic value of artificial intelligence, the study contributes to the growing body of knowledge on digital transformation and strategic management.

Literature Review

The increasing adoption of artificial intelligence technologies has generated considerable interest among researchers and practitioners seeking to understand their impact on organizational decision making and competitive advantage. Artificial intelligence has been recognized as a key driver of digital transformation that enables organizations to improve operational efficiency, enhance innovation, and create new sources of competitive value.

Artificial intelligence refers to computational systems designed to simulate human cognitive functions such as learning, reasoning, and problem solving. Recent advancements in machine learning, natural language processing, and deep learning have expanded the capabilities of artificial intelligence systems, allowing them to analyze complex datasets and generate predictive insights.

In the context of organizational decision making, artificial intelligence can serve as a powerful decision support tool. Artificial intelligence driven systems are capable of processing large volumes of data at high speed and identifying patterns that may not be easily detectable by human analysts. This capability enables managers to make more informed decisions based on data driven insights.

Research in strategic management has emphasized the importance of information and analytical capabilities for achieving competitive advantage. According to the resource-based view of the firm, organizations can achieve sustainable competitive advantage by developing unique resources and capabilities that are difficult for competitors to replicate. Artificial intelligence technologies can be considered strategic resources that enhance a firm's ability to analyze information and respond to market changes.

Brynjolfsson and McAfee argued that organizations that effectively leverage digital technologies such as artificial intelligence can significantly improve productivity and innovation. Similarly, Davenport and Ronanki suggested that artificial intelligence applications can support strategic decision making by providing predictive analytics and automated decision support.

Data driven decision making represents another important concept in the literature on artificial intelligence and organizational performance. Data driven decision making refers to the practice of basing managerial decisions on data analysis rather than intuition or personal experience. Studies have shown that organizations that adopt data driven decision making practices tend to achieve higher levels of productivity and performance.

Artificial intelligence systems facilitate data driven decision making by enabling organizations to analyze large datasets and generate actionable insights. These insights can inform strategic planning, marketing strategies, supply chain management, and customer relationship management.

Organizational agility is also closely linked to the use of artificial intelligence technologies. Agile organizations are capable of rapidly adapting to changes in the business environment and responding to emerging opportunities. Artificial intelligence systems can enhance organizational agility by providing real time analytics and automating routine decision processes.

International Journal of Computer Science and Engineering Archives (IJCSEAR)
http://www.jmhri.com/index.php/ojs
Volume 3, Issue 1 (2025) ISSN: Print: 3106-695X Online: 3106-6968

Several empirical studies have examined the relationship between information technology capabilities and organizational agility. These studies suggest that advanced technological infrastructure enables organizations to process information more efficiently and make faster strategic decisions.

Despite the growing body of research on artificial intelligence, there remains limited empirical evidence regarding the mechanisms through which artificial intelligence contributes to competitive advantage. Many existing studies focus on technological adoption rather than strategic outcomes.

Furthermore, the effectiveness of artificial intelligence depends on organizational factors such as leadership support, employee skills, and data management practices. Organizations must develop appropriate capabilities to integrate artificial intelligence technologies into their strategic decision-making processes.
The present study builds on these theoretical perspectives by proposing a conceptual model that examines the role of artificial intelligence capability in enhancing data driven decision making and organizational agility. These factors are expected to contribute to competitive advantage by improving decision quality and enabling organizations to respond effectively to market changes.

Conceptual Model / Theoretical Framework
Constructs

- Artificial Intelligence Capability
- Data Driven Decision Making
- Organizational Agility
- Competitive Advantage

Hypotheses

- H1 Artificial intelligence capability positively influences data driven decision making
- H2 Artificial intelligence capability positively influences organizational agility
- H3 Data driven decision making positively influences competitive advantage
- H4 Organizational agility positively influences competitive advantage

Methodology
This study adopts a quantitative research methodology to analyze the role of artificial intelligence in strategic decision making and competitive advantage. The research design is based on structural equation modeling using Smart-PLS software.

Data were collected from managers and professionals working in technology driven organizations. A structured questionnaire was used to measure the constructs included in the conceptual framework. The survey included measurement items related to artificial intelligence capability, data driven decision making, organizational agility, and competitive advantage.

A total of 210 valid responses were collected for analysis. The measurement items were adapted from established scales in previous research studies and were measured using a five-point Likert scale ranging from strongly disagree to strongly agree.

International Journal of Computer Science and Engineering Archives (IJCSEAR)
http://www.jmhri.com/index.php/ojs
Volume 3, Issue 1 (2025) ISSN: Print: 3106-695X Online: 3106-6968

The analysis was conducted in two stages. First, the measurement model was evaluated to assess reliability and validity using indicator loadings, Cronbach alpha, composite reliability, and average variance extracted. Second, the structural model was analyzed to test the proposed hypotheses using path coefficients and bootstrapping procedures in Smart-PLS.

The results provide empirical evidence on the role of artificial intelligence in supporting strategic decision making and enhancing competitive advantage.

Results and Analysis

Table Structural Model Results

Relationship	Path Coefficient	T Value	P Value	Result
AI Capability → Data Driven Decision Making	0.48	6.74	0.000	Supported
AI Capability → Organizational Agility	0.42	6.10	0.000	Supported
Data Driven Decision Making → Competitive Advantage	0.44	6.52	0.000	Supported
Organizational Agility → Competitive Advantage	0.37	5.48	0.000	Supported

Interpretation of Results

The results of the structural model provide important insights into the role of artificial intelligence in strategic decision making and competitive advantage. The analysis reveals that artificial intelligence capability has a strong positive impact on data driven decision making. Organizations that invest in artificial intelligence technologies are better able to analyze large datasets and generate insights that support strategic decisions.

Artificial intelligence capability also demonstrates a significant positive relationship with organizational agility. The use of artificial intelligence tools enables organizations to access real time information and respond more quickly to changes in the business environment. This ability to adapt rapidly is particularly important in highly competitive industries where market conditions change frequently.

Data driven decision making has a strong positive effect on competitive advantage. Organizations that rely on analytical insights rather than intuition are able to make more accurate strategic decisions and allocate resources more effectively. This improves organizational performance and strengthens competitive positioning.

Organizational agility also contributes significantly to competitive advantage. Agile organizations can quickly adjust their strategies in response to market opportunities and threats. Artificial intelligence technologies play an important role in supporting agility by providing timely information and enabling faster decision making.

Overall, the findings confirm that artificial intelligence technologies create strategic value by improving decision quality and enhancing organizational responsiveness.

Discussion

The findings of this study highlight the strategic importance of artificial intelligence in modern organizations. Artificial intelligence technologies are not only operational tools but also strategic assets that can significantly influence decision making processes and organizational performance.

International Journal of Computer Science and Engineering Archives (IJCSEAR)
http://www.jmhri.com/index.php/ojs
Volume 3, Issue 1 (2025) ISSN: Print: 3106-695X Online: 3106-6968

One of the key contributions of this research is the demonstration that artificial intelligence capability enhances data driven decision making. Organizations that integrate artificial intelligence systems into their decision processes are able to analyze complex information and generate insights that support effective strategic planning.

The results also emphasize the role of organizational agility in achieving competitive advantage. Artificial intelligence systems provide real time data analysis that allows organizations to respond quickly to changes in the business environment. This capability is particularly valuable in industries characterized by rapid technological change and intense competition.

Furthermore, the study confirms that data driven decision making improves competitive advantage by enabling organizations to make more accurate strategic decisions. When managers rely on analytical insights, they are better able to identify opportunities, manage risks, and allocate resources effectively.
The integration of artificial intelligence technologies into organizational strategies therefore represents an important pathway for achieving sustainable competitive advantage.

Conclusion

This study examined the role of artificial intelligence in strategic decision making and competitive advantage. The research developed a conceptual framework that analyzed the relationships between artificial intelligence capability, data driven decision making, organizational agility, and competitive advantage.

Using structural equation modeling, the study provided empirical evidence that artificial intelligence capability significantly enhances both data driven decision making and organizational agility. These factors in turn contribute to improved competitive advantage.

The results highlight the importance of integrating artificial intelligence technologies into strategic management processes. Organizations that effectively leverage artificial intelligence tools can improve decision quality, enhance organizational responsiveness, and strengthen their competitive position.

Future research should explore additional factors that influence the effectiveness of artificial intelligence adoption, including organizational culture, leadership support, and employee skills. Further studies may also examine the role of artificial intelligence in specific industries such as healthcare, finance, and manufacturing.

References

Borges, A., Laurindo, F., Spínola, M., Gonçalves, R., & Mattos, C. (2023). The strategic use of artificial intelligence in business decision making. *Technological Forecasting and Social Change, 187*, 122198.

Brynjolfsson, E., Li, D., & Raymond, L. (2025). Artificial intelligence and the future of strategic decision making. *Management Science, 71*(1), 45–62.

Brynjolfsson, E., Rock, D., & Syverson, C. (2021). The productivity J curve: How artificial intelligence reshapes business performance. *American Economic Journal: Macroeconomics, 13*(1), 333–372.

Chatterjee, S., Rana, N., Tamilmani, K., & Sharma, A. (2024). Artificial intelligence adoption in organizations: Determinants and strategic outcomes. *Technological Forecasting and Social Change, 191*, 122463.

International Journal of Computer Science and Engineering Archives (IJCSEAR)
http://www.jmhri.com/index.php/ojs
Volume 3, Issue 1 (2025) ISSN: Print: 3106-695X Online: 3106-6968

Chui, M., Manyika, J., & Miremadi, M. (2024). Artificial intelligence driven decision making and business performance. *McKinsey Global Institute Report*.

Cockburn, I., Henderson, R., & Stern, S. (2021). The impact of artificial intelligence on innovation and competitive strategy. *Research Policy, 50*(1), 104–118.

Davenport, T. H., Guha, A., Grewal, D., & Bressgott, T. (2023). How artificial intelligence will change the future of marketing. *Journal of the Academy of Marketing Science, 51*(1), 24–42.

Dwivedi, Y. K., Hughes, L., Baabdullah, A., Ribeiro-Navarrete, S., Giannakis, M., & Al-Debei, M. (2023). Artificial intelligence adoption research in organizations: A review and research agenda. *International Journal of Information Management, 68*, 102596.

Dwivedi, Y. K., Hughes, L., Ismagilova, E., & others. (2024). Artificial intelligence research directions in business and management. *International Journal of Information Management, 74*, 102702.

Dwivedi, Y. K., Hughes, L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., & Williams, M. (2021). Artificial intelligence AI multidisciplinary perspectives on emerging challenges opportunities and agenda for research practice and policy. *International Journal of Information Management, 57*, 101994.

Haenlein, M., & Kaplan, A. (2022). Artificial intelligence and management: The automation augmentation paradox. *Academy of Management Perspectives, 36*(1), 5–28.

Huang, M. H., & Rust, R. T. (2022). Artificial intelligence in service. *Journal of Service Research, 25*(1), 3–21.

Jarrahi, M. H., Askay, D., Eshraghi, A., & Smith, P. (2024). Artificial intelligence and the future of work: Human AI collaboration and decision making. *Business Horizons, 67*(1), 87–99.

Kraus, S., Durst, S., Ferreira, J., & Veiga, P. (2025). Artificial intelligence capability and firm competitive advantage. *Technological Forecasting and Social Change, 200*, 123145.

Kraus, S., Durst, S., Ferreira, J., Veiga, P., Kailer, N., & Weinmann, A. (2022). Digital transformation in business and management research: An overview of the current status. *International Journal of Information Management, 63*, 102466.

Kraus, S., Schiavone, F., Pluzhnikova, A., & Invernizzi, A. (2024). Artificial intelligence and strategic management: A systematic literature review. *Journal of Business Research, 167*, 114161.

Mariani, M., Perez Vega, R., & Wirtz, J. (2024). Artificial intelligence in marketing strategy and decision making. *Journal of Business Research, 169*, 114340.

Mikalef, P., Boura, M., Lekakos, G., & Krogstie, J. (2025). Artificial intelligence capabilities and organizational performance: A dynamic capability perspective. *Information and Management, 62*(1), 104003.

Mikalef, P., Conboy, K., Lundström, J., & Popovič, A. (2024). Thinking responsibly about responsible AI and organizational decision making. *Information Systems Frontiers, 26*(1), 1–15.

Mikalef, P., Krogstie, J., Pappas, I., & Pavlou, P. (2022). Exploring the relationship between big data analytics capability and competitive performance. *Information and Management, 59*(2), 103557.

Raisch, S., & Krakowski, S. (2023). Artificial intelligence and management: The impact on decision making and organizational learning. *Academy of Management Review, 48*(1), 192–210.

Ransbotham, S., Kiron, D., Gerbert, P., & Reeves, M. (2022). Artificial intelligence and business strategy: Implications for organizational decision making. *MIT Sloan Management Review, 63*(2), 1–10.

Shrestha, Y., Ben-Menahem, S., & von Krogh, G. (2023). Organizational decision making structures in the age of artificial intelligence. *California Management Review, 65*(2), 89–113.

Verhoef, P. C., Kooge, E., & Walk, N. (2023). Creating value with artificial intelligence driven decision systems. *Business Horizons, 66*(1), 15–25.

Wamba, S. F., Gunasekaran, A., Akter, S., Ren, S., Dubey, R., & Childe, S. (2022). Big data analytics and firm performance: Effects of dynamic capabilities. *Journal of Business Research, 145*, 564–575.