

AI Applications in Strategic and Operational Management

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Introduction:

Artificial Intelligence (AI) is an innovative tool that has emerged in strategic and operation management by helping organizations overcome barriers, and propelled flexibility and competitiveness in uncertain structures. Through the use of machine learning, natural language processing, and predictive analytics AI helps organizations and companies to make the right decisions and choose the right strategy to solve problems or improve performances. These capabilities improve strategic planning and exploitation, holding great value for different industries (Keding, 2021; Al-Surmi et al., 2022).

In strategic management, AI can help in such applications as the creation of better scenarios, forecasting of certain markets, and competitive analysis based on big amounts of data processed. For example, predictive analytics outlines trends in the market and customers' behavior thus allowing organizations to design strategies ahead of time (Wamba et al., 2024; Sharma et al., 2024). They also help to search and define new trends and latent patterns that are usually overlooked with the aid of traditional approaches which is more beneficial in making decisions in a more elaborated model when the environment seems to be uncertain (Grover et al., 2022).

On the operational level, AI adds more value by automating activities preventing human fallibility, and optimizing processes to achieve maximum output. The known technologies comprising robotic process automation (RPA), assist in managing repetitive work, whereas, intelligent customer relationship management (CRM) enhances customer satisfaction and customer retention (Saura, & Ribeiro-Soriano, 2021) Dhamija, & Bag, 2020). AI is also used to enhance the supply chain process, and product quality, manage risks for different disruptions, and offer real-time solutions to avoid them (Sharma et al., 2024; Wamba et al., 2024).

However, there are profound barriers that prevent the expansion of AI in strategic and operational management. Digital integrity issues like data privacy and prejudiced algorithms are emerging challenges for implementation since organizations must come up with ethical and understandable AI systems (Keding, 2021 & Duangekanong, 2022). Further, the expenses related to access to AI and the technical knowledge needed for the integration limit DS adoption mainly by small and medium enterprises (SMEs). (Al-Surmi et al., 2022; Grover et al., 2022).

The aim of this research is to establish how AI can be implemented in both strategic and operational management, notably in terms of opportunities and constraints. With regards to the contribution, this study gives an idea of how to improve decision-making through the implementation of AI; how to operationalize the processes through AI, and what barriers to AI adoption the organization can overcome.

Problem statement

AI has a very promising role in strategic and operative levels of management due to recent developments with its capability to inform management decisions, optimize processes, and control resources. However, there are critical issues that organizations encounter in establishing and implementing AI into their management systems. Inadequate experience, more specifically, the following unforeseen issues negatively impact the optimization of AI applications: ethical questions like data privacy and algorithmic bias, as well as high implementation costs (Keding, 2021; Al-Surmi et al., 2022).

In the area of strategic management AI is applied to strategic planning and forecasting of the market and competitive evaluation. However, many organizations are still hesitant to use it due to resistance from within the organization, and lack of information about what AI can and cannot do, as well as the challenge of how to incorporate AI instruments into a company's procedures (Sharma et al., 2024; Wamba et al., 2024). Likewise, operational management experiences problems when trying to use AI technologies, including RPA and CRM systems. Various firms face challenges in the area of mass application, cost, and absence of guides for the application of AI (Dhamija & Bag, 2020).

Moreover, some others that are still unsettled are ethical issues regarding AI, use and take of AI such as privacy, security of data, and fairness. These issues cause trust-related shortcomings among the stakeholders and challenges related to the adoption process. In particular, SMEs are challenged much more as a result of restricted resources, which hinders the processes of obtaining and integrating AI systems and applications efficiently (Grover et al., 2022; Duangekanong, 2022).

This study aims to fill the above gaps in the literature by examining the subjects and uses of employing AI in strategic and operational management to unveil the hurdles in this kind of management and come up with pragmatic recommendations. To that end, the research endeavors to translate potential AI promises into what is possible in practice and help organizations take full advantage of it while mitigating the ethical and practical issues that may arise along the process.

Importance of the study

AI in strategic and operational management means that these technologies can change the strategic decision-making processes, improve overall organizational efficiency, and increase the competitiveness of businesses in the context of major changes in the business environment now and in the near future. However, today effective adoption and utilization of AI remains a big challenge to most organizations, therefore the need for this research.

These reasons make this research important in the following ways. First, it responds to the enabling capacity of AI in strategic management by discussing the uses of AI for scenario planning, market forecasting, and competitor analysis. These capabilities help organizations to provide predictive and data-driven insights for decision-making thereby, increasing organizational strategic flexibility and long-term planning (Sharma et al., 2024; Wamba et al., 2024). Analyzing these aspects, the paper adds to the knowledge of how AI can be used to mitigate risks and leverage opportunities for successful organizational decision-making in volatile contexts.

Second, the study focuses on the functional use of AI in operating management, for instance, process management, resource management, and supply chain management. Business applications, including RPA and AI-driven CRM, with high-performance bargaining power are integrated because they enhance efficiency, minimize costs, and maintain high performance (Saura & Ribeiro-Soriano, 2021; Dhamija & Bag, 2020). The study is useful for organizations that are interested in increasing organizational performance by using AI tools.

Third, the study is important in that; it is useful in identifying the future prospective work's weakness, ethically questionable practices of data privacy and security, and the organizational reforms it might bring about such as cost and technical know-how. In so doing, the research provides practical guidelines and solutions for addressing these challenges which enables the effective, safe, and responsible deployment of AI (Grover et al., 2022; Keding, 2021).

Lastly, this research is most suitable for SMEs because they have organizational structures and capital constraints that limit their ability to successfully implement and grow AI systems. Thus, this study presents SMEs with a guide of practical solutions that the firms can implement to harness the potential of AI whilst ensuring continued competitiveness in the evolving market (Duangekanong, 2022; Al-Surmi et al., 2022).

Study Questions:

1. How can AI enhance decision-making and scenario planning in strategic management?
2. What are the key applications of AI in operational management?
3. What challenges do organizations encounter when implementing AI in strategic and operational processes?
4. What frameworks or models can facilitate the effective integration of AI in business management?

Hypotheses

1. AI significantly enhances strategic decision-making by providing predictive and data-driven insights.
2. Organizations utilizing AI in operational processes achieve higher efficiency and productivity compared to traditional methods.
3. Ethical concerns and a lack of technical expertise are major barriers to AI adoption in business management.
4. A structured framework for AI integration can mitigate implementation challenges and improve outcomes.

Literature Review:

AI as a disruptive innovation has become a game-changer in shaping strategic and operational management in organizations, helping to design effective decisions, increase organizational performance, and retain competitiveness in turbulent conditions. Moving forward, this section discusses and compares AI applications in these domains by synthesizing prior works to showcase advancements, limitations, and potential research directions.

AI advances have supported strategic management by helping to gather the needed data to support strategic decision-making, develop contingency plans, and perform market predictions. In the review of literature, Keding (2021) opines that AI helps managers tackle the problem of managing surplus data whose analysis yields useful insights. Perhaps, one of the effective tools that belong to the AI capability is predictive analytics which enables the prediction of trends, opportunities, and threats in the market (Sharma et al., 2024). Additionally, decision-support technologies promote long-term decisions involving patterns that are discovered and correlated with the objectives of an organization (Wamba et al., 2024).

Another important use of AI is in market competitive analysis in which AI offers an organization a current perspective of the market competition and activities of competitors. According to Grover et al. (2022), such advanced capabilities increase adaptability which increases the speed at which firms can respond to prevailing conditions. Despite all that has been said, the AI integration in strategic management is still very limited due to the following issues; Technical know-how, Org. structure, among others elaborated by Al-Surmi et al., 2022.

In OM, AI technologies deliver efficiency by automating a process, optimizing the use of a resource, and increasing productivity. Several works have been written about RPA; for instance, Dhamija and Bag (2020) explained that RPA causes the deskilling of work to eliminate time-consuming processes so that employees can work more efficiently. , AI integrated Customer Relationship Management (CRM) enhances customer experience to enhance satisfaction and ensure lower customer churn rates (Saura & Ribeiro-Soriano, 2021).

Across supply chain optimization efforts, AI also helps predict demand patterns, process inventory, and spot potential disruptions. For example, Wamba et al. (2024) point to how AI models can improve supply chain resilience by facilitating real-time decision-making and adaptive planning. However, such applications increase operational efficiency but there are some challenges including high implementation costs and resistance to change that make these applications not widely adopted (Duangekanong, 2022).

AI brings with it benefits to be sure, however, adoption sees it accompanied by ethical concerns and operational barriers. Keding (2021) and Grover et al. (2022) highlight the critical issues of (data) privacy, algorithmic bias, and transparency. Without clear regulatory frameworks, these issues are compounded, an uncertainty for organizations looking to utilize the technology in an ethical manner.

Limitations, such as high cost, lack of expertise, and a lack of resistance to change all work against the adoption of AI (Al-Surmi et al., 2022). These barriers hit hard on SMEs, as they rarely have the means to adopt and scale up AI technologies (Duangekanong, 2022). To address these challenges, it involves solutions tailored to the operational and ethical challenges with a balance between cost efficiency.

However, the current climate of AI is filled with several promising trends around strategic and operational management. For example, AI integration with emerging technologies like blockchain, and the Internet of Things (IoT), provides scope for improving data security and operation efficiency (Sharma et al., 2024). Furthermore, emotional AI, or 'feeling AI,' enables novel avenues for personalized customer engagements and adaptive decision-making (Saura & Ribeiro-Soriano, 2021).

Finally, future research should focus on scaling artificial intelligence solutions to SMEs and specifically to SMEs operating in resource-constrained environments. Additionally, creating ethical frameworks and transparent AI systems will help create trust and fair rollout (Grover, et al., 2022; Keding, 2021). Finally, we need to pay more attention to the long-term impact of AI on consumer behavior and organizational culture.

Research Gap:

Across supply chain optimization efforts, AI also helps predict demand patterns, process inventory, and spot potential disruptions. For example, Wamba et al. (2024) point to how AI models can improve supply chain resilience by facilitating real-time decision-making and adaptive planning. However, such applications increase operational efficiency but there are some challenges including high implementation costs and resistance to change that make these applications not widely adopted (Duangekanong, 2022).

With the potential to provide great benefits, the implementation of AI is burdened with ethical issues and business barriers. This is mentioned by Keding (2021) and by Grover et al. (2022) as crucial issues, such as data privacy, algorithmic bias, and transparency. Without clear regulatory frameworks, these issues are compounded, an uncertainty for organizations looking to utilize the technology in an ethical manner.

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Finally, future research should focus on scaling artificial intelligence solutions to SMEs and specifically to SMEs operating in resource-constrained environments. Lastly, we will need to build out ethical frameworks and transparent AI systems to build that trust and deploy such systems in an equitable way (Grover et al., 2022; Keding, 2021). Finally, we need to pay more attention to the long-term impact of AI on consumer behavior and organizational culture (Saura & Ribeiro-Soriano, 2021).

Theoretical Foundation

Several theoretical frameworks are integrated underpinning the integration of Artificial Intelligence (AI) into strategic and operational management through a robust understanding of how it can be applied and the benefits and potential challenges brought about. These theories create a solid base from which to

think about what AI's synergistic development about improvement in decision-making, resource optimization, and process optimization will bring.

1. Dynamic Capabilities Theory

Dynamic Capabilities Theory focuses on the organization's ability to modify, integrate, and reconfigure resources to respond to changes in an environment that was targeted. This theory goes in line with AI when it helps businesses make predictions around the market dynamics using predictive analytics, scenario planning, and real-time decision-making. AI-led systems help increase organizational agility as a strategic advantage in volatile markets, argues Wamba et al. (2024)..

2. Resource-Based View (RBV)

According to the Resource View, unique, valuable, and hard-to-imitate resources afford an organization a competitive advantage if appropriately managed. Under this framework, the capabilities that AI can bring to bear include big data processing, automation, and machine learning, all of which drive strategic and operational efficiencies. According to Grover et al. (2022), AI is an important strategic resource for organizations to achieve sustainable growth.

3. Technology Acceptance Model (TAM)

Perceived usefulness (PU) and perceived ease of use (PEU) are the factors that explain the adoption of new technologies using the Technology acceptance model. First, this framework is important for understanding how managers and employees utilize AI technologies in strategic and operational management. According to Dhamija and Bag (2020), organizational culture and digital literacy are key determinants of the acceptance and integration of AI systems.

4. Systems Theory

According to Systems Theory, the organization is made up of interconnected systems in which the performance of one part affects the entire system. The interconnectedness of the world is best described by AI, as AI unifies various organizational functions, such as supply chain management, customer relationship management (CRM), and strategic decision-making, into one uniform system. Saura and Ribeiro-Soriano (2021) show how AI helps to bridge the gap in collaboration between process and operations and process and business strategies for enhancing overall organizational performance.

5. Ethical Theories in AI Implementation

The adoption of AI raises ethical concerns, including data privacy, algorithmic bias, and transparency. Ethical theories, such as deontology and consequentialism, provide a framework for addressing these issues. Keding (2021) underscores the importance of fairness and accountability in AI systems, advocating for the development of transparent frameworks to mitigate ethical risks.

6. Decision Theory

Decision Theory focuses on how individuals and organizations make choices under uncertainty. AI enhances decision-making processes by providing predictive insights, optimizing resource allocation, and minimizing risks. Sharma et al. (2024) discuss the role of AI in supporting decision-makers by offering data-driven recommendations, thereby improving both strategic and operational outcomes.

7. Innovation Diffusion Theory

Innovation Diffusion Theory explains how new technologies are adopted and spread within organizations and industries. Al-Surmi et al. (2022) apply this theory to AI adoption, highlighting factors such as organizational readiness, perceived benefits, and external pressures as determinants of successful implementation.

Methodology

Introduction

This study employs a **convergent mixed-methods approach** to explore the applications, benefits, and challenges of Artificial Intelligence (AI) in strategic and operational management. By integrating quantitative and qualitative methods, this methodology ensures a robust analysis that combines statistical rigor with contextual depth, offering actionable insights for organizations seeking to adopt AI technologies.

Research Design

- The research is designed to capture both measurable outcomes and nuanced insights. This **convergent parallel design** involves collecting quantitative and qualitative data simultaneously, analyzing them independently, and integrating findings to address the research objectives comprehensively. This design is ideal for addressing the multifaceted nature of AI applications in management, as it incorporates both numerical and experiential evidence (Dhamija & Bag, 2020; Keding, 2021).

Data Collection

- **1. Quantitative Data Collection**

- **Survey Instrument:**

A structured survey is developed based on validated tools such as the *Technology Acceptance Model (TAM)* and the *Dynamic Capabilities Framework*. These frameworks assess perceived usefulness, ease of use, and the ability of AI to adapt organizational capabilities (Wamba et al., 2024; Grover et al., 2022).

- **Sections of the Survey:**

- **Demographics:** Role, industry, years of experience with AI.
- **AI Adoption:** Types and extent of AI technologies used.
- **Outcomes:** Perceived benefits, challenges, and performance improvements from AI implementation.
- **Validation:** The survey undergoes pilot testing with 20 participants to ensure clarity and reliability. Modifications are made based on feedback to refine the questions (Mustak et al., 2021).
- **Respondents:**
The survey targets 200 professionals, including managers, decision-makers, and AI practitioners, from industries such as healthcare, manufacturing, and retail. These participants are chosen for their experience with AI adoption in strategic and operational processes.

2. Qualitative Data Collection

- **Interviews:**

Semi-structured interviews are conducted with 15 industry experts, including executives and AI technology developers. These interviews explore participants' experiences, challenges, and success stories in integrating AI into strategic and operational management.

- **Interview Guide:**

- How has AI impacted your strategic decision-making processes?
- What operational efficiencies have been achieved through AI integration?

- What challenges and barriers have you faced in adopting AI technologies?
- **Frameworks Used:** The interview protocol is informed by *Systems Theory* to capture the interconnectedness of AI applications across different organizational functions (Saura & Ribeiro-Soriano, 2021).
- **Case** **Studies:**
Five organizations that have successfully implemented AI in their management processes are selected for in-depth analysis. These cases examine the use of AI tools in strategic planning, process optimization, and decision-making. The case study framework is based on the *Resource-Based View (RBV)* to understand how AI serves as a unique organizational resource (Grover et al., 2022; Sharma et al., 2024).

Sampling Strategy

- A **purposive sampling** technique ensures the inclusion of participants with relevant experience and expertise in AI-driven management processes.
- **Sample Size:**
- **Quantitative:** 200 survey respondents.
- **Qualitative:** 15 interviewees and 5 case study organizations.

Selection Criteria:

- Participants must have direct experience with AI in strategic or operational management.
- Organizations selected for case studies must demonstrate measurable outcomes from AI integration.

Data Analysis

1. Quantitative Analysis

- **Statistical Techniques:**
- **Descriptive Statistics:** Used to summarize the data on AI adoption trends, benefits, and challenges.

- **Inferential Statistics:** Regression analysis evaluates the relationship between AI adoption and key performance indicators (KPIs) such as decision-making accuracy, efficiency, and cost reduction (Al-Surmi et al., 2022; Wamba et al., 2024).
- **Software:** SPSS is used for data analysis, ensuring precision in identifying patterns and trends.

2. Qualitative Analysis

- **Thematic Analysis:** NVivo software is employed to code interview transcripts and identify recurring themes. This analysis captures insights into the practical challenges, success factors, and ethical considerations of AI adoption (Dhamija & Bag, 2020).
- **Cross-Case Synthesis:** Case studies are analyzed comparatively to identify common practices and unique innovations. The synthesis is guided by the *Innovation Diffusion Theory*, which examines the factors influencing AI adoption across organizations (Mustak et al., 2021).

Research Instruments

- **Survey** **Instrument:**
Based on validated scales such as the *TAM* and *Dynamic Capabilities Framework*, the survey measures the extent of AI adoption, perceived benefits, and challenges.
- **Interview** **Guide:**
Semi-structured questions explore the role of AI in decision-making, operational efficiency, and organizational adaptation.
- **Case Study** **Framework:**
Focuses on organizational context, AI tools used, challenges faced, and measurable outcomes achieved.

Ethical Considerations

- **Informed Consent:** Participants are provided with detailed information about the study and must provide written consent before participation.
- **Confidentiality:** Data is anonymized to protect participant and organizational identities.
- **Bias Mitigation:** The use of validated instruments and frameworks ensures objectivity and reliability in data collection and analysis.
- **Data Security:** All data is securely stored and accessed only by authorized researchers.

Scope and Boundaries

- **Scope:** The study focuses on AI applications in strategic decision-making, resource optimization, and process automation across industries such as healthcare, manufacturing, and retail.
- **Geographical Focus:** Participants are drawn from North America, Europe, and Asia to provide a global perspective.
- **Timeframe:** The study examines AI trends and practices from 2020 to 2024.

Limitations

- **Self-Reported Data:** Surveys and interviews rely on participant self-reports, which may introduce biases.
- **Industry-Specific Insights:** Findings may not be generalizable to all industries due to the focus on specific sectors.
- **Rapid Technological Advancements:** AI's rapid evolution may outpace the study's findings, necessitating ongoing updates.

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