

# The integration of AI and business excellence in infrastructure and development: A literature review and directions for future research

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**Abstract:** This study conducts a systematic literature review to analyze the integration of artificial intelligence (AI) within business excellence frameworks. An analysis of the findings in the reviewed articles yielded five major themes: AI technologies and intelligent systems; impact of AI on business operations, strategies, and models; AI-driven decision-making in infrastructure and policy contexts; new forms of innovation and competitiveness; and the impact of AI on organizational performance and value creation in infrastructure projects. The findings provide a comprehensive understanding of how AI can be integrated into organizational excellence emerged frameworks to address challenges in infrastructure governance, and sustainable development. Key questions addressed include: how AI affects consumer behavior and marketing strategies. What AI's capabilities for businesses, especially marketing and digital strategies? How can organizations address the drivers and barriers to help make better use of AI in these business operations? Should organizations even do anything with these insights? These questions and more will be tackled throughout this discussion. This paper attempts to derive a comprehensive conceptual framework from several fields of human resources, operational excellence, and digital transformation, that can help guide organizations and policymakers in embedding AI into infrastructure and development initiatives. This framework will help practitioners navigate the complexities of AI integration, ensuring profitability and sustainable growth in a highly competitive landscape. By bridging the gap between AI technologies and development-related policy initiatives, this research contributes to the advancement of infrastructure governance, public management, and sustainable development.

**Keywords:** artificial intelligence; business excellence; literature review; infrastructure development; sustainable growth

## 1. Introduction

Today's business world demands that contemporary organizations leverage Artificial Intelligence (AI) if they wish to maintain any semblance of competitive advantage. The globalization of industry, the lightning-paced evolution of digital technology, and incessantly changing consumer preferences conspire to create a very complex commercial environment (Kar et al., 2021). Into this tumult, AI has the potential to deliver stunning operational efficiencies and truly innovative service and product offerings, but only if organizations can first make sense of the enormous amounts of data AI consumes.

For many organizations, the automation of various sorts of intelligent tasks is fast becoming a key component of their business model (Jebbor et al., 2024).

The integration of AI presents significant challenges, particularly in legacy systems that were designed before AI. For instance, AI adoption in human resources management within healthcare facilities has encountered obstacles due to outdated infrastructures (Singh, 2023). Singh dives into some of the details in his piece about how stubbornly old business models can resist the AI sea change. And that's an important issue to consider, given that Benmamoun et al. (2023) points out the human cost and serious health implications that can stem from AI decisions made by long-untrustworthy systems. Elendu thinks public trust is a vital part of the equation because, in Elendu's view, AI systems must work for the common good.

The influence of artificial intelligence goes well beyond improving operational efficiency. In fact, it is dramatically changing the very essence of customer relationships and marketing strategies. AI enhances the customer experience and enabling unprecedented levels of personalization (Tula, 2024). In a genuinely competitive environment, this is all what restless businesses must adapt (Chen et al., 2021). And that is how they will also win the never-finish game of customer acquisition and retention.

It is just as important perhaps more so to understand what propels or inhibits the adoption of AI if one wants to comprehend how organizations might use AI to attain a superb level of performance. Research in the field of strategic management, such as the work of Kar et al. (2021), suggests that leveraging AI for superior outcomes necessitates a deep understanding of three interrelated factors: the organization's culture, the steadfastness of its leadership, and the alignment of its technological capacities with its business aims (Hyde, 2024).

In this setting, the current paper strives to offer an all-encompassing examination of the assimilation of artificial intelligence (AI) into the business model of excellence. Drawing from profuse insights gathered across different disciplines and case studies, The manuscript construct a coherent framework that organizations might use to find their way through the myriad complications tied to AI integration. This framework will function as a kind of step-by-step guide for enterprises that wish to utilize AI in the service of sustainable, profitable growth and an elevated, outperforming business model.

## **2. Basic terminology**

Understanding the key terminologies is crucial for this review:

- **Artificial Intelligence (AI):** AI refers to the simulation of human intelligence processes by machines, particularly computer systems. These processes include learning (the acquisition of information and rules for using it), reasoning (using rules to reach approximate or definite conclusions), and self-correction (Elendu, 2023). AI encompasses various subfields, including machine learning, natural language processing (NLP) Business excellence is a holistic management approach that focuses on continuous improvement and delivering outstanding performance in all areas of an organization, robotics, and computer vision.
- **Machine Learning (ML):** A subset of AI, machine learning focuses on the development of algorithms that allow computers to learn from and make predictions based on data. ML algorithms can identify patterns and improve their

performance over time without being explicitly programmed for each task (Purwaamijaya et al., 2021).

- Deep Learning: A specialized form of machine learning that employs neural networks with many layers (hence “deep”). Deep learning models are particularly effective for tasks such as image and speech recognition, natural language processing, and other complex data-driven tasks (Andronie et al., 2021).
- Big Data: This term describes the vast volumes of structured and unstructured data generated by businesses and individuals. Big data analytics involves examining large datasets to uncover hidden patterns, correlations, and insights that can inform decision-making processes (Hassan, 2024).
- Business Excellence: Business excellence is a management approach that focuses on continuous improvement and delivering outstanding performance in all areas of an organization (Bharadiya et al., 2023). It emphasizes the importance of customer satisfaction, operational efficiency, and employee engagement. Frameworks such as the Malcolm Baldrige Criteria and EFQM Excellence Model are commonly used to guide organizations in their pursuit of excellence (Ghaffar, 2024).
- Digital Transformation: This refers to the process by which organizations integrate digital technologies into all areas of their business, fundamentally changing how they operate and deliver value to customers (Ekellem, 2023). Digital transformation often involves adopting new technologies, such as AI, to enhance productivity and competitiveness.
- Automation: The use of technology to perform tasks without human intervention. In the context of AI, automation can range from simple rule-based processes to complex decision-making systems that use machine learning algorithms to optimize operations (Khlie et al., 2024).
- Customer Experience (CX): Customer experience encompasses the interactions a customer has with a brand throughout their journey. This includes pre-purchase activities, purchasing, and post-purchase support (Purnawati, 2024). AI technologies can enhance CX by providing personalized recommendations, predictive analytics, and improved customer service through chatbots and virtual assistants.
- Predictive Analytics: A branch of advanced analytics that uses historical data, statistical algorithms, and machine learning techniques to identify the likelihood of future outcomes. Predictive analytics is often used in marketing to forecast customer behavior and optimize strategies (Shaik, 2023).
- Ethical AI: The study and implementation of AI technologies in a manner that is ethical and responsible. Ethical AI focuses on issues such as fairness, accountability, transparency, and the societal impacts of AI systems, ensuring that AI deployment benefits individuals and communities without discrimination or bias (Benhamida et al., 2024).
- Legacy Systems: Refers to outdated computing systems, software, or technology that are still in use, often because they perform critical functions. Integrating AI with legacy systems poses challenges, including compatibility issues and the need for substantial upgrades (Singh, 2023).

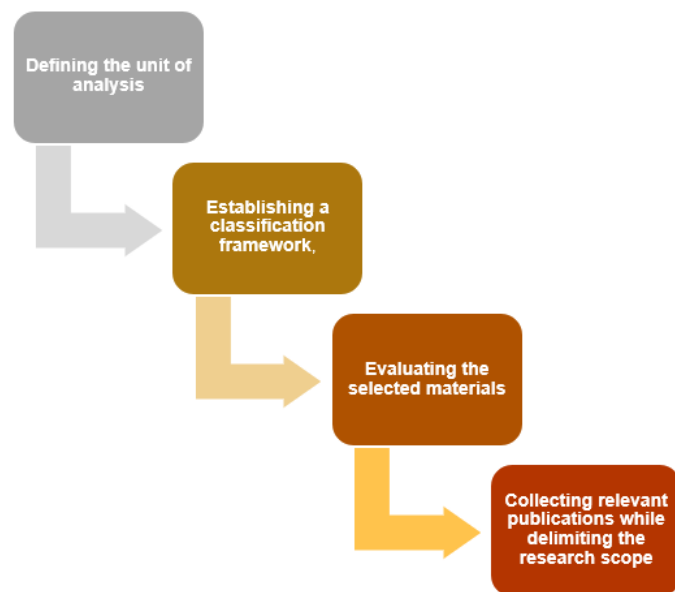
- **Strategic Management:** The formulation and implementation of major goals and initiatives taken by an organization's top management on behalf of owners, involving consideration of resources and assessment of the internal and external environments in which the organization competes. Strategic management frameworks often guide organizations in aligning their AI initiatives with broader business goals (Kar et al., 2021).
- **Return on Investment (ROI):** A performance measure used to evaluate the efficiency of an investment. In the context of AI, ROI can be calculated by assessing the financial benefits gained from AI initiatives relative to the costs associated with their implementation (Hyde, 2024).
- **Human-Machine Collaboration:** Refers to the synergy between human intelligence and AI capabilities, where both work together to achieve better outcomes. This collaboration can enhance decision-making, streamline operations, and foster innovation within organizations (Hassan, 2024).

### **3. Research method**

#### **Research design**

The purpose of this study is to explore and assess the literature review integrating Artificial Intelligence (AI) and Business Excellence and to classify relevant articles. Additionally, this study seeks to identify gaps, issues, and opportunities for further research. Conducting a literature review is a valid approach, as it is essential for structuring a research field and advancing our understanding of any emerging domain. A literature review helps in identifying the conceptual foundations of a field and contributes to theory development. Moreover, it has been established that a systematic literature review is an important step in discovering areas requiring more specific papers (Webster and Watson, 2002).

Our study is directed by theoretical reconsiderations and follows a structured process (**Figure 1**) to minimize the risk of bias and irrelevant paper selection. This systematic approach ensures reliable results, forming a strong foundation for drawing conclusions. The same methodology has been applied in recent studies related to Business Excellence and AI, including research on machine learning and predictive analytics (Olatoye, 2024).



**Figure 1.** Literature review approach.

Following this structured approach guarantees a rigorous and effective literature review.

Our study focuses on peer-reviewed journal articles and influential books with managerial relevance in the field. To maintain academic rigor, we deliberately excluded unpublished working papers and conference proceedings. The literature search covers the period from 1992 to 2023.

For the search criteria, researchers used keywords related to Business Excellence, Artificial Intelligence, and Predictive Analytics. The development of search terms followed an iterative process, beginning with a brainstorming approach, followed by a snowballing method to refine and expand the list of keywords based on the literature. The final search terms were combined using Boolean operators (AND, OR) and applied to keywords, titles, abstracts, and full-text articles.

Each selected paper was briefly analyzed to ensure its relevance to the study. To enhance reliability, researchers jointly conducted the screening and selection process, thereby minimizing misinterpretation risks. As a result, 150 articles were identified for in-depth reading and evaluation. A database was created in Excel to systematically code and classify the selected articles. The classification grouped articles based on:

- Theoretical foundations,
- Research methodologies,
- Measurement scales,
- Key findings
- Interrelationships between AI and Business Excellence.

#### **4. Descriptive analysis**

A thorough literature review will form the bedrock of this inquiry. The review will systematically sift through prevailing academic articles, journals, and industry reports related to AI in business (Chen et al., 2021). These will be arranged in a hierarchy of key themes:

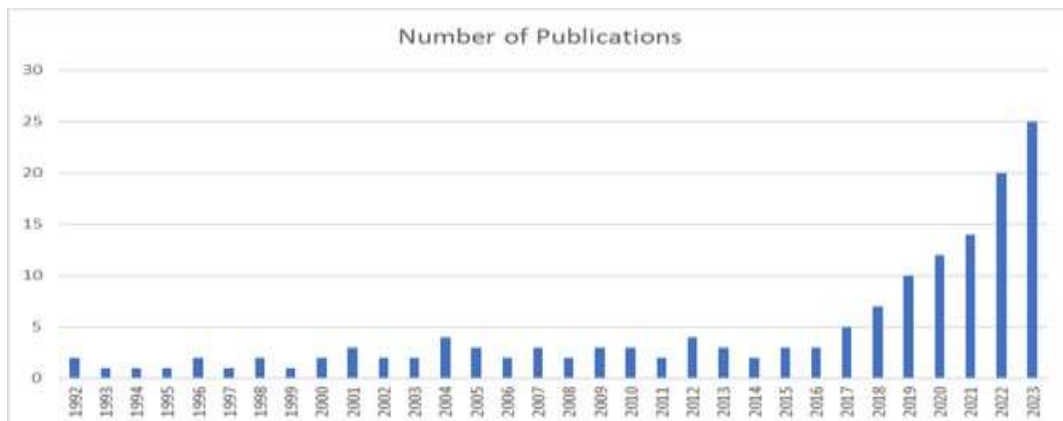
- **AI Technologies and Applications:** Various AI technologies will be explored, such as machine learning, natural language processing, and automation, along with their applications across a range of industries (Adigwe, 2024).
- **Business Excellence Frameworks:** We will examine established frameworks for business excellence, such as the Malcolm Baldrige Criteria and the EFQM Excellence Model, to identify practices and conditions correlated with successful outcomes (Bharadiya et al., 2023).
- **Challenges and Barriers:** We will identify and discuss common problems businesses encounter when integrating AI, along with potential solutions (Kar et al., 2021).
- **Case Studies of Successful Integration:** We will analyze successful case studies to highlight the strategies, outcomes, and lessons learned by businesses that have integrated AI into their operations (Hassan, 2024).

#### 4.1. Distribution across the time period and main journals

This study (Table 1) carried out an analysis of the distribution of publications per year across the period studied in order to see the trend of research over the years. Figure 2 presents the year wise distribution of all 150 papers from 1992 to June 2023.

**Table 1.** Number Of Publications

Unit of analysis	Description
The sources include	Books, peer-reviewed papers, theses published on AI and business excellence.
Type of analysis	Qualitative
Period of analysis	1990 to 2023
Search engines	- Elsevier (www.sciencedirect.com) - Springer (www.springerlink.com) - Google Scholar (scholar.google.com)
Keywords used in searches	AI, Business Excellence Integration of AI Operational Efficiency
Main journals in Business Excellence	- Journal of Business Research, - International Journal of Information Management - Journal of Operations Management
Total number of articles evaluated	150 articles



**Figure 2.** Distribution of publications per year across the period studied.

## 4.2. Geographical application area

The data presented in the pie chart reflects the geographical distribution of research and applications related to Artificial Intelligence (AI) and Business Excellence (see **Figure 3**). Here's a breakdown of what this data could mean:

(1) Concentration of Research:

- USA (35%): The United States holds the largest share, indicating it is a leading country in the integration of AI into business practices. This could suggest a strong investment in AI technologies, robust academic and corporate research, and an overall favorable environment for innovation.
- Germany (20%): Germany's significant share reflects its strong industrial base and emphasis on efficiency and quality in manufacturing and services, which are crucial for business excellence. This might indicate a focus on leveraging AI to enhance operational processes.

(2) Emerging Markets:

- UK (10%) and Canada (8%): The presence of these countries suggests that there is considerable interest and activity in AI research and applications, often influenced by their advanced technological infrastructure and emphasis on innovation in various sectors.
- Australia (7%) and India (6%): These countries are likely exploring AI to improve business performance and operational efficiencies, suggesting a growing interest in AI applications outside the traditional powerhouses.

(3) Diverse Applications:

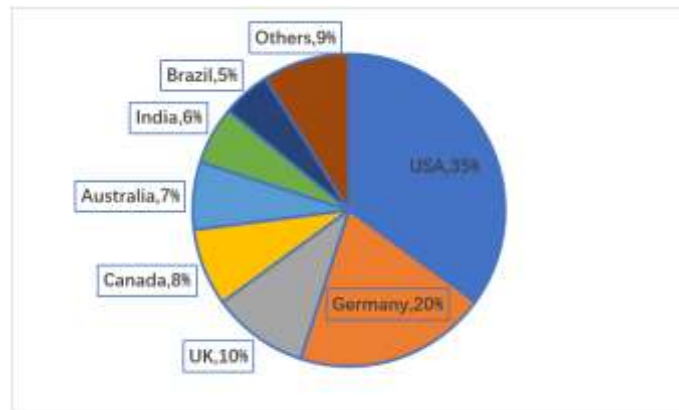
- Brazil (5%): Indicates that AI is being explored in Latin America, suggesting potential growth in AI applications in emerging markets.
- Others (9%): This category represents various countries that may not have a significant share individually but collectively show a global interest in AI and business excellence.

(4) Global Trends:

- The data reflects a global trend toward the integration of AI across various industries, emphasizing the importance of geographical diversity in research and application. Countries leading in AI research may benefit from economic growth, technological advancements, and improved operational efficiencies.

(5) Strategic Insights:

- Organizations looking to expand their AI capabilities might find it beneficial to examine practices from countries with significant shares in AI application. Understanding regional strengths can inform strategies for adopting AI technologies effectively.



**Figure 3.** Geographical application area of AI and Business Excellence.

### 5. Theoretical elements of our proposed model

Recognizing a gap in structured and holistic models for integrating Artificial Intelligence (AI) into Business Excellence frameworks, we propose a comprehensive model that synthesizes theoretical and practical elements identified in the literature. Our integrated model bridges AI-driven technologies with key business excellence principles, ensuring operational efficiency, innovation, and sustainable competitive advantage (**Figure 4**). The model follows a phased deployment approach, beginning with identifying the critical success factors (CSFs) that shape the strategic alignment of AI with business excellence principles such as continuous improvement, quality management, and customer satisfaction.



**Figure 4.** The Integrated Model.

The model acknowledges that organizations implementing AI within business excellence frameworks must consider multiple dimensions, including technological readiness, data governance, process automation, decision intelligence, and human-AI collaboration. AI-driven process optimization, predictive analytics, and machine learning algorithms contribute to enhancing quality, reducing waste, and increasing agility in business operations. Moreover, the integration of AI enables real-time



decision-making, predictive risk management, and adaptive business strategies, reinforcing excellence in performance.

However, while AI offers significant advantages in terms of automation and efficiency, barriers such as technological complexity, resistance to change, ethical concerns, and data privacy issues must be managed. Therefore, our model incorporates a structured approach to mitigating these challenges through organizational change management, AI ethics guidelines, and robust cybersecurity frameworks. Additionally, AI applications in business excellence must be tailored to industry-specific requirements, ensuring alignment with performance metrics such as Six Sigma, Lean methodologies, and Total Quality Management (TQM).

The proposed model is designed as an adaptable framework that can be applied across various industries, fostering a synergy between AI capabilities and business excellence. By integrating AI into existing business excellence methodologies, companies can achieve enhanced productivity, strategic agility, and long-term value creation. Figure X illustrates the theoretical framework and implementation strategy of our proposed model, emphasizing the role of AI in driving innovation and sustainable business performance.

At the core of our framework lies a structured integration of AI capabilities with business excellence dimensions, facilitated by robust enabling technologies and a structured integration mechanism. The framework recognizes that AI-driven technologies serve as key enablers in modern business environments, supporting organizations in achieving excellence through enhanced decision-making, operational efficiency, and strategic agility (Baabdullah et al., 2021; John et al., 2022).

### **5.1. AI Capabilities and Their Role in Business Excellence**

Machine Learning & Predictive Analytics enhance strategic alignment and decision-making by enabling organizations to analyze large datasets, forecast trends, and identify patterns that drive proactive strategies (Osasona, 2024; Li, 2024). These AI-driven insights empower businesses to optimize operations, reduce risks, and capitalize on emerging opportunities, particularly in dynamic business environments where real-time data processing is crucial (Benchekroun et al., 2022).

Automation & Process Optimization contribute to process excellence and lean management by streamlining workflows, eliminating inefficiencies, and ensuring resource optimization (Rawashdeh et al., 2023). AI-powered robotic process automation (RPA) and intelligent workflow automation improve productivity, reduce costs, and maintain high-quality standards (Berger, 2024).

Natural Language Processing (NLP) & Chatbots enhance customer focus and experience by providing personalized interactions, automating customer service, and enabling seamless communication through AI-driven conversational agents (Mogaji et al., 2020; Anjorin et al., 2024). Sentiment analysis and AI-driven feedback mechanisms further improve customer engagement and brand loyalty (Farayola, 2023).

Computer Vision & IoT Integration drive innovation and agility by enabling real-time monitoring, smart automation, and data-driven decision-making (Badghish and Soomro, 2024; Zebec, 2024). In manufacturing and logistics, AI-powered computer

vision systems optimize quality control, predictive maintenance, and safety compliance, fostering operational excellence (Redchuk and Mateo, 2021).

Decision Support Systems contribute to leadership and strategic alignment by providing AI-augmented insights, scenario analysis, and real-time dashboards (Gudigantala et al., 2023). These systems enhance executive decision-making, ensuring businesses stay adaptive, data-driven, and responsive to market dynamics (Jankovic and Curovic, 2023).

## **5.2. Enabling Technologies & Infrastructure**

To effectively harness AI for business excellence, organizations require a robust technological backbone:

Cloud Computing & Big Data facilitate large-scale AI adoption by providing scalable, secure, and cost-efficient data processing capabilities (Yablonsky, 2021). The integration of AI with cloud infrastructure ensures real-time analytics, enhanced collaboration, and enterprise-wide accessibility to AI-driven insights (Berger, 2024).

Cybersecurity & Ethics play a crucial role in ensuring that AI deployment aligns with ethical, legal, and security standards (Oladele, 2024; McGrath, 2024). Organizations must establish AI governance frameworks, data privacy protocols, and risk management mechanisms to mitigate concerns related to data integrity, bias, and security threats (Olatoye, 2024).

Digital Transformation Strategies act as a foundation for AI integration, guiding businesses in adopting AI-enabled solutions, reengineering processes, and fostering a digital-first culture (Haidar, 2023; Raisch and Krakowski, 2021). A well-structured transformation roadmap ensures that AI aligns with organizational goals and industry-specific requirements (Rawashdeh et al., 2023).

AI Governance & Risk Management is essential for ensuring responsible AI deployment. Establishing clear governance frameworks allows organizations to monitor AI performance, ensure compliance with industry standards, and mitigate risks associated with algorithmic bias, ethical dilemmas, and regulatory compliance (John et al., 2022; Oladele, 2024).

## **5.3. Integration Mechanism: Connecting AI to Business Excellence**

The seamless integration of AI into business excellence is facilitated through the following mechanisms:

AI-Driven Decision Making empowers organizations to make faster, data-driven, and highly accurate strategic decisions, improving overall business performance and resilience (Li, 2024; Zebec, 2024).

Smart Performance Measurement & KPIs allow businesses to quantify AI impact by integrating AI-driven metrics with traditional performance measurement systems such as Six Sigma and Total Quality Management (TQM) (Yablonsky, 2021; Berger, 2024). AI enables predictive performance monitoring, anomaly detection, and continuous improvement (Chen et al., 2022).

Digital Culture & Change Management ensures that AI adoption is supported by a workforce capable of leveraging AI-driven insights (Haidar, 2023). Employee

training, leadership development, and AI awareness programs drive successful integration (Jankovic and Curovic, 2023).

AI-Augmented Workforce & Training fosters a human-AI collaboration model, where AI enhances rather than replaces human expertise (Raisch and Krakowski, 2021). AI-driven augmentation in knowledge management, talent development, and skill enhancement ensures that employees effectively leverage AI's potential (Rawashdeh et al., 2023).

AI for Sustainable & Resilient Business Models promotes long-term growth by aligning AI capabilities with sustainability goals, circular economy strategies, and corporate social responsibility (CSR) initiatives (Badghish and Soomro, 2024). AI-driven environmental monitoring, energy optimization, and sustainable supply chain management reinforce business excellence (Berger, 2024; Redchuk and Mateo, 2021).

The proposed framework presents AI as an integral driver of business excellence, innovation, and sustainable competitive advantage. By leveraging AI capabilities, supported by enabling technologies and a structured integration mechanism, organizations can optimize leadership, customer focus, process excellence, innovation, and sustainability. As AI continues to evolve, businesses that effectively integrate AI within their excellence frameworks will not only enhance their operational efficiency but also achieve strategic agility, resilience, and long-term value creation.

#### **5.4. Drivers and barriers to integrate the systems and their relationships**

When businesses try to harness the power of Artificial Intelligence (AI), they often find that the situation is not so clear-cut. There are many reasons to integrate AI into business operations, but there are also many obstacles. Some of the obstacles are caused by a lack of knowledge, and some are the result of human nature pushing back against change (Tula, 2024). This section examines both the benefits and challenges associated with AI integration.

##### **(1) Drivers of AI Integration**

The elements that make the successful adoption of AI systems in organizations possible and likely are referred to as drivers. Taken from the literature, here are some of the key drivers of AI system adoption in organizations:

- **Advances in Technology:** The swift progress of AI technologies provides organizations with the means to increase operational efficiency and innovate in their service offerings (Aldoseri, 2023). When command of the technologies is kept close to the core of organizational objectives, the strategic integration of AI is enhanced.
- **Intensified Competitive Rivalry:** The drive to stay ahead of the pack forces organizations to integrate AI into their operations (Chen et al., 2021). In sectors where rivals are using AI, they are using it for everything from refining internal procedures to disassembling the secret sauce of their followers. And when it comes to internal procedures, AI is creating new kinds of efficiencies for those who use it (Purnawati, 2024).

##### **(2) Barriers to AI Integration**

Barriers represent the challenges and obstacles organizations face when attempting to integrate AI systems. Key barriers identified include:

- **Data Accessibility:** The explosion of big data offers businesses the opportunity to amass sufficient quantities of information to accurately train AI models (Elendu, 2023). The upshot is that organizations can now harness this information as well as meaningful insights to better understand their customers, make improved decisions, and even optimize processes across the board.
- **Organizational Efforts:** Adapting to changing customer demands requires a concerted effort across the entire organization. AI can help by providing insights into the effectiveness of the organization's efforts (Shaik, 2023). This can reveal how well (or poorly) the business is operating across all departments and can show the return on investment (ROI) for all customer-facing initiatives across the entire company.
- **Cost Cutting and Efficiency Gains:** Organizations want to reduce the costs of running things and to make their operations more efficient to automate and optimize. They see AI as the next step in this evolution (Ghaffar, 2024). AI systems can take over many of the repetitive tasks that people now do; they are good at that. And when it comes time to really drive down costs, we see the people side of things usually gets hit first.
- **Support and Vision from Leadership:** A strong commitment from leadership and a clear vision for the integration of AI into the organization are vital for successful adoption. When leaders actively support and promote AI initiatives, they help establish a culture of innovation within the organization (Kar et al., 2021). This, in turn, helps allocate the resources needed for successful AI implementation and ensures that the organization's strategies are aligned with adopted AI capabilities.

### (3) Relationships Between Drivers and Barriers

Organizations face many integration challenges when adopting AI systems. The most significant barrier is the organization's culture of change. Employees' acceptance of the new technology is vital to its successful adoption (Hyde, 2024). Even if an organization identifies the need for AI and commits to its implementation, cultural acceptance is a make-or-break proposition. Employees must not only tolerate the new system; they must accept it and see it, themselves, performing functions previously done by humans.

- **Influence of Leadership Support:** Employee deficiencies in critical skills and knowledge can slow AI assimilation to a crawl. Finding people who are qualified and have the right kind of technical expertise to implement and run AI systems may be a problem for some organizations (Aldoseri, 2023). Closing these skill gaps will certainly demand a vigorous investment in training and development for employees (Elendu, 2023).
- **Technological advancements often conflict with legacy systems,** posing significant integration challenges for organizations (Singh, 2023). The difficulty arises when outdated, complex, and rigid systems must be integrated with modern AI technologies. Many legacy systems were not designed to support AI, leading to compatibility issues, inefficiencies, and increased costs. As a result, organizations must develop strategic approaches, such as phased implementation or middleware solutions, to ensure a smooth transition and optimize the benefits of AI adoption.

- **Ethical Considerations:** Including worries about data privacy and the integrity of algorithms, can dissuade organizations from opting for AI technologies. These worries can be directly managed if organizations pick AI partners that operate under good ethical principles (Aldoseri, 2023). But organizations can also help themselves by understanding the main issues around AI ethics and by establishing ethics as a key part of their own decision-making processes.
- **Data Availability vs. Quality:** The effectiveness of AI systems depends on the quality and availability of data. Many organizations face challenges such as data silos, inconsistent formatting, and a lack of robust data governance (Hassan, 2024). Without improvements in these areas, AI implementations may fail to deliver reliable insights and optimal performance.
- **Cost Considerations:** The up-front costs of integrating AI can be high, especially for small and medium-sized businesses. With limited funds to work with, SMEs may invest their budgets elsewhere and delay not just the integration of AI but also the realization of the benefits that AI can bring.

## **6. Research gaps and directions for future research**

- (1) **Empirical Validation of AI Benefits:** So far, studies discussing the possible advantages of AI have outnumbered the empirical, hard-data evidence. Most of what we have are forecasts and somewhat speculative case studies (Ekellem, 2023). What would help is measuring the actual effect of integrating AI into businesses over the long term 5 to 10 years. That bit of better evidence could then help both businesses and scholars make better decisions and predictions regarding the actual value of AI.
- (2) **Sector-Specific AI Challenges: The Current State of Knowledge:** Much of the current literature on AI speaks of an ‘AI monolith.’ In other words, it deals with AI in a broad and undifferentiated manner, inappropriately treating ‘AI’ as if it were a single entity that behaved the same way across all contexts (Kar et al., 2021). This ‘AI monolith’ is inadequate because AI works in different ways, and to different effects, across the many sectors and contexts in which it is applied. Thus, this literature offers little in the way of sector-specific insights.
- (3) **Cultural Impact on AI Adoption:** Too little attention has been paid to how the specific attributes of an organization’s culture affect the adoption and successful operation of AI (Elendu, 2023). Although Purwaamijaya et al. (2021) recognize the importance of culture, they say it isn’t well understood. I would take this further: The issues remain poorly understood, largely unstudied, and mostly in the dark since the last decade. Research should illuminate the ways culture does and doesn’t affect AI.
- (4) **Ethical Frameworks for AI Implementation:** The AI literature certainly does a good job of pointing out potential ethical concerns, like bias and privacy (Hassan, 2024). But for all the good it does, it seems to be a talk mostly in the name of virtue. Hardly any AI for business implementations literature goes beyond that, offering up frameworks with any practical value that organizations can use to make the ethical AI in business.

- (5) **Integration with Legacy Systems:** Many organizations still use systems that predate the modern wave of AI. These older systems often come with integration challenges that can slow down or even derail efforts to harness AI's power (Singh, 2023). What we really need to do in so-called bridge systems is intelligently route around those old applications, which are useful, but not very smart. We need to keep useful functions in those applications while stopping the dumb routing. Reworking legacy systems to support smarter functions should be part of any AI integration strategy.
- (6) **Long-Term Impact of AI on Business Performance: Elucidation:** A great deal of the research available today considers the direct, immediate impact that AI yields when implemented in business processes (Hyde, 2024). Very few studies have considered or tracked the direct and indirect effects that AI has on an organization over time. This might be because AI is still relatively young and its long-term influence is yet to be seen. However, businesses need to understand how this game-changing technology can impact their performance and overall operational excellence over the next 5 to 10 years.
- (7) **Employee Perceptions and Acceptance of AI:** Much is known about user acceptance being a key factor in the adoption of any new technology (Raouf et al., 2024). Yet little is known about how employees perceive AI, especially in the context of modifying their current jobs or potentially displacing them. To understand the necessity for AI in the newsroom, we must first understand how employees perceive this "revolution."
- (8) **Data Governance and Quality Issues:** The effectiveness of artificial intelligence (AI) systems is directly affected by the quality of the data fed into them it has been called the "AI Quality Problem" (Kar et al., 2021). However there is a lack of research into governance frameworks and best practices that organizations can implement to ensure high-quality data for AI systems.
- (9) **Cross-Cultural Comparisons of AI Adoption: Explanation:** Most of the research on AI integration is carried out in Western contexts (Hyde, 2024). Yet there is a gap in our understanding of how the integration of AI is affected by the diversity of world cultures. This panel will consider both the drivers and the barriers to AI integration in a number of non-Western cultures. It will also look at unusual Western cultures (such as the military) to see what we can learn about AI integration in those contexts.
- (10) **Measuring the Return on Investment (ROI) of AI:** The return on investment (ROI) from artificial intelligence (AI) is very hard to measure. Today, many businesses are spending significant amounts of money on AI (Aldoseri, 2023). A McKinsey survey indicated that in 2021, the AI investments of large companies amounted to more than \$50 million per year. However, in the same survey, McKinsey researchers stated that AI is delivering only limited, if any, benefits. And in September 2022, the Wall Street Journal reported that to gauge the performance of AI, several companies had started to use the "increasingly vague and hard-to-quantify concept of 'helping humans be more productive.'

**Author contributions:** Conceptualization, FM and ZB; methodology, FM and HB; validation, JEMJ, HB and ZB; formal analysis, FM, writing—original draft

preparation, FM, ZB and HB; writing—review and editing, JEMJ. All authors have read and agreed to the published version of the manuscript.

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