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BUSINESS MODEL INNOVATION ENABLED BY ARTIFICIAL INTELLIGENCE: EVIDENCE FROM A SYSTEMATIC REVIEW

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Abstract: The rapid emergence of artificial intelligence (AI) has had a profound impact on contemporary business practices worldwide. Organisations are increasingly transforming the ways in which they create, deliver, and capture value through the adoption of AI-enabled technologies, including automation, machine learning, predictive analytics, and natural language processing. This systematic literature review examines scholarly discourse on AI-driven business model innovation (BMI), with particular emphasis on studies indexed in the Scopus database. The review synthesises existing research to illustrate how AI interacts with other advanced digital technologies, such as cloud computing, blockchain, and the Internet of Things (IoT), in supporting the development of resilient and adaptable business ecosystems. Despite the significant opportunities associated with AI adoption, organisations continue to face substantial challenges relating to data integrity, organisational transformation, workforce reskilling, and regulatory compliance. This article provides a comprehensive examination of the influence of AI on business model innovation, the organisational and technological capabilities required for its effective implementation, and the ethical, financial, and legal challenges that organisations must address to successfully leverage AI.

Keywords: Artificial Intelligence; business model innovation; machine learning; predictive analytics; blockchain.

1. Introduction

In the contemporary digital landscape, artificial intelligence (AI) has emerged as a pivotal force driving the evolution and transformation of innovative business models across a wide range of sectors. No longer confined to its traditional role as a tool for enhancing operational efficiency, AI is increasingly recognised as a fundamental enabler of strategic renewal, reshaping core business offerings and redefining organisational value propositions. Advancements in machine learning, automation, predictive analytics, and natural language processing have empowered organisations to reassess and redesign their products and services, deepen their understanding of customer needs, optimise operational processes, and strengthen data-driven decision-making.

The transformative influence of AI is particularly evident among small and medium-sized enterprises operating across diverse industries, including manufacturing, healthcare, finance, and the automotive sector. These organisations are experiencing a notable increase in business model innovation initiatives as AI technologies become more widely integrated into their operations. Such integration is not only reshaping competitive dynamics but also

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fostering a culture of adaptability and continuous improvement, enabling firms to respond more effectively to rapidly changing market conditions. As a result, the strategic incorporation of AI within organisational structures is increasingly viewed as central to how businesses operate, compete, and achieve sustained success.

Drawing on a systematic review of scholarly publications indexed in the Scopus database, this paper provides a comprehensive assessment of existing literature on AI-driven business model innovation. It examines the roles played by various AI technologies in the evolution and reconfiguration of business models, while also exploring the organisational capabilities required to support their effective adoption. In addition, the study addresses the key challenges organisations face when implementing AI systems and identifies critical gaps in the current body of research. By synthesising prior findings, this review contributes to the literature and offers a foundation for future research into the complex and dynamic relationship between artificial intelligence and business model evolution.

2. Methodology

This study adopts a systematic literature review (SLR) approach to examine the growing body of research at the intersection of artificial intelligence (AI) and business model innovation in a structured, transparent, and methodologically rigorous manner. The SLR methodology ensures that the review is comprehensive, replicable, and reflective of the most recent developments in the field. By applying a systematic process of identification, selection, and synthesis, the review offers a robust overview of scholarly contributions addressing how AI technologies are transforming contemporary business models.

The Scopus database was selected as the primary source of literature due to its wide coverage of high-quality, peer-reviewed journals and conference proceedings across multiple disciplines. Scopus is widely recognised within the academic community as a reliable repository for interdisciplinary research, making it particularly suitable for examining AI-driven business model innovation, which spans domains such as business and management, information systems, technology, and engineering. Drawing on publications from these diverse fields enables the review to capture the technological and strategic dimensions of AI-enabled business model transformation and to highlight the interplay between technological innovation and organisational strategy.

The review focuses on studies published between 2018 and 2024, a period selected to capture recent advancements and emerging trends in artificial intelligence and its integration into business contexts. This timeframe reflects a phase of accelerated development in AI technologies, including automation, machine learning, natural language processing, and predictive analytics, all of which have played a critical role in driving innovation in business models across a wide range of industries. Concentrating on this period allows the review to provide an up-to-date synthesis of research examining both the opportunities and challenges associated with AI adoption in contemporary organisations.

To ensure academic rigour, strict inclusion and exclusion criteria were applied during the article selection process. Only studies with direct relevance to AI-driven business model

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innovation were included, ensuring that the review focused on meaningful and high-quality contributions. The selected literature encompasses a variety of research designs, including empirical studies, conceptual frameworks, theoretical analyses, and case-based investigations. This diversity enhances the review's ability to offer a holistic understanding of how AI influences business model development and transformation across different organisational and industrial contexts.

A thematic synthesis approach was employed to analyse the selected studies. This method facilitated the identification of recurring themes, patterns, and relationships within the literature, providing structured insights into AI-enabled business model innovation. Key themes included the role of AI in transforming value creation and capture mechanisms, the organisational capabilities required for effective AI integration, and the barriers to implementation, such as data integrity concerns, workforce transformation, ethical considerations, and regulatory challenges. In addition, the analysis highlighted the increasing convergence of AI with complementary digital technologies, including cloud computing, blockchain, and the Internet of Things (IoT), which collectively support the development of resilient and adaptive business ecosystems.

Overall, this systematic approach enables a comprehensive synthesis of existing research while identifying gaps and opportunities for future scholarly inquiry. The findings contribute to a deeper understanding of the strategic implications of AI adoption and provide valuable insights for researchers, practitioners, and policymakers seeking to navigate the evolving relationship between artificial intelligence and business model innovation.

2.1 Search Strategy

To ensure a comprehensive retrieval of relevant literature, a carefully designed search strategy was implemented using the Scopus database. A set of targeted keywords and phrases was developed to capture a broad range of studies examining the impact of artificial intelligence on business model innovation. These search terms included *"AI-driven business model innovation"*, *"artificial intelligence and business models"*, *"machine learning and business models"*, *"AI integration in business"*, and *"AI transformation in industry"*. The selected keywords reflect the multifaceted nature of AI adoption and its influence on business model development across different sectors.

This search strategy enabled a broad yet focused identification of scholarly publications, ensuring that relevant studies from multiple disciplines were included. As a result, the review provides a holistic synthesis of existing research and establishes a solid foundation for future investigations into AI-enabled organisational transformation.

2.2 Inclusion Criteria

Studies were included in the review based on clearly defined criteria to ensure academic quality and relevance. Eligible publications were required to be peer-reviewed journal articles or conference papers indexed in the Scopus database. In addition, the studies had to

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demonstrate a direct focus on business model innovation across one or more industries and explicitly examine the role of artificial intelligence in driving such innovation.

Included studies were further required to offer substantive insights into AI-driven business model transformation through empirical evidence, conceptual frameworks, theoretical discussions, or detailed case studies. This selection approach ensured that both practical and theoretical perspectives were represented, supporting a comprehensive examination of the strategic and organisational implications of AI adoption.

2.3 Exclusion Criteria

Studies were excluded if they did not explicitly address the integration of artificial intelligence within the context of business model innovation. In particular, research focusing solely on the technical aspects of AI, such as algorithm design or hardware architecture, without linking these elements to business models or organisational strategy, was excluded. Similarly, articles addressing AI-related issues such as ethics, privacy, or regulatory frameworks were omitted unless they demonstrated a clear and direct connection to business model innovation. To maintain accessibility and consistency, publications written in languages other than English were also excluded. This exclusion process ensured that the final dataset remained focused on studies that directly contribute to understanding how AI influences the innovative restructuring of business models.

2.4 Data Extraction and Analysis

Data were systematically extracted from the selected studies with particular attention to AI technologies, industry applications, organisational capabilities, and implementation challenges. The analysis sought to capture both the technological drivers of AI adoption and their practical implications for organisations operating in different sectors.

A thematic synthesis approach was applied to analyse and consolidate the extracted data. This process enabled the identification of recurring themes and sub-themes across the literature. Core themes included AI-enabled value creation, operational efficiency, and the development of new business models. Sub-themes addressed specific organisational challenges such as data governance, workforce reskilling, and ethical oversight. This structured analytical approach supports a coherent presentation of findings and provides a comprehensive overview of how artificial intelligence is reshaping business models across industries.

3. AI Technologies Enabling Business Model Innovation

A range of core artificial intelligence (AI) technologies underpin AI-driven business model innovation, enabling organisations to rethink and reconfigure their operational processes and strategic orientations. Key technologies including machine learning (ML), automation, natural language processing (NLP), and predictive analytics form the technological foundation for enhancing efficiency and facilitating the development of new business models. Machine learning algorithms enable organisations to analyse large volumes

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of data and extract actionable insights, thereby optimising processes and supporting real-time, data-driven decision-making. Similarly, AI-enabled automation streamlines workflows by reducing manual tasks, lowering operational costs, and improving overall productivity.

Predictive analytics and NLP further strengthen AI's value creation potential by enabling organisations to anticipate customer needs and tailor solutions accordingly. Predictive analytics supports demand forecasting, risk management, and operational flexibility, while NLP enhances customer engagement through applications such as chatbots, voice assistants, and sentiment analysis. Together, these technologies enable more responsive, personalised, and scalable customer service experiences.

Overall, advancements in AI are driving the emergence of customer-centric, adaptable, and scalable business models. By leveraging AI, organisations can expand operations without incurring substantial additional costs, respond rapidly to market changes, and deliver customised offerings that address evolving customer expectations. Such transformation has become essential for maintaining competitiveness in an increasingly fast-paced and technologically advanced business environment.

3.1 Machine Learning and Predictive Analytics

Machine learning (ML) and predictive analytics play a central role in embedding artificial intelligence into innovative business models by enabling organisations to extract meaningful insights from large datasets and support informed decision-making. These technologies enhance both operational efficiency and customer experience. For instance, ML models are widely used for real-time fraud detection, supply chain optimisation, and the prediction of consumer behaviour (Movahed, 2025). Predictive analytics complements these capabilities by allowing organisations to anticipate customer demand and market trends, thereby supporting proactive and strategic decision-making.

In the financial sector, ML has significantly improved risk assessment and fraud detection processes, making them faster and more accurate than traditional approaches (Kayyali, 2025). Financial institutions increasingly rely on ML techniques to analyse complex datasets and identify anomalies with greater precision. Similarly, in the healthcare sector, predictive analytics contributes to improved patient outcomes by supporting clinical decision-making, reducing waiting times, and enabling more efficient allocation of resources (Esmaeilzadeh, 2024). These examples illustrate how AI-enabled business models can reduce costs, streamline operations, and deliver personalised services across diverse industries.

3.2 Automation and Robotics

The adoption of AI-driven automation and robotics is reshaping traditional business models across numerous industries. By automating repetitive and labour-intensive processes, these technologies help organisations streamline operations, reduce operating costs, and minimise the risk of human error. In the automotive manufacturing sector, for example, AI-powered robots are commonly used to perform assembly line tasks, enhancing production efficiency, flexibility, and consistency. Moreover, these systems improve workplace safety by

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reducing human exposure to hazardous environments and performing high-risk tasks with greater precision (Srivastava et al., 2025).

The development of autonomous vehicles provides a prominent example of how AI-driven automation is accelerating business model innovation within the automotive industry. Beyond transforming mobility, autonomous vehicles are enabling new business models such as mobility-as-a-service (MaaS), which offers shared, on-demand transportation solutions and reduces the need for private vehicle ownership. Business models based on pay-per-ride or subscription services allow consumers to access transportation without owning a vehicle, resulting in more flexible, cost-effective, and sustainable mobility solutions (Gupta et al., 2021). Through such innovations, AI-enabled automation is opening new revenue streams and enhancing service delivery within the transportation sector.

3.3 Natural Language Processing (NLP)

Natural language processing (NLP) is transforming the ways in which organisations design and implement their business models, particularly in sectors such as healthcare, finance, and legal services. Its applications extend beyond customer interaction to include the automation of knowledge-intensive tasks such as document analysis, contract review, and compliance monitoring. In legal and financial contexts, NLP reduces labour costs, improves accuracy, and accelerates decision-making by enabling professionals to focus on higher-value activities.

NLP technologies support the efficient examination of contracts by identifying key clauses and potential risks, thereby reducing the likelihood of human error. Similarly, NLP-based systems enhance compliance processes by analysing large volumes of regulatory documentation and ensuring adherence to legal requirements (Gadicha et al., 2025). As a result, NLP is playing a significant role in reshaping business models by improving operational efficiency while simultaneously enhancing customer engagement and service responsiveness.

3.4 Blockchain Integration

The integration of blockchain technology with artificial intelligence in decentralised systems is significantly enhancing organisational efficiency and transparency. By reducing reliance on intermediaries, organisations can minimise delays and transaction costs while improving process reliability. AI-enabled automation of contract execution, payment processing, and data validation, combined with blockchain's secure and transparent infrastructure, allows organisations to reduce operational costs and increase transaction speed (Movahed, 2025).

In supply chain management, AI supports demand forecasting, coordination, and bottleneck identification, while blockchain enables transparent tracking of products and their origins. Together, these technologies create more efficient, traceable, and cost-effective supply chains. Their combined impact is particularly evident in sectors where trust, transparency, and security are critical. In the financial industry, AI-enhanced blockchain applications support secure peer-to-peer transactions, facilitate fraud detection, and enable

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decentralised finance (DeFi) systems, reducing dependence on traditional financial intermediaries. Similarly, in healthcare, blockchain safeguards the integrity and confidentiality of patient data, while AI enhances patient monitoring, diagnosis, and treatment recommendations, resulting in more secure and effective healthcare systems (Rajarejeswari et al., 2024).

Overall, the convergence of blockchain technology and artificial intelligence represents a significant shift in business model innovation. This integration enables the development of secure, transparent, and efficient platforms that streamline operations and foster trust across industries, while also creating opportunities for novel business models that better align with evolving market and customer demands.

4. Organizational Capabilities for AI Integration

For organisations to integrate artificial intelligence effectively into their operations, they must develop specialised organisational capabilities that support the adoption, scalability, and strategic deployment of AI technologies. Among these, dynamic capabilities—defined as an organisation's ability to sense opportunities, seize resources, and reconfigure assets in response to changing market conditions—are particularly critical. In the context of AI, dynamic capabilities involve identifying emerging opportunities for AI adoption, adapting existing processes to accommodate AI technologies, and leveraging these technologies to drive innovation (Jorzik et al., 2024). As AI becomes increasingly central to organisational competitiveness, such capabilities enable firms to remain agile and responsive in dynamic environments.

Resource orchestration represents another essential capability, encompassing the effective coordination and management of key AI-related resources, including data, algorithms, technological infrastructure, and human expertise. Organisations must ensure the availability of robust systems for data management and analytics, alongside the technical capacity to deploy, maintain, and refine AI solutions. The alignment of data, talent, and technology is critical for translating AI adoption into tangible business value (Srivastava et al., 2025).

In addition to technical and structural capabilities, organisations must also undergo cultural transformation to create an environment conducive to AI-driven innovation. This involves fostering a culture that encourages experimentation, continuous learning, and ethical awareness, while ensuring that AI initiatives align with broader organisational goals. Employees must be equipped with the skills required to engage effectively with AI technologies, and organisations must establish ethical frameworks to guide AI use in accordance with societal norms and organisational values (Movahed, 2025). Such adjustments are essential to ensure that AI integration results in sustained and meaningful innovation.

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4.1 Dynamic Capabilities

The development of dynamic capabilities is fundamental to the successful integration of AI-driven business model innovation. As noted by Jorzik et al. (2024), dynamic capabilities reflect an organisation's capacity to sense market changes, seize emerging opportunities, and reconfigure resources to address evolving demands. These capabilities are especially important in technology-intensive environments, where rapid innovation and heightened competition require continuous strategic adaptation.

As artificial intelligence reshapes industries, organisations must continually reassess and evolve their business models to align AI functionalities with long-term strategic objectives. This requires a deliberate evaluation of how AI can enhance customer experiences, generate novel value propositions, and improve operational efficiency. By deploying AI technologies to automate routine processes, support predictive analytics, and personalise customer interactions, organisations can strengthen decision-making and deepen customer engagement. However, it is essential that AI initiatives remain closely aligned with organisational strategy and market expectations, particularly given the rapid pace of technological change.

The cultivation of dynamic capabilities in AI contexts also requires the development of an organisational culture that promotes experimentation and continuous learning. AI integration should not be viewed as a one-off implementation but rather as an ongoing, iterative process characterised by experimentation, learning, and refinement. Organisations that encourage employees to explore innovative AI applications and learn from both successes and failures are better positioned to sustain adaptability and innovation over time.

Dynamic capabilities further involve the strategic reallocation and upgrading of resources in response to emerging AI technologies. Organisations may need to modernise existing systems, invest in AI-specific infrastructure, and recruit specialised talent to support advanced applications. The ability to rapidly reconfigure resources ensures that AI initiatives remain aligned with organisational objectives and responsive to changing market conditions. Ultimately, the development of dynamic capabilities enables organisations to leverage AI strategically, maintain competitiveness, and achieve sustained innovation in increasingly digitalised markets.

4.2 Resource Orchestration

Resource orchestration is a core capability for organisations seeking to maximise the value derived from artificial intelligence. It refers to the effective coordination and deployment of critical resources, including data assets, algorithms, technological infrastructure, and human expertise, that are essential for AI implementation (Srivastava et al., 2025). To support AI-driven decision-making, organisations must establish robust infrastructures capable of managing large-scale data, supported by advanced analytics tools and secure data storage systems.

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Investment in human capital is equally important. Organisations must recruit and retain skilled professionals such as data scientists, engineers, and AI specialists who possess the technical expertise required to design, implement, and refine AI systems. However, technical talent alone is insufficient. Employees across functional areas including marketing, operations, and customer service must also receive appropriate training to apply AI tools effectively within their respective roles. Cross-functional collaboration between AI specialists and business leaders is therefore essential to ensure that AI initiatives are strategically aligned and deliver measurable outcomes.

High-quality data is a further prerequisite for effective AI performance. Poor data quality can undermine model accuracy and lead to flawed insights or decisions. To mitigate these risks, organisations should establish comprehensive data governance frameworks that ensure data accuracy, relevance, and timeliness (Srivastava et al., 2025). Through effective resource orchestration, organisations can align technology, talent, and data, thereby maximising the strategic impact of AI adoption.

4.3 Organisational Culture Shifts

Beyond technological deployment, the successful adoption of artificial intelligence requires substantial cultural change within organisations. As AI becomes increasingly embedded in business operations, organisations must foster cultures that support continuous learning, collaboration, and ethical responsibility. Such cultural transformation is essential for realising the full potential of AI while managing the associated risks.

A culture of continuous learning is particularly important, given the rapid evolution of AI technologies. Employees must be encouraged and supported to regularly update their skills and knowledge. This includes specialised technical training for AI professionals, as well as broader initiatives that enable employees in non-technical roles to understand and apply AI within their functional areas (Movahed, 2025). Embedding learning across the organisation ensures that AI capabilities can be effectively scaled and sustained.

Collaboration across organisational boundaries is also critical. AI adoption is not solely the responsibility of IT departments or technical specialists; it requires close cooperation between business leaders, domain experts, and AI practitioners. Cross-functional teams facilitate the integration of diverse perspectives, promoting innovation and improving the alignment of AI initiatives with organisational goals.

Ethical considerations represent a further cornerstone of cultural transformation. Organisations must ensure that employees understand the ethical implications of AI-enabled decision-making, particularly in areas where transparency, fairness, and data privacy are paramount. Providing training on ethical responsibilities and establishing clear governance structures helps ensure that AI systems comply with legal standards and societal expectations, while reducing bias and unintended consequences (Movahed, 2025).

In summary, organisations that prioritise cultural transformation by fostering ethical awareness, collaboration, and continuous learning are better positioned to implement

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artificial intelligence responsibly and effectively. Such organisations are more likely to achieve sustained innovation and long-term value creation through AI integration.

5. Industry Specific Applications

Traditional global business models are undergoing substantial transformation as a result of rapid advances in artificial intelligence. Organisations across a wide range of industries are increasingly integrating AI technologies into their operational and strategic processes to enhance customer satisfaction, develop new value propositions, and improve operational efficiency. This shift is evident across multiple sectors, each of which applies AI in distinctive ways to sustain competitiveness in an increasingly digital and dynamic environment. The growing adoption of AI not only reflects a change in operational practices but also highlights the importance of adaptability and continuous innovation in responding to evolving market conditions.

In the healthcare sector, AI is advancing applications in patient management, diagnostics, and personalised treatment. By analysing large and complex datasets, AI systems support more accurate diagnoses and enable the development of tailored treatment plans, thereby improving patient outcomes. Similarly, in the financial sector, AI enhances customer engagement, fraud detection, and risk assessment through the use of machine learning and predictive analytics, enabling faster and more informed decision-making. In the automotive industry, AI is driving major shifts through the development of autonomous vehicles and mobility-as-a-service models, while AI-enabled automation and robotics are improving flexibility, efficiency, and safety in manufacturing and industrial operations.

Across these sectors, AI extends beyond automation to serve as a key driver of business model innovation. Organisations are leveraging AI to develop more adaptive, customer-centric, and scalable business models that can respond rapidly to market changes and deliver enhanced value. This widespread adoption of AI-driven innovation is laying the foundation for more interconnected, efficient, and responsive industry ecosystems.

5.1 Healthcare

In the healthcare sector, artificial intelligence is transforming business models by improving operational efficiency, enhancing patient outcomes, and enabling new service delivery models such as telemedicine and personalised care pathways (Esmaeilzadeh, 2024). AI technologies are increasingly used to predict patient outcomes, optimise resource allocation, and generate tailored treatment recommendations, contributing to more effective and timely healthcare delivery. For example, AI-driven predictive analytics support healthcare providers in anticipating patient needs and allocating clinical resources more efficiently.

AI also facilitates the development of personalised care plans that take into account individual medical histories and genetic profiles, thereby improving treatment effectiveness and patient satisfaction. In addition, AI plays a growing role in telemedicine by enabling remote consultations and continuous patient monitoring, which expands access to healthcare services, particularly in underserved or remote regions.

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Despite these benefits, significant challenges remain in implementing AI within healthcare systems. Fragmented processes, data silos, and concerns over patient data privacy can hinder AI integration. Given the sensitivity of healthcare data, robust cybersecurity measures and governance frameworks are essential. Moreover, widespread adoption requires organisational transformation to ensure that healthcare professionals are equipped with appropriate infrastructure, training, and institutional support to use AI effectively (Bhatnagar & Sehajpal, 2025). Addressing these challenges is critical to fully realising AI's potential in the healthcare sector.

5.2 Finance

Artificial intelligence is reshaping business models in the financial sector by strengthening key functions such as risk assessment, fraud detection, and customer engagement. Advanced machine learning algorithms enable financial institutions to forecast market trends, evaluate credit risk, and identify fraudulent activities in real time, thereby improving decision-making accuracy and reducing financial losses (Patil, 2024). AI also supports the development of personalised financial products, enhancing customer experience by offering more relevant and customised services.

For example, AI-powered robo-advisors provide tailored investment recommendations, while automated credit scoring systems allow lenders to assess creditworthiness more precisely. These innovations improve operational efficiency and deepen customer relationships through more responsive and adaptable financial services.

However, several challenges continue to constrain the widespread adoption of AI in finance. Data privacy remains a critical concern, as financial institutions handle highly sensitive customer information. In addition, algorithmic transparency is essential to ensure that customers and regulators understand the basis of AI-driven decisions. Ensuring fairness and preventing bias in AI-based financial assessments are also key ethical considerations. Addressing these issues is essential for the responsible and sustainable use of AI in the financial sector.

5.3 Automotive

The automotive sector is at the forefront of AI-enabled business model innovation, particularly through the emergence of mobility-as-a-service (MaaS) models. AI-powered autonomous vehicles are transforming shared mobility solutions and redefining concepts of transportation access and ownership. On-demand, self-driving vehicles are enabling new revenue models, including pay-per-use and subscription-based services, which offer consumers greater flexibility, affordability, and convenience (Gupta et al., 2021).

Beyond mobility services, AI is enhancing automotive manufacturing through applications such as predictive maintenance, intelligent production systems, and increased operational flexibility. AI-driven monitoring systems can identify potential equipment failures before they occur, enabling proactive maintenance and reducing downtime (Robinson & Gorecha, 2024). Furthermore, the integration of AI with robotics in production lines improves

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assembly speed, accuracy, and cost efficiency. These advancements allow manufacturers to increase output while maintaining high quality standards and responding more effectively to market fluctuations. Overall, AI is enabling the automotive industry to develop more sustainable, adaptive, and customer-oriented business models that are reshaping both vehicle manufacturing and transportation services.

5.4 Manufacturing

Artificial intelligence is transforming the manufacturing sector by enabling intelligent production systems, predictive maintenance, and enhanced supply chain efficiency. When combined with technologies such as the Internet of Things (IoT) and robotics, AI allows manufacturers to create production environments that are more flexible, efficient, and responsive to real-time conditions (Chithiraikannu et al., 2024). AI-driven automation supports continuous monitoring of machinery and sensor data, facilitating early detection of faults and reducing unplanned downtime through predictive maintenance.

AI also plays a crucial role in quality control by identifying defects during production, improving product consistency, and reducing waste. In industries such as electronics and consumer goods, AI-enhanced automation accelerates production processes by automating repetitive tasks such as assembly and packaging. These capabilities contribute to cost reduction by increasing throughput while minimising errors and material waste. By adopting AI technologies, manufacturers can improve operational efficiency, enhance competitiveness, and respond more rapidly to fluctuations in market demand. The integration of AI supports the development of more resilient and sustainable manufacturing business models, positioning firms to thrive in an increasingly competitive global market.

6. Challenges and Barriers in AI Integration

The integration of Artificial Intelligence (AI) into business models offers considerable opportunities for innovation, efficiency, and growth; however, it is also accompanied by a range of substantial challenges. Despite its transformative potential, organisations frequently encounter obstacles that complicate the effective adoption of AI technologies. One of the most critical challenges concerns data quality as AI systems depend on large volumes of accurate, reliable, and well-structured data. Poor data quality can lead to flawed analyses and suboptimal decision-making.

In addition, workforce transformation represents a significant concern, as AI-driven automation may displace certain traditional roles, necessitating substantial investments in reskilling and upskilling initiatives. Regulatory uncertainty further compounds these challenges, as AI technologies often evolve more rapidly than the legal and institutional frameworks designed to govern them. Without clear guidance, organisations may struggle to ensure compliance while continuing to innovate. Moreover, ethical considerations such as algorithmic bias, transparency, and data privacy remain pressing issues. If AI systems are not designed and implemented in a fair and accountable manner, organisations risk reputational damage and loss of stakeholder trust. Addressing these interconnected challenges is essential for the successful and responsible integration of AI into business strategies.

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6.1 Data Quality and Infrastructure

For AI to operate effectively, organisations must have access to high-quality data supported by a robust technological infrastructure. AI systems rely on extensive datasets to identify patterns, predict outcomes, and support timely decision-making. However, many organisations particularly small and medium-sized enterprises (SMEs) face persistent challenges related to data governance, data quality, and infrastructure readiness (Zavodna et al., 2024; Block, 2024). Data that is incomplete, inaccurate, or biased can significantly undermine the performance of AI models, leading to unreliable predictions and potentially harmful outcomes. Weak data governance structures may also result in inefficient data storage, prolonged processing times, and difficulties in integrating information from multiple sources.

To overcome these challenges, organisations must invest in the development of robust data infrastructures capable of supporting the collection, storage, and analysis of large-scale datasets. This typically involves the adoption of cloud computing technologies, the establishment of reliable data management systems, and the continuous organisation and maintenance of data assets to ensure their accuracy and accessibility. Beyond financial investment, the development and maintenance of such infrastructure require substantial time and specialised expertise, particularly to support advanced AI models and analytical processes. As such, successful AI adoption depends on a careful balance between financial resources, technical capability, and organisational commitment.

For SMEs, the cost of establishing and maintaining advanced data infrastructures can be particularly prohibitive, and many lack both the capital and technical expertise required. Consequently, these organisations must prioritise data quality and allocate resources strategically towards appropriate technologies and staff training. By doing so, they can create a strong foundation for AI integration. Adherence to sound data management practices enables organisations to harness AI more effectively, improving operational efficiency and enhancing the quality of managerial decision-making. In the long term, such investments support innovation, resilience, and competitiveness in an increasingly data-driven business environment.

6.2 Workforce Transformation

The rapid diffusion of AI technologies has raised significant concerns regarding workforce displacement, as automation has the potential to replace human labour in various sectors. Routine and repetitive tasks in industries such as manufacturing, customer service, and finance are increasingly being automated, which may lead to job reductions in certain occupational categories. At the same time, AI adoption is generating new employment opportunities that require advanced technical skills, including roles such as data scientists, AI engineers, and ethics officers (Leuba & Piricz, 2024). These positions are essential for the design, deployment, and ethical governance of AI systems and are expected to grow in demand as AI becomes more deeply embedded in organisational operations.

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To mitigate the risks associated with workforce displacement, organisations must invest in comprehensive reskilling and upskilling programmes that enable employees to transition into new roles within an AI-driven economy. Such initiatives can equip workers with competencies in areas such as data analytics, machine learning, and AI system management. In addition, organisations should cultivate a culture of continuous learning by providing employees with ongoing opportunities to update their skills and adapt to emerging technologies. This proactive approach not only enhances individual employability in a rapidly evolving labour market but also allows organisations to retain valuable institutional knowledge while building a workforce capable of leveraging AI effectively. Although AI may disrupt certain job categories, it simultaneously creates new pathways for professional growth. By prioritising workforce development, organisations can facilitate a smoother transition towards an AI-enabled future.

6.3 Ethical and Regulatory Challenges

Ethical governance is fundamental to the responsible and equitable deployment of AI technologies. As AI systems increasingly influence decisions that affect customers, employees, and other stakeholders, it is essential that these systems operate in a fair, transparent, and unbiased manner (Coovadia et al., 2025). AI systems often rely on large datasets to inform decision-making; however, without appropriate oversight, they may inadvertently reinforce existing biases. This can result in discriminatory outcomes, particularly in sensitive applications such as recruitment, performance evaluation, or credit approval, ultimately undermining public trust in AI-enabled systems. Organisations must therefore embed ethical considerations into the design and implementation of AI to promote accountability and social responsibility.

The regulatory landscape surrounding AI remains under development, presenting additional complexity for organisations seeking to deploy these technologies responsibly. Governments and regulatory bodies are actively working to establish frameworks that address the ethical and legal implications of AI, including issues related to data protection, algorithmic transparency, and accountability (Sharma et al., 2025). In the absence of clearly defined and harmonised regulations, organisations may struggle to interpret their legal obligations and assess the risks associated with AI adoption. Staying informed about evolving regulatory requirements is therefore essential.

To address these challenges, organisations must develop robust ethical governance frameworks that guide AI research, development, and deployment. This involves establishing clear ethical guidelines, ensuring transparency in algorithmic decision-making, and engaging proactively with regulators and other stakeholders. By aligning AI practices with legal requirements and societal values, organisations can enhance public confidence in AI technologies. Ultimately, strong ethical governance not only mitigates risk but also supports sustainable innovation by fostering trust, accountability, and long-term legitimacy in the use of artificial intelligence.

7. Future Research Directions

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To advance scholarly understanding of AI-enabled business model innovation, this study highlights several critical areas that merit further investigation. As AI technologies continue to evolve, there is a growing need for comprehensive and interdisciplinary frameworks that support the effective integration of AI within organisational operations. Such frameworks should extend beyond technological considerations to incorporate ethical, strategic, and managerial dimensions, ensuring that AI adoption aligns with broader business objectives and societal values (Jorzik et al., 2024). A holistic framework of this nature would provide organisations with a structured approach to managing the complexities of AI integration, facilitating coherence between technological capabilities, organisational structures, and ethical standards in pursuit of sustainable and responsible innovation.

A notable gap in the existing literature is the limited availability of empirical evidence. Although numerous conceptual frameworks have been proposed, many remain insufficiently tested in real-world settings. Future research should therefore prioritise empirical validation across a range of industries, including healthcare, finance, and manufacturing. By examining these frameworks in practical contexts, scholars can generate deeper insights into how AI-driven business models function across different sectors. Such studies would enable organisations to better understand the sector-specific challenges and opportunities associated with AI adoption, while also contributing to the refinement of existing models and offering actionable guidance for broader application (Aderibigbe et al., 2023).

In addition to cross-sectoral analysis, there is an urgent need to operationalise ethical AI frameworks. As AI systems become increasingly embedded in organisational decision-making processes, ensuring fairness, transparency, and accountability is essential for maintaining stakeholder trust. Future research should focus on developing measurable indicators related to AI governance, data privacy, and equity, enabling organisations to assess whether their AI applications comply with ethical principles and legal requirements. In the absence of clearly defined ethical benchmarks, AI systems may perpetuate algorithmic bias, produce inequitable outcomes, or compromise individual privacy, thereby undermining the legitimacy and effectiveness of AI-driven innovations (Movahed, 2025). The establishment of such indicators would support organisations in monitoring ethical performance while fostering transparency and accountability.

Finally, further research is required to examine the scalability of AI technologies and their long-term implications for organisational structures. Understanding how AI-driven innovations can be effectively scaled across industries, and how they reshape governance, decision-making, and organisational design over time, is critical to unlocking their full potential. By addressing these research priorities, future studies can contribute to pushing the boundaries of AI-enabled business model innovation, equipping organisations with the knowledge needed to navigate the challenges of AI integration while remaining attentive to ethical and societal considerations.

8. Conclusion

Artificial intelligence is becoming an increasingly integral element of business model transformation, fundamentally reshaping industries through the creation of new value,

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enhanced operational efficiency, and more customer-centric services. By enabling organisations to analyse vast volumes of data, automate complex processes, and generate predictive insights, AI supports more informed decision-making, optimised resource allocation, and personalised customer experiences. Its application across sectors such as manufacturing, healthcare, and finance demonstrates its broad potential: from optimising supply chains and production systems, to improving patient outcomes and strengthening risk management practices. Collectively, these developments are facilitating the emergence of business models that are more agile, efficient, and responsive to rapidly evolving market conditions.

Despite its transformative potential, the integration of AI into business models presents several notable challenges. Data quality remains a critical concern, as AI systems depend on accurate, relevant, and high-quality data to function effectively. Inadequate data can lead to flawed predictions and suboptimal decisions, thereby constraining the benefits of AI adoption. Workforce-related challenges also persist, as AI implementation often necessitates substantial reskilling and upskilling initiatives. Moreover, the automation of routine tasks raises concerns regarding job displacement and employee adaptation, requiring organisations to manage workforce transitions carefully and responsibly.

Among the most significant challenges associated with AI adoption is the need for robust ethical governance. Upholding principles of transparency, accountability, and fairness throughout the design, deployment, and use of AI systems is essential for maintaining public trust and social legitimacy. Organisations must give due consideration to issues such as algorithmic bias, data privacy, and the protection of individual rights, ensuring that AI applications are aligned with ethical standards. These concerns are closely linked to regulatory compliance, particularly as legal frameworks continue to evolve alongside technological advancements. To ensure sustainable and responsible AI adoption, organisations must remain vigilant, adaptable, and proactive in responding to emerging regulatory requirements while embedding ethical considerations into their strategic decision-making processes.

Looking ahead, continued research into cross-industry frameworks, ethical AI principles, and empirical validation of AI applications will be vital for supporting the effective and responsible integration of AI into business models. By addressing existing challenges and capitalising on emerging opportunities, AI-driven business model innovation has the potential to reshape industries, generate new revenue streams, and support long-term sustainable growth. As AI technologies continue to advance, organisations that strategically embrace AI will be better positioned to enhance customer value, improve competitiveness, and thrive within an increasingly digital and interconnected global economy.

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