Research Mapping on the use of AI in Business Development

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Article Info

ABSTRACT

Artificial Intelligence (AI) has emerged as a transformative force in business development, driving innovation, strategic decision-making, and digital transformation. This study conducts a bibliometric analysis using Scopus data and VOSviewer to map the research landscape on AI applications in business. The analysis reveals that AI is closely linked to innovation, big data, machine learning, sustainability, and competition, highlighting its broad impact across industries. The co-authorship and country collaboration networks indicate that research is concentrated in technologically advanced regions, with limited representation from developing economies, suggesting the need for more inclusive global research efforts. The findings also identify a fragmented research landscape, where multiple disciplines study AI's role in business from diverse perspectives, reinforcing the need for greater interdisciplinary collaboration. Future research should focus on bridging regional gaps, exploring AI's long-term effects on business sustainability, and integrating ethical considerations into AI-driven strategies. This study provides valuable insights for academics, policymakers, and business leaders, contributing to a comprehensive understanding of how AI is shaping modern business practices.
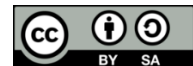
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1. INTRODUCTION

In today's rapidly evolving business landscape, technological innovation has become the cornerstone of competitive advantage and sustainable growth. Over the past few decades, businesses have witnessed a profound transformation driven by digitalization, which has redefined traditional practices and reshaped market dynamics [1]. At the heart of this digital revolution lies Artificial Intelligence (AI), a technology that has transcended its theoretical origins to become a pragmatic tool for enhancing operational efficiency, customer engagement, and decision-making processes. The integration of AI in business contexts ranges from simple automation of routine tasks to the deployment of complex algorithms that forecast market trends and consumer behavior. This paradigm shift has not only spurred innovation but also challenged organizations to adapt quickly in order to harness the transformative potential of AI. Consequently, understanding how AI influences business development has

emerged as a critical area for both academic inquiry and practical application [2], [3].

The advent of AI has ushered in a new era for business development, characterized by enhanced data analytics, improved customer relationship management, and streamlined operational processes. With advancements in machine learning, natural language processing, and robotics, AI systems have increasingly been deployed in areas such as predictive maintenance, personalized marketing, and financial forecasting [4]. Such developments have led to significant improvements in efficiency and accuracy, which in turn have allowed businesses to scale rapidly while reducing operational risks. Moreover, the continuous evolution of AI technologies presents a unique opportunity to reexamine established business models, encouraging a shift from traditional strategies to more agile, data-driven approaches. This evolution is underpinned by both theoretical and empirical studies that emphasize AI's role as a catalyst for innovation and strategic transformation across diverse industries [5], [6].

Beyond operational enhancements, the integration of AI into business development has also stimulated significant academic and industry interest in understanding its broader socio-economic implications. Researchers have begun to map the diffusion of AI technologies across various sectors, exploring how these innovations are adopted, adapted, and scaled within different organizational contexts [7], [8]. These studies have revealed that while AI adoption can drive competitive advantage, it also raises important questions regarding ethics, workforce displacement, and the digital divide. The interplay between technology adoption and human capital development is particularly complex, as organizations are required to balance efficiency gains with the need for ethical guidelines and employee upskilling. This dual focus on technological prowess and socio-ethical considerations underscores the necessity of a comprehensive research mapping that situates AI within the broader framework of business development [9].

In parallel with the technological advancements, there has been a burgeoning interest in synthesizing and mapping the existing body of literature on AI applications in business development. Research mapping serves as an essential tool for scholars and practitioners alike, offering insights into prevailing trends, methodological approaches, and potential gaps in current knowledge [10], [11]. Such mapping endeavors provide a structured overview of how AI has been deployed across various business functions and the resultant impact on competitive strategies and market performance. By cataloging and analyzing the wealth of research outputs, scholars can identify emerging areas of interest, align future investigations with industry needs, and inform policy decisions. This comprehensive approach not only highlights the successes and challenges associated with AI adoption but also offers a roadmap for future research initiatives that seek to integrate AI more holistically into business development strategies.

Despite the significant advancements in AI technologies and their growing adoption in business development, several challenges persist that hinder a holistic understanding of the field. The literature on AI in business development is characterized by fragmentation, with studies often focusing on isolated applications or industry-specific case studies rather than offering a comprehensive view of the discipline [12]. This compartmentalized approach has led to gaps in the theoretical integration of AI across diverse business functions, as well as inconsistencies in methodologies and metrics used to assess AI's impact. Moreover, rapid technological advancements often outpace academic research, creating a lag between practice and theory that complicates efforts to map current trends effectively. Without a systematic and integrative research mapping, stakeholders—including policymakers, business leaders, and academic researchers—face challenges in developing unified

strategies that fully leverage AI's potential while mitigating its risks [13].

The objective of this study is to systematically map the existing research on the use of AI in business development, thereby providing a comprehensive overview of the field. This research mapping endeavor aims to identify key trends, methodological approaches, and thematic clusters within the current literature, as well as to highlight areas where significant gaps or inconsistencies exist. By synthesizing findings from a wide range of studies, the research intends to offer valuable insights that can inform future academic inquiries and practical applications, ensuring that emerging AI technologies are integrated effectively and ethically into business strategies. Ultimately, this study seeks to bridge the gap between isolated research efforts and provide a cohesive framework that supports innovation, strategic planning, and policy development in the era of digital transformation.

2. LITERATURE REVIEW

The evolution of Artificial Intelligence (AI) within business development has been a subject of extensive scholarly interest over the past two decades. Early studies primarily focused on the technological underpinnings of AI, with research directed at exploring the capabilities of machine learning algorithms, natural language processing, and expert systems [14]. As AI began to transition from academic laboratories to real-world business applications, seminal works such as [15] highlighted the transformative potential of digital technologies in enhancing operational efficiency and competitive positioning. These early contributions laid the groundwork for a more nuanced exploration of how AI can drive strategic decision-making, optimize resource allocation, and foster innovation in various sectors. The literature from this period emphasizes the technological promise of AI, while also acknowledging the need for integrating human judgment and ethical

considerations into AI-driven business processes [16], [17].

Building on this foundation, subsequent research expanded the focus from purely technical aspects to the practical implications of AI adoption in business environments. [18] provided one of the earliest comprehensive analyses of how AI applications are reshaping business models by automating routine tasks, enhancing customer service through personalized interactions, and enabling data-driven decision-making. Their work underscored that AI's value does not reside solely in efficiency gains but also in its capacity to unlock new revenue streams and create competitive advantages in dynamic market settings. In parallel, studies such as those by [19] explored the organizational challenges associated with integrating AI systems, particularly regarding workforce displacement, ethical dilemmas, and the need for continual upskilling. This body of literature stresses that while AI technologies offer significant potential benefits, the path to successful adoption is fraught with complexities that require both strategic foresight and adaptive management practices.

An important strand of the literature centers on the methodological approaches used to map and synthesize research in this field. Research mapping has emerged as a critical tool for aggregating and analyzing disparate studies to provide a comprehensive overview of the state of knowledge regarding AI in business development. [20] argue that research mapping facilitates the identification of thematic clusters, methodological trends, and gaps in the literature. This approach not only helps to organize the vast and fragmented body of research but also guides future inquiries by pinpointing areas that warrant further exploration. For example, systematic reviews and bibliometric analyses have been used to chart the evolution of AI applications across different business functions, revealing a diverse array of research outputs that vary widely in scope, methodology, and disciplinary focus [21],

[22]. These mapping studies serve as essential references for both academics and practitioners, highlighting emerging trends and providing a roadmap for integrating AI more effectively into business strategies.

Empirical evidence has played a vital role in demonstrating the impact of AI on business development. Numerous case studies and sector-specific analyses have documented successful implementations of AI-driven solutions in areas such as supply chain management, marketing, and customer relationship management. For instance, research by [23] presents compelling evidence that companies leveraging AI technologies have been able to optimize their operations, reduce costs, and improve service delivery through advanced data analytics and predictive modeling. These empirical studies often employ mixed-methods research designs, combining quantitative data analysis with qualitative insights from industry leaders to construct a holistic view of AI's practical benefits and challenges. Additionally, longitudinal studies have traced the evolution of AI applications over time, illustrating how iterative improvements in technology and increasing data availability have continually reshaped business strategies [24], [25]. This body of empirical work reinforces the idea that while AI can act as a powerful lever for business growth, its successful implementation requires careful alignment with organizational goals, robust data governance, and a willingness to adapt to rapidly changing market conditions [26]–[28].

The literature further delves into the challenges and limitations that accompany the integration of AI into business development. A recurring theme is the issue of fragmentation in research outputs, where studies tend to focus on isolated applications or industry-specific cases without providing a unifying theoretical framework. This fragmentation has led to inconsistencies in research methodologies and evaluation metrics, thereby hindering the comparability of findings across studies [29]. Scholars have noted that while individual case studies offer valuable insights, they often fail to capture the broader socio-technical implications of AI adoption, such as its impact on workforce dynamics, ethical practices, and regulatory environments. Moreover, the rapid pace of technological advancement means that academic research sometimes lags behind real-world practices, creating a disconnect between theoretical models and practical applications. These challenges underscore the need for comprehensive research mapping that not only aggregates existing knowledge but also identifies critical gaps and inconsistencies in the literature [30], [31].

In addressing these challenges, recent studies have begun to advocate for a more integrated and interdisciplinary approach to researching AI in business development. Researchers suggest that combining insights from computer science, management studies, ethics, and even sociology can lead to a more robust understanding of how AI technologies affect business operations and stakeholder relationships. This interdisciplinary perspective is particularly important given the multifaceted nature of AI, which intersects with diverse areas such as cybersecurity, data privacy, and human resource management. For instance, emerging frameworks in the literature emphasize the importance of ethical AI, advocating for transparency, accountability, and fairness in AI-driven decision-making processes [32]. These frameworks seek to ensure that the deployment of AI not only drives business performance but also aligns with broader societal values and regulatory standards. Such integrative approaches are critical for developing a cohesive body of knowledge that can inform both theory and practice in a rapidly evolving field.

3. METHODS

The study employed a bibliometric approach using data exclusively from the Scopus database, ensuring a focused and high-quality corpus of literature on the use of Artificial Intelligence in business development. A comprehensive search was

conducted in Scopus using a set of predefined keywords—including "artificial intelligence," "machine learning," "digital transformation," and "business development"—to retrieve relevant peer-reviewed articles and conference papers. After applying strict inclusion criteria to ensure methodological rigor and relevance, the resulting dataset was analyzed using VOSviewer. This software facilitated the visualization and mapping of bibliometric networks, including co-authorship, co-citation, and keyword co-occurrence analyses, which allowed the identification of key thematic clusters and influential publications within the field.
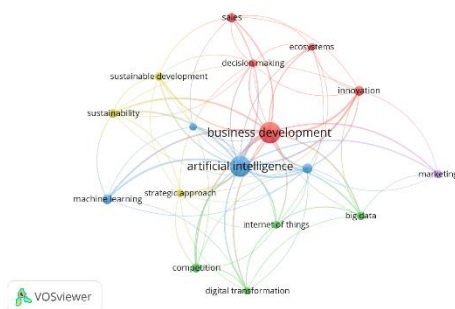
4. RESULTS AND DISCUSSION

Figure 1. Network Visualization
Source: Data Analysis, 2025

The bibliometric visualization generated using VOSviewer provides a network representation of key themes and relationships within the research landscape on Artificial Intelligence (AI) in Business Development. The network map consists of various nodes (keywords) and links (connections), where the size of the nodes indicates the frequency of a term's occurrence in the dataset, and the thickness of the links represents the strength of co-occurrence between terms. Based on the visualization, "business development" and "artificial intelligence" appear as the two most central themes, suggesting that AI is widely discussed in relation to business expansion, strategic decision-making, and technological transformation. One of the key thematic clusters, represented by red-colored nodes, includes terms such as "innovation," "decision-making," "ecosystems," and "sales."

This cluster highlights the role of AI in driving business innovation and enhancing decision-making processes. AI is increasingly being used for predictive analytics, market forecasting, and optimizing sales strategies. The connection between ecosystems and AI indicates an emerging trend in AI-driven business networks and partnerships, which are becoming essential in fostering innovation and achieving competitive advantages. These relationships emphasize how AI contributes to business ecosystems by enhancing connectivity, automation, and strategic collaborations.

The blue cluster, which includes terms like "machine learning," "strategic approach," and "sustainability," points to AI's role in long-term business strategy and sustainable development. Machine learning, a subset of AI, is widely applied in predictive modeling, process optimization, and risk assessment—enabling companies to refine their strategies. Moreover, the connection with sustainability and sustainable development suggests that AI is being increasingly adopted to improve resource efficiency, reduce waste, and support environmentally conscious business practices. This aligns with the growing trend of integrating AI into corporate social responsibility (CSR) and green business strategies. Another significant cluster, marked in green, includes "big data," "internet of things (IoT)," "digital transformation," and "competition." This grouping signifies the technological convergence of AI with big data and IoT, which are critical enablers of digital business transformation. The close connection between AI and competition indicates that firms leveraging AI-driven data insights gain a competitive advantage in market positioning, customer personalization, and operational efficiency. Businesses that integrate AI with IoT and big data analytics can enhance supply chain management, optimize customer experiences, and drive real-time decision-making—a crucial aspect of digital competitiveness. Lastly, the purple cluster, which includes "marketing," suggests that AI is playing an expanding role in

personalized marketing, customer engagement, and consumer behavior analysis. AI-powered tools such as chatbots, recommendation algorithms, and predictive analytics are revolutionizing digital marketing by improving customer targeting, campaign efficiency, and return on investment (ROI). The interconnection of marketing with business development and AI highlights a shift toward AI-driven market intelligence, automation, and data-driven customer relationship management (CRM). Overall, the visualization underscores that AI is not only a technological enabler but also a strategic imperative in modern business development.
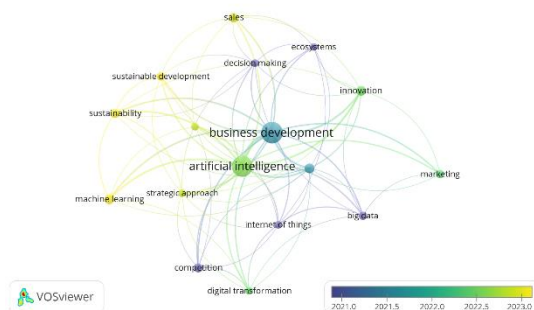

Figure 2. Overlay Visualization
Source: Data Analysis, 2025

This VOSviewer visualization represents a bibliometric analysis of the research landscape on Artificial Intelligence (AI) in Business Development, with a time-based color gradient indicating the evolution of topics from 2021 to 2023. The color scale at the bottom shows how recent each keyword's prominence has been, ranging from dark blue (older studies from 2021) to yellow (more recent studies from 2023). The central terms, "business development" and "artificial intelligence", are among the most studied topics, as indicated by their large node sizes. The surrounding concepts, which include "machine learning," "innovation," "big data," and "marketing," reveal key areas where AI is being applied in business development. These terms are interconnected, suggesting that AI's influence spans multiple business functions, from strategic decision-making to digital marketing and sustainability.

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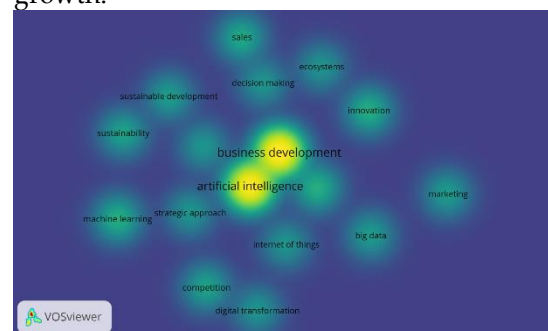

Figure 3. Density Visualization
Source: Data Analysis, 2025

This VOSviewer density visualization represents the concentration of research activity on Artificial Intelligence (AI) in

Business Development. The color gradient indicates the intensity of research focus, with yellow areas representing high research density and green areas showing moderate activity, while less active areas fade into the blue background. The two most prominent topics, "business development" and "artificial intelligence," are at the center of the visualization and appear in bright yellow, confirming that these are the core themes in the research field. Surrounding these, other key concepts such as "decision making," "innovation," "marketing," "big data," and "sustainability" appear in green, indicating significant but slightly lower research attention. This suggests that while AI's role in business development is well-studied, there are still evolving areas where further investigation is needed.

The dispersion of green clusters around the core topics reveals diverse areas of AI application in business development, with topics like "machine learning," "digital transformation," and "competition" indicating technological and strategic dimensions of AI adoption. The presence of "sustainability" and "sustainable development" highlights an increasing interest in AI's role in driving responsible and eco-friendly business practices. Meanwhile, terms such as "sales," "ecosystems," and "strategic approach" suggest a growing focus on AI's contribution to improving sales efficiency, business ecosystems, and corporate strategies. The spread of these keywords implies that while AI's role in business is widely acknowledged, research efforts are branching into interdisciplinary domains—linking AI with ethics, environmental sustainability, and strategic management. Future studies may explore these intersections further, particularly in underrepresented areas where AI's impact is still emerging.
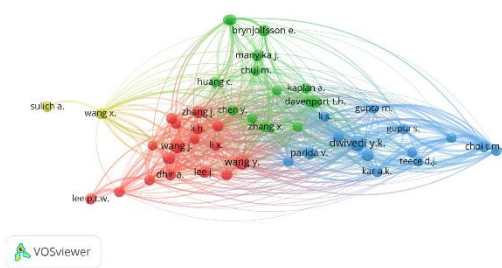
Co-Authorship Network

Figure 4. Author Visualization
Source: Data Analysis, 2025

This VOSviewer co-authorship network visualization represents the collaboration patterns among researchers in the field of Artificial Intelligence (AI) in Business Development. The different colored clusters indicate distinct research groups, with each node representing an author and the connections (edges) showing co-authorship links. The size of the nodes reflects the number of publications or influence of each author within the network. The visualization highlights three major clusters: a red cluster consisting of authors like Zhang J., Wang J., and Lee J., indicating a strong network of collaboration; a green cluster featuring influential scholars like Brynjolfsson E., Manyika J., and Davenport T.H., who are well-known for their work on AI-driven business strategy and digital transformation; and a blue cluster that includes Dwivedi Y.K., Choi T.M., and Gupta S., suggesting a focus on AI's role in business innovation and strategic decision-making. The presence of isolated authors or weakly connected nodes (e.g., Sulich A.) indicates less collaboration with the central research groups. Overall, the visualization underscores the interdisciplinary and collaborative nature of AI research in business, revealing key academic influencers and research networks driving this field.
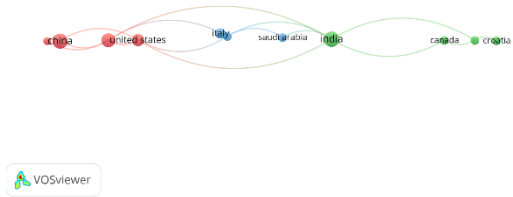
Figure 5. Country Visualization
Source: Data Analysis, 2025

This VOSviewer country collaboration network visualization illustrates international research partnerships in the field of Artificial Intelligence (AI) in Business Development. The nodes represent countries, while the connections (edges) indicate co-authorship links between researchers from different nations. The size of each node reflects the research output or influence of that country, while the colors group countries into collaborative clusters. The United States and China (red cluster) appear as dominant contributors, frequently collaborating on AI-related business research. Italy and Saudi Arabia (blue cluster), as well as India, Canada, and Croatia (green cluster), demonstrate active but more regionally focused collaborations. India acts as a central connecting hub, linking both Western (United States, Italy) and Eastern (Saudi Arabia, Canada, Croatia) research efforts. The structure of this visualization suggests that AI research in business development is globally distributed but still exhibits strong regional collaboration patterns, with certain countries serving as bridges between research clusters. Strengthening international partnerships could help enhance knowledge exchange and innovation in AI-driven business strategies.

DISCUSSION

The Growing Role of AI in Business Development

The bibliometric analysis of AI in business development underscores a significant increase in academic interest in this field. As evidenced by the keyword co-occurrence and density visualizations, AI is not merely a technological advancement but a transformative force that influences multiple aspects of business strategy, innovation, and sustainability. The centrality of "artificial intelligence" and "business development" in the keyword network highlights the core focus of researchers on how AI-driven solutions are shaping modern business practices. The emergence of terms like "innovation," "decision-making," "big data," and "digital transformation" further

reinforces the notion that AI is not only automating processes but also driving strategic change within organizations. These findings align with prior research that emphasizes AI's role in enhancing business intelligence, improving operational efficiency, and fostering data-driven decision-making [33]. One of the most notable trends in the field is the increasing intersection of AI and sustainability, as indicated by the presence of "sustainability" and "sustainable development" in the bibliometric analysis. This suggests that AI is being integrated into environmentally friendly business models, sustainable supply chains, and corporate social responsibility (CSR) initiatives. Scholars have begun to explore AI's ability to optimize resource management, reduce waste, and enhance sustainable practices [29]. The visualization also indicates that while sustainability-related research in AI-driven business development is growing, it remains a developing field, requiring further interdisciplinary exploration to bridge the gap between AI innovation and sustainable business solutions.

Emerging Research Themes and Gaps

The network visualization of author collaborations reveals distinct research clusters, suggesting that AI applications in business development are being studied from multiple disciplinary perspectives. For example, researchers such as Brynjolfsson, Manyika, and Davenport are well-known for their work on AI's economic and strategic implications, while others like Dwivedi, Gupta, and Choi focus on AI's role in business innovation and digital transformation. The presence of these independent yet interconnected clusters suggests a fragmented research landscape, where scholars are working on related themes but within relatively isolated subfields. This fragmentation limits the development of a unified theoretical framework that integrates AI's technological advancements with business development strategies. Furthermore, the author collaboration map indicates that a large proportion of studies originate from researchers in technologically

advanced regions, particularly the United States, China, and Europe. While AI's impact on business is a global phenomenon, there is a noticeable lack of representation from developing economies, where AI adoption is rapidly increasing but remains under-researched. Future research should aim to include more studies from emerging markets and developing economies to provide a more comprehensive and globally representative understanding of AI in business development.

Another key finding from the bibliometric analysis is the growing integration of AI with other advanced technologies, particularly big data, the Internet of Things (IoT), and machine learning. The co-occurrence network visualization illustrates strong links between AI and these concepts, reinforcing prior research that suggests AI does not operate in isolation but rather within a larger ecosystem of intelligent, data-driven technologies [34]. However, while AI's synergy with big data and IoT is well-documented, its intersection with blockchain, cybersecurity, and cloud computing remains less explored in the business development context. Future studies should investigate how AI can be securely integrated with decentralized technologies to enhance transparency, security, and efficiency in business operations.

International Research Collaboration Trends

The country collaboration network visualization highlights international research partnerships in AI-driven business development. The most influential contributors to the field are the United States, China, and India, with strong collaborative links between these nations. European countries such as Italy and Croatia, along with Canada and Saudi Arabia, also play a role in the global research landscape. The presence of distinct regional clusters suggests that AI research collaborations often occur within specific geopolitical regions, potentially influenced by government policies, research funding, and industry demands. However, the limited representation of African, Latin American, and Southeast Asian countries in

the co-authorship network points to a global imbalance in AI research contributions. Given the rapid adoption of AI-driven business solutions in emerging economies, it is crucial for future research efforts to incorporate diverse perspectives and regional contexts. Encouraging cross-regional collaboration through joint research initiatives, academic exchange programs, and international AI summits could help bridge this gap and foster a more inclusive and globally representative research landscape.

Practical Implications for Businesses and Policymakers

The findings from this study hold several important implications for business leaders, policymakers, and AI practitioners. First, the strong co-occurrence of AI with decision-making and innovation suggests that businesses should invest in AI-driven business intelligence tools to gain real-time insights, enhance strategic planning, and optimize operational performance. AI-powered predictive analytics, for example, can help organizations anticipate market trends, customer behavior, and supply chain disruptions, enabling data-driven decision-making that improves business resilience and competitiveness. Second, the increasing connection between AI and sustainability highlights the potential of AI in supporting corporate sustainability initiatives. Businesses that integrate AI into their sustainability strategies can benefit from automated resource optimization, energy-efficient operations, and enhanced regulatory compliance. Policymakers should consider incentivizing businesses to leverage AI for sustainable development, potentially through tax benefits, subsidies, or sustainability-focused AI grants. Third, the fragmented nature of AI research indicates that business leaders and policymakers must adopt an interdisciplinary approach to AI adoption. While AI is often studied from a technological or business strategy perspective, ethical considerations, workforce impact, and regulatory compliance must also be taken into account. Governments and regulatory bodies should work with AI researchers to develop

standardized frameworks that ensure AI applications in business development are ethical, transparent, and aligned with societal values.

Future Research Directions

While this bibliometric analysis provides valuable insights into the research landscape of AI in business development, several areas require further exploration. First, future studies should focus on bridging the gap between AI research in developed and developing economies. The underrepresentation of Africa, Latin America, and Southeast Asia in AI research suggests a need for more localized studies that examine how AI is transforming business environments in diverse economic and cultural contexts. Second, research collaboration should be strengthened across disciplines. AI research in business development is currently divided into separate streams, including technological, managerial, and economic studies. An interdisciplinary research approach that integrates AI ethics, law, behavioral economics, and human-computer interaction could provide a more holistic understanding of AI's business implications. Finally, longitudinal studies are needed to track the long-term impact of AI on business growth and sustainability. While existing research predominantly focuses on short-term AI applications, understanding its long-term effects on business performance, employment patterns, and market dynamics is critical. Conducting multi-year empirical studies could help businesses and policymakers develop more informed AI adoption strategies that balance innovation with ethical and societal considerations.

5. CONCLUSION

This study provides a comprehensive bibliometric analysis of research on Artificial Intelligence (AI) in Business Development, highlighting key trends, thematic clusters, and collaboration networks. The findings reveal that AI plays a transformative role in business innovation, strategic decision-making, and digital transformation, with strong interconnections to big data, machine learning, sustainability, and competition. The author and country collaboration networks indicate that research in this field is dominated by scholars from technologically advanced regions, while developing economies remain underrepresented, suggesting a need for more inclusive global research efforts. Additionally, the study identifies a fragmented research landscape, where multiple disciplines explore AI's business impact from different perspectives, reinforcing the need for greater interdisciplinary collaboration. Future research should focus on bridging regional and disciplinary gaps, examining AI's long-term effects on business sustainability, and integrating ethical considerations into AI-driven business strategies. By addressing these challenges, researchers, policymakers, and business leaders can leverage AI more effectively to foster innovation, competitiveness, and sustainable economic growth.

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