

Literature Review: The Role Of Big Data In Business Intelligence (BI)

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Abstract

This literature review explores the pivotal role of Big Data in enhancing Business Intelligence (BI) capabilities, particularly in strategic decision-making, operational efficiency, and gaining a competitive advantage. Through an analysis of recent studies, it highlights how Big Data facilitates real-time insights, enabling firms to optimize processes, improve predictive analytics, and adapt to dynamic market conditions. The review integrates theoretical frameworks such as Dynamic Capability Theory and Resource-Based Theory to underline the strategic value of Big Data in BI. Despite its transformative potential, challenges like high implementation costs, technological complexity, and resource limitations hinder its adoption, particularly for small and medium-sized enterprises. This study identifies gaps in current research and calls for further exploration into cost-effective solutions and skill development to enable broader adoption across various industries and regions.

Keywords: Big Data, Business Intelligence, strategic decision-making, operational efficiency, Dynamic Capability Theory, Resource-Based Theory.

INTRODUCTION

In the digital age, characterized by rapid technological advancements, Big Data has become a critical driver of innovation across various industries. Big Data provides the ability to collect, store, and analyze large volumes of diverse and complex data, enabling real-time insights for businesses. In the context of Business Intelligence (BI),



Big Data has expanded the scope of data analytics, allowing organizations to make more informed, data-driven decisions. Research by Cheng, Mahinder Singh, Zhang, & Wang (2023) shows that integrating Big Data into BI systems helps businesses better understand customer behavior, predict market trends, and optimize operations. However, the implementation of Big Data in BI also poses challenges, such as technological limitations and a lack of skilled human resources.

The integration of Big Data into Business Intelligence has transformed the way companies utilize information for strategic decision-making. With the ability to process large datasets from various sources, businesses can gain deeper insights into consumer preferences and market dynamics. According to Cumba & Huang (2024), Big Data enables firms to improve predictive analytics, allowing them to anticipate future market trends and respond proactively. This capacity for foresight has proven particularly valuable in sectors like retail and finance, where rapid shifts in consumer behavior require agile responses. However, while the potential for data-driven decision-making has grown, many organizations still face difficulties in fully leveraging these capabilities due to the complexity of data processing technologies.

One of the significant benefits of Big Data in BI is its ability to optimize operational efficiency. By analyzing data patterns, businesses can streamline processes, reduce waste, and improve resource allocation. Alshuaibi, Alhebri, Khan, & Sheikh (2024) highlight that companies implementing Big Data analytics in their BI systems have reported improvements in supply chain management, inventory control, and customer service. For example, real-time analytics allow companies to adjust their logistics operations based on current demand, minimizing delays and reducing costs. Despite these advantages, challenges such as the high cost of data infrastructure and the need for specialized talent remain critical barriers to full adoption, especially in small and medium-sized enterprises.

Furthermore, the role of Big Data in enhancing customer experience has been widely recognized. Nguyen, Dang-Van, Vo-Thanh, Do, & Pervan (2024) found that companies utilizing Big Data for BI were better equipped to personalize marketing efforts, resulting in higher customer satisfaction and loyalty. By analyzing customer data, businesses can tailor products and services to meet individual preferences, thereby fostering stronger customer relationships. However, the successful implementation of such systems requires a robust framework for data governance to ensure privacy and security. As more companies adopt Big Data technologies, there is a growing need to address these ethical concerns to maintain consumer trust and compliance with regulatory standards.



The primary aim of this literature review is to explore the role of Big Data in Business Intelligence, specifically in enhancing analytical capabilities and supporting strategic decision-making. This review also seeks to identify key concepts and theories that underpin Big Data's role in BI, as well as to assess research gaps and future directions.

THEORETICAL FRAMEWORK

Big Data refers to large, diverse, and complex datasets that require advanced technologies and methodologies for processing and analysis. Big data refers to a collection of massive data that enables the analysis of trends, anticipation of emerging needs, optimization of operations, and informed decision-making aligned with customer needs, offering significant profit potential for businesses, especially in retail (Taghipour, 2024). Big Data is defined by several key features: its massive scale (volume), the rapid pace at which it is produced (velocity), the diversity of data formats (variety), the reliability or trustworthiness of the data (veracity), and the meaningful insights it can provide (value). Grasping these aspects is crucial for conducting effective data analysis (Mahto & Mishra, 2024).

Business Intelligence (BI) is a set of strategies, technologies, and applications that companies use to analyze business data to support decision-making. Business intelligence (BI) is an area of information technology that enhances user interactions within business domains, significantly impacting business operations. It is essential in modern data warehouse environments and facilitates self-service through enabling BI tools (Kumar, Mishra, & Kumar, 2023). Big Data has become a crucial component of BI, offering richer and deeper data insights that were previously unattainable with traditional data systems.

Two prominent theories related to Big Data and BI are Dynamic Capability Theory (DCT) and Resource-Based Theory (RBT). Dynamic Capability Theory emphasizes an organization's ability to adapt to environmental changes by leveraging dynamic resources like Big Data (Kleiner, 2013; Teece, 2009). Resource-Based Theory posits that a company's competitive advantage arises from unique, inimitable resources, such as data management and analytical capabilities (Barney & Clark, 2007; Barney & Tong, 2004).

The relationship between Big Data and BI can be explained through Dynamic Capability Theory, where companies that utilize Big Data for analysis and decision-making are more adaptive to market changes and environmental shifts (Mulla, 2024). Similarly, Resource-Based Theory highlights Big Data as a strategic resource that strengthens a

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company’s competitive advantage. The study by Cumba & Huang (2024) demonstrated that small and medium-sized enterprises (SMEs) that integrated Big Data into their BI systems experienced improved business performance, reflecting the application of RBT.

RESEARCH METHOD

The selected literature focuses on studies published in the last five years (2019–2024) with a focus on Big Data and Business Intelligence. Additional criteria include the relevance of the study to the topic, the research methodology used (primarily empirical studies), and sources from reputable, peer-reviewed journals indexed in leading databases such as **ScienceDirect** and **Scopus**.

The primary databases used for the literature search were ScienceDirect and Scopus, which provide access to high-quality scholarly journals focused on information technology, business management, and data analytics. The keywords used in the search included "Big Data," "Business Intelligence," "Dynamic Capability Theory," and "Resource-Based Theory." The combination of these keywords ensured that relevant research supporting the objectives of this review was selected.

Table 1. Relevant Previous Research (Articles)

Author	Title and Year	Implementation
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Minghao Xu, Yufei Zhang, Haoran Sun, Yuanxiu Tang, Junjun Li	How Digital Transformation Enhance Corporate Innovation Performance: The Mediating Role of Big Data Capabilities and Organizational Agility (2024)	To effectively implement these findings, enterprises should embed big data capability development and organisational agility into their digital transformation strategies. This involves investing in advanced analytics infrastructure, enhancing data governance, and fostering a culture of continuous learning and rapid response to market dynamics. Firms should align their strategic goals with big data initiatives and ensure cross- functional integration to support agile decision-making processes. By systematically strengthening these capabilities, businesses can more effectively navigate the complexities of digital transformation and unlock sustained innovation performance in an increasingly competitive and data-driven environment.
Luisa Tomas Cumba & Xiaoxia Huang	The Opportunities for Digitalization of Companies on Modern Technologies in a Post- Pandemic World (2024)	To capitalize on the role of Big Data in Business Intelligence, companies—especially SMEs— should prioritize the integration of BDA tools into their core operations as part of their broader digital transformation strategy. This includes investing in data infrastructure, analytics platforms, and talent development to extract actionable insights from large datasets. Given the proven link between DT and BDA, organizations should also adopt flexible work models and remote capabilities to attract skilled professionals, regardless of location. By embedding BDA into manufacturing and managerial processes, businesses can enhance agility, optimize workflows, and make more informed, data-driven decisions in both stable and volatile environments.
Mahinder Singh, Yi-Cheng Zhang,	Analytics Capability, and Green Knowledge	intelligence, manufacturing companies should focus on building robust



Shan-Yong Wang Mohammad Said Ibrahim Alshuaibi, Adeb Alhebri, Sajjad Nawaz Khan, Adnan Ahmed Sheikh	Management on Sustainability Performance Big Data Analytics, GHRM Practices, and Green Digital Learning Paving The Way Towards Green Innovation and Sustainable Firm Performance (2024)	big data analytics capabilities. This involves integrating advanced analytics tools, training employees in data-driven decision-making, and aligning BI systems with strategic sustainability objectives. While green knowledge management may still support overall environmental initiatives, the findings suggest that direct investments in BDA systems are more critical for translating BI into measurable sustainability gains. Companies should prioritize BI and BDA alignment in their digital strategies to strengthen their competitive edge and support long-term sustainable growth. initiatives, enabling more targeted innovation strategies. By embedding BDA into GHRM and GDLO practices, companies can gain deeper insights into employee performance, learning progress, and innovation outcomes. This not only supports continuous improvement but also fosters a culture of data-driven sustainability. SMEs should invest in analytics infrastructure and employee training to fully unlock the synergistic benefits of BDA, green innovation, and sustainable firm performance
Ninh Nguyen, Thac Dang-Van, Tan Vo- Thanh, Hai-Ninh Do, Simon Pervan	Digitalization Strategy Adoption: The Role of Key Stakeholders, Big Data Organizational Culture, and Leader Commitment (2024)	To harness the role of Big Data in Business Intelligence effectively, hospitality firms should cultivate a strong big data organizational culture by investing in IT training for employees, fostering collaboration with suppliers, and enhancing customer-centric practices. Leaders must actively demonstrate commitment to digital transformation initiatives, as their involvement significantly amplifies the impact of big data culture on strategic adoption. By



		aligning stakeholder capabilities with leadership support, hotels can successfully implement data-driven digitalization strategies that improve operational efficiency, guest experience, and long-term competitiveness
Shafique Ur Rehman, Hamzah Elrehail, Abdallah Taamneh, Abdallah Alsaad, Raid Al-Adaileh	Antecedents and Consequences of Big Data Knowledge Management (2024)	To effectively leverage big data for business intelligence, organizations should prioritize the development and integration of robust big data management practices that support the accumulation, sharing, and utilization of knowledge across departments. Managers are advised to invest in knowledge management systems and training programs that facilitate the translation of data into actionable innovation strategies. Furthermore, enhancing innovation capacity should be treated as a core organizational goal, with big data initiatives aligned to promote new product development, service improvement, and operational efficiencies. By embedding big data KM into strategic planning and innovation pipelines, firms can unlock competitive advantages that are sustainable and responsive to dynamic market conditions
Adnan Khan & Meng Tao	Knowledge Absorption Capacity's Efficacy To Enhance Innovation Performance Through Big Data Analytics And Digital Platform Capability (2022)	To improve innovation outcomes, manufacturing firms in developing economies should invest in building their knowledge absorption capacity by fostering environments that encourage continuous learning and external knowledge integration. In practical terms, this includes training employees in data analytics, creating cross-functional teams, and facilitating collaborations with research institutions. Companies should also prioritize the development of digital platform capabilities and integrate big data analytics into daily decision-making processes to enhance organizational agility. Furthermore, rather



		than relying solely on a data- driven culture, leaders should adopt flexibility-oriented approach that empowers teams to quickly adapt data insights into actionable strategies. These steps can collectively enable firms to better harness business intelligence tools and achieve sustainable innovation in competitive markets
Nicholas Tan, Md Irfanuzzaman Khan, Md Abu Saleh	The Intersection of Big Data and Health Care Innovation: Millenial Perspectives on Precision Medicine Technology (2024)	To successfully implement precision medicine in diverse societies, healthcare stakeholders must prioritize the secure, ethical, and transparent use of big data to foster public trust. Policymakers and health institutions in developed Asian contexts, such as Singapore, should invest in robust data infrastructure and public education campaigns that enhance understanding of data privacy, system reliability, and the benefits of data-driven healthcare. Furthermore, incorporating citizen feedback into the design of big data systems can help align technological advancements with user expectations, thereby strengthening engagement and adoption. These efforts will ensure that business intelligence systems built on big data not only support scientific innovation but are also socially sustainable and inclusive.
Bayou Tilahun Assaye, Bekalu Endalew, Maru Meseret Tadele, Gizaw Hailiye, Teferie... et al.	Readiness of Big Health Data Analytics by Technology-Organization- Environment (TOE) Framework in Ethiopian Health Sectors (2024)	To enhance the role of big data in business intelligence within the healthcare sector, particularly in developing countries like Ethiopia, policy-makers and healthcare leaders must focus on strengthening organizational support, targeted staff training, and the establishment of clear legal and IT frameworks. Investing in simplifying big data tools (reducing complexity) and aligning them with existing systems can improve acceptance and practical application. Furthermore, addressing personal skepticism through awareness programs and



		showcasing success stories can help build a more optimistic outlook among healthcare professionals. These actions are essential for building data-driven decision- making cultures and maximizing the value of big health data for improved healthcare outcomes
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RESULT AND DISCUSSION

Review of Previous Research

Xu, Zhang, Sun, Tang, & Li (2024) explored the role of digital transformation in enhancing corporate innovation performance, with a particular focus on the mediating roles of big data capabilities and organizational agility. Their study, based on a survey of 476 managers in the manufacturing industry in China, used partial least squares structural equation modeling (PLS-SEM) to confirm that both big data capabilities and organizational agility significantly improve innovation performance. However, the study acknowledged limitations, such as its geographic focus and reliance on cross- sectional data. This research is relevant to the literature review on Big Data in Business Intelligence, as it highlights how Big Data capabilities contribute to better decision-making and innovation, supporting the idea that Big Data plays a crucial role in optimizing business outcomes through enhanced agility and data-driven insights.

Cumba & Huang (2024) examined the impact of digital transformation on modern technologies in the post-pandemic era, particularly focusing on small and medium-sized enterprises (SMEs). Their survey of 345 managers found that while digital transformation positively influenced Big Data analytics (BDA), it did not have a significant effect on blockchain technology (BCT). Using resource-based theory (RBT) and PLS-SEM, the study emphasized the importance of digital tools like BDA for business growth but identified gaps in the application of blockchain. This research contributes to the understanding of how Big Data and digital technologies affect business intelligence, reinforcing the argument that while Big Data enhances analytical capabilities, other emerging technologies may require further development to provide similar benefits in the BI landscape.

The next study by Cheng et al. (2023) investigates the impact of business intelligence (BI) and big data analytics capability on sustainability performance in Malaysian manufacturing companies, with a focus on the moderating role of green



knowledge management (GKM). The results show that BI significantly enhances big data analytics capability, which in turn positively influences sustainability performance.

However, GKM does not strengthen this relationship, indicating the need for further exploration into how green knowledge could better integrate with business intelligence strategies. This study is relevant to the topic as it highlights the significance of big data in improving sustainability, a crucial aspect of modern business strategies.

Alshuaibi et al. (2024) explore the relationship between Green Human Resource Management (GHRM), Green Digital Learning Orientation (GDLO), and Sustainable Firm Performance (SFP) in Saudi Arabian SMEs. The research demonstrates that GHRM and GDLO enhance green innovation, which mediates their effects on SFP. Additionally, Big Data Analytics (BDA) is found to moderate the relationship between GHRM and innovation, further promoting sustainability. This study is relevant as it shows the importance of incorporating digital learning and green practices alongside big data analytics to achieve sustainability goals in business operations.

Nguyen et al. (2024) examine the factors driving the adoption of digitalization strategies in the Vietnamese hospitality industry, focusing on big data organizational culture and leader commitment. The study reveals that customer orientation, supplier cooperation, and employee IT skills contribute to a strong big data culture, which positively impacts digitalization efforts. The interaction between leadership and big data culture further supports this transformation. The relevance of this research lies in its focus on digitalization and big data, offering insights into how businesses can leverage these tools to stay competitive and agile in a data-driven environment.

Rehman, Elrehail, Taamneh, Alsaad, & Al-Adaileh (2024) investigate the role of big data management and knowledge management in driving innovation capacity and competitive advantage in Pakistani firms. The study highlights that leadership, talent management, and technology are critical to big data knowledge management, which subsequently fosters innovation and competitive advantage. Innovation capacity also mediates the relationship between knowledge management and competitive success. This research is relevant for understanding how big data practices enhance innovation and competitiveness, aligning with the broader topic of leveraging big data for strategic business growth and sustainability.

The study by Khan, Tao, & Li (2022) investigates how knowledge absorption capacity (KAC) enhances innovation performance in manufacturing firms through big data analytics (BDAC) and digital platform capability. Using the dynamic capability and absorptive capacity theories, the research confirms that KAC helps firms build dynamic



capabilities, which in turn improve firm agility and performance. The study highlights the mediating role of BDAC and dynamic process capabilities, while flexibility orientations positively moderate these relationships. This study is relevant to the topic as it emphasizes the importance of knowledge absorption and data-driven capabilities in enhancing firm agility, which can be extended to sectors beyond manufacturing.

In the next study, Tan, Khan, & Saleh (2024) explore millennial attitudes toward the adoption of Precision Medicine (PM) in Singapore through the Technology Acceptance Model (TAM). The research confirms that subjective technical knowledge, trust in government, and perceived data security significantly shape positive attitudes toward PM, which in turn influence adoption intention. While objective technical knowledge and trust in doctors were not supported, societal and peer influences were found to be key drivers. This study contributes to understanding how individual and societal factors affect the adoption of innovative technologies, which aligns with the broader topic of how technology and trust influence consumer behaviors.

The last study by Assaye et al. (2024) examines the readiness of Ethiopian healthcare sectors for big health data analytics using the Technology-Organization-Environment (TOE) framework. The findings indicate that complexity, environmental context, and top management support significantly influence the adoption of big data analytics in healthcare. Government IT policies also play a crucial role, but optimism and compatibility negatively impact readiness, suggesting challenges in overcoming discomfort with new technologies. This study is relevant as it highlights organizational and environmental factors affecting big data adoption, which is essential for understanding how technology can be integrated into various sectors, including healthcare.

RESULT

The main findings from the reviewed studies reveal that Big Data plays a crucial role in BI, particularly in:

- a) **Strategic Decision-Making:** Big Data allows faster and more accurate decision-making based on real-time data analysis. Big Data Analytics (BDA) enables faster and more accurate decision-making by providing timely, evidence-based insights. In sectors like manufacturing, BDA facilitates real-time quality monitoring and predictive maintenance, significantly enhancing the quality, speed, and accuracy of the decision-making process (Tsaniyah, Ningsih, Cyntia, Kusumasari, & Nugroho, 2024).
- b) **Operational Efficiency:** Through predictive analytics, companies can optimize supply

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chains, reduce costs, and improve product quality (Cheng et al., 2023). Big Data supports operational efficiency by enabling predictive maintenance, optimizing production processes, and facilitating real-time system monitoring. This leads to precise forecasting, reduced downtime, and improved resource management, ultimately enhancing overall productivity within the Industry 4.0 framework (Bhandari, Shrestha, & Pradhan, 2024).

- c) Competitive Advantage: Companies that successfully implement Big Data in BI tend to outperform competitors who lack similar capabilities (Cumba & Huang, 2024).

The main findings from the reviewed studies underscore the critical role of Big Data in enhancing business intelligence (BI), with significant implications for strategic decision-making, operational efficiency, and competitive advantage. For instance, Big Data enables businesses to make faster, more accurate strategic decisions by leveraging real-time data analysis, as highlighted in research by Nguyen et al. (2024).

In the Vietnamese hospitality industry, a strong organizational culture around Big Data, coupled with leadership commitment, has been shown to improve decision-making processes and digital transformation efforts. This finding resonates with the broader trend that companies utilizing Big Data for strategic decision-making are better equipped to respond to market changes and customer needs.

Moreover, the operational efficiency of companies is greatly improved through the use of predictive analytics, as detailed in studies by (Cheng et al., 2023). Predictive analytics helps optimize supply chains, reduce operational costs, and enhance product quality, thereby boosting performance. In line with these findings, Rehman et al. (2024) highlight that Big Data management, combined with strong knowledge management practices, fosters innovation and contributes to a firm's competitive advantage. Companies that effectively harness Big Data, as seen in the Pakistani firms studied, outperform their competitors by continuously innovating and improving operational processes. Together, these insights affirm that Big Data not only streamlines operations but also strengthens a firm's position in the market, offering a significant competitive edge.

DISCUSSIONS

Most studies agree that Big Data positively influences BI. However, differences in results are noted across industry sectors and company sizes. For instance, large companies in manufacturing tend to benefit more from Big Data compared to SMEs, which often face technological and human resource limitations (Cumba & Huang, 2024). One of

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the main limitations identified is the geographic scope of previous studies. Much of the research focuses on developed countries such as China and the United States, with limited attention given to developing regions.

Large manufacturing firms are often better positioned to leverage Big Data due to their greater access to advanced technologies and skilled personnel, as noted by Cumba & Huang (2024). In contrast, SMEs face challenges such as limited resources and technological infrastructure, which restrict their ability to fully capitalize on Big Data. Furthermore, the geographic focus of much of the existing research, predominantly in developed countries, leaves a gap in understanding how Big Data influences firms in developing regions. Additionally, the complexity of data processing tools, such as partial least squares (PLS), presents a barrier for less technologically advanced firms, which suggests a need for simpler, more accessible tools to encourage broader adoption. These findings underscore the importance of tailoring Big Data strategies to different organizational contexts and developing inclusive frameworks that accommodate varying levels of technological capability.

Recent studies further highlight that Big Data capabilities significantly enhance organizational innovation and agility, which are essential components of Business Intelligence (BI). Xu et al. (2024) found that companies that embed Big Data development and organizational agility into their digital transformation strategies achieve higher innovation performance. Their findings emphasize that “enterprises should embed big data capability development and organisational agility into their digital transformation strategies” to sustain competitiveness. This is echoed by Rehman et al. (2024), who argue that integrating Big Data into knowledge management processes not only drives innovation but also enables organizations to better respond to market dynamics. Similarly, Khan and Tao (2022) demonstrated that firms with high knowledge absorption capacity—facilitated through Big Data analytics and digital platforms—are more adept at implementing innovative solutions, underlining the crucial synergy between BI, data-driven learning, and adaptability.

Moreover, the implementation of Big Data Analytics (BDA) within SMEs and manufacturing industries is shown to improve operational agility and sustainability outcomes. Cumba and Huang (2024) emphasized that “by embedding BDA into manufacturing and managerial processes, businesses can enhance agility, optimize workflows, and make more informed, data-driven decisions in both stable and volatile environments.” Cheng et al. (2024) supported this view by showing that companies aligning BDA tools with sustainability objectives experienced stronger environmental and



performance outcomes, highlighting that “direct investments in BDA systems are more critical for translating BI into measurable sustainability gains.” Additionally, Alshuaibi et al. (2024) noted that SMEs integrating BDA into Green HRM and digital learning systems gain deeper insights into innovation processes and employee performance, paving the way for sustainable firm growth. These findings reinforce the centrality of Big Data as a transformative enabler for business intelligence, innovation, and strategic agility.

CONCLUSIONS

In conclusion, this review highlights the pivotal role that Big Data plays in enhancing Business Intelligence (BI) capabilities, especially in the areas of strategic decision-making, operational efficiency, and gaining competitive advantage. By utilizing Big Data analytics, companies are better equipped to analyze real-time information, allowing them to make faster, more informed decisions that align with market demands. This leads to optimized processes, such as improved supply chain management and cost reduction, ultimately boosting service quality. Furthermore, businesses that successfully implement Big Data solutions tend to outperform their competitors, reinforcing the importance of data-driven strategies in maintaining a competitive edge in today’s fast-evolving market.

Theoretical and Practical Implications

From a theoretical perspective, the integration of Big Data into BI aligns with both Dynamic Capability Theory and Resource-Based Theory, emphasizing the need for businesses to rapidly adapt to market changes and leverage their resources for sustainable competitive advantage. Big Data enables firms to analyze real-time information, allowing them to respond more effectively to shifting market demands, improve operational processes such as supply chain management, and reduce costs, which collectively lead to enhanced service quality. Moreover, companies that successfully implement Big Data-driven BI strategies tend to outperform competitors by gaining deeper insights into customer behavior and market trends, ensuring they stay ahead in an increasingly data-driven landscape. However, to fully capitalize on Big Data’s potential, businesses must invest in robust technological infrastructures and develop the necessary analytical skills within their workforce. These practical steps are critical for unlocking the full range of benefits that Big Data offers, enabling companies to optimize decision-making processes and maintain long-term competitive success.



Recommendation

Future research should prioritize expanding studies to include underrepresented sectors, particularly small and medium-sized enterprises (SMEs) in developing countries, as these businesses often face unique challenges in adopting Big Data due to limited technological infrastructure and human resources. By exploring the specific obstacles SMEs encounter, researchers can provide more targeted solutions that address the constraints of these organizations. Furthermore, there is a need for deeper investigation into how businesses across various sectors can effectively overcome technical and resource-related challenges when implementing Big Data in Business Intelligence (BI). This includes examining the role of affordable technologies, the development of skills in data analytics, and the integration of Big Data tools into existing systems. By understanding these hurdles and identifying best practices, future research can offer practical guidance for organizations of all sizes, enabling them to unlock the full potential of Big Data for strategic decision-making, operational efficiency, and competitive advantage. Such studies will contribute significantly to the broader adoption of Big Data in industries that are currently underrepresented in the literature.

REFERENCE

- Alshuaibi, M. S. I., Alhebri, A., Khan, S. N., & Sheikh, A. A. (2024). Big data analytics, GHRM practices, and green digital learning paving the way towards green innovation and sustainable firm performance. *Journal of Open Innovation: Technology, Market, and Complexity*, 10(4).
- Assaye, B. T., Endalew, B., Tadele, M. M., Teferie, G. H., Teym, A., Melese, Y. H., ... Haimanot, A. B. (2024). Readiness of big health data analytics by technology-organization-environment (TOE) framework in Ethiopian health sectors. *Heliyon*, 10(19).
- Barney, J. B., & Clark, D. N. (2007). *Resource-Based Theory: Creating and Sustaining Competitive Advantage*. New York: Oxford University Press Inc. <https://doi.org/10.1362/026725708X382046>
- Barney, J. B., & Tong, T. W. (2004). Building versus Acquiring Resources: Analysis and Application to Learning Theory. In *Strategy and Performance* (pp. 57–81). UK: Palgrave Macmillan.
- Bhandari, D. R., Shrestha, P., & Pradhan, G. M. (2024). Big Data in Industry 4.0 and



- 5.0 for Operational Efficiency and Decision-Making. *International Journal of Advances in Scientific Research and Engineering*, 10(10), 19–26.
<https://doi.org/https://doi.org/10.31695/ijasre.2024.10.2>
- Cheng, J., Mahinder Singh, H. S., Zhang, Y. C., & Wang, S. Y. (2023). The impact of business intelligence, big data analytics capability, and green knowledge management on sustainability performance. *Journal of Cleaner Production*, 429.
<https://doi.org/10.1016/j.jclepro.2023.139410>
- Cumba, L. T., & Huang, X. (2024). The Opportunities for Digitalization of Companies on Modern Technologies in a Post-Pandemic World. *Modern Management Based on Big Data V*, 164–170. IOS Press.
- Khan, A., Tao, M., & Li, C. (2022). Knowledge absorption capacity's efficacy to enhance innovation performance through big data analytics and digital platform capability. *Journal of Innovation and Knowledge*, 7(3).
<https://doi.org/10.1016/j.jik.2022.100201>
- Kleiner, A. (2013). The Dynamic Capabilities of David Teece. *Strategy Business*, 2013(November 11), 1–4.
- Kumar, A., Mishra, A., & Kumar, S. (2023). Business Intelligence. In *Architecting a Modern Data Warehouse for Large Enterprises: Build Multi-cloud Modern Distributed Data Warehouses with Azure and AWS* (pp. 307–349). Berkeley: Apress.
- Mahto, R., & Mishra, N. (2024). An Overview of Characteristics and Application of Big Data. *Journal of Advances in Science and Technology*.
<https://doi.org/https://doi.org/10.29070/qtsz4a47>
- Mulla, F. M. (2024). Utilizing Data Analytics for Strategic Business Decision-Making and Market Insights. *Indian Scientific Journal Of Research In Engineering And Management*, 08(12), 1–7. <https://doi.org/https://doi.org/10.55041/ijsrem38119>
- Nguyen, N., Dang-Van, T., Vo-Thanh, T., Do, H. N., & Pervan, S. (2024). Digitalization strategy adoption: The roles of key stakeholders, big data organizational culture, and leader commitment. *International Journal of Hospitality Management*, 117.
<https://doi.org/10.1016/j.ijhm.2023.103643>
- Rehman, S. U., Elrehail, H., Taamneh, A., Alsaad, A., & Al-Adaileh, R. (2024). Antecedents and consequences of big data knowledge management. *International Journal of Information Management Data Insights*, 4(2).
- Tan, N., Khan, M. I., & Saleh, M. A. (2024). The intersection of big data and healthcare innovation: millennial perspectives on precision medicine technology. *Journal of Open Innovation: Technology, Market, and Complexity*, 10(4).



- Teece, D. J. (2009). *Dynamic Capabilities and Strategic Management*. Oxford: Oxford University Press Inc.
- Tsaniyah, F. A., Ningsih, S. P., Cyntia, D. Y., Kusumasari, I. R., & Nugroho, R. H. (2024). The Role of Big Data Analytics in Supporting Decision-Making Theories in Companies. *Jurnal Bisnis Dan Komunikasi Digital*, 2(2), 10. <https://doi.org/https://doi.org/10.47134/jbkd.v2i2.3458>
- Xu, M., Zhang, Y., Sun, H., Tang, Y., & Li, J. (2024). How digital transformation enhances corporate innovation performance: The mediating roles of big data capabilities and organizational agility. *Heliyon*, 10(14).

