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The Role Of Big Data Analytics In Strategic Decision-Making And Business Performance: A Systematic Literature Review

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Abstract. Digital transformation has increased organizational reliance on big data analytics (BDA) to support strategic decisions and improve business performance. This study synthesizes evidence on how BDA contributes to strategic decision-making, organizational performance, and innovation through a systematic literature review. The review followed the PRISMA 2020 framework and searched Scopus, IEEE Xplore, ScienceDirect, SpringerLink, and Google Scholar for English-language journal and conference publications from 2021 to 2026. After identification, screening, and full-text eligibility assessment, 33 studies were included and examined using thematic analysis. The findings show that BDA strengthens decision quality and speed by combining analytics capability, predictive modeling, artificial intelligence, and data-driven insights. BDA is also associated with operational efficiency, project success, organizational agility, customer personalization, competitive advantage, sustainability, and innovation capability. The dominant themes were strategic decision-making, business performance, sustainability and innovation, and artificial intelligence with predictive analytics. However, the literature provides limited evidence on explainable and ethical artificial intelligence, human-AI collaboration, real-time analytics, and BDA adoption among small and medium-sized enterprises and organizations in developing economies. The review contributes an integrated view of BDA as a socio-technical and strategic capability and recommends transparent, scalable, and human-centered analytics governance.

Keywords: big data analytics; strategic decision-making; business performance; systematic literature review; PRISMA 2020

1. Introduction

The rapid expansion of digital technologies has changed the scale, speed, and variety of data available to organizations. Internet platforms, social media, cloud computing, the Internet of Things, and artificial intelligence generate continuous data streams that can be converted into strategic information. In this environment, data are no longer merely operational records they are organizational assets that can improve efficiency, reveal customer behavior, support innovation, and strengthen competitiveness (Cruz & Rosário, 2025; Thayyib, 2023)

Big data analytics refers to the organizational processes and technological capabilities used to collect, integrate, analyze, and interpret large and complex datasets. Its value lies not only in processing volume but also in producing timely and actionable insights through descriptive, predictive, and prescriptive techniques. Machine learning and artificial intelligence extend these capabilities by enabling forecasting, pattern recognition, risk analysis, and automated recommendations (Çinar, 2024; Lee et al., 2022).

Strategic decision-making requires information that is accurate, relevant, and available at the appropriate time. Conventional decision processes may depend heavily on managerial intuition and fragmented information, whereas BDA can support evidence-based choices by integrating internal and external data. Organizations with stronger big data analytics capability are therefore expected to make faster and more adaptive decisions, especially under environmental uncertainty and market disruption (Chen et al., 2022).

The effects of BDA extend beyond decision quality. Previous studies associate analytics capability with operational productivity, project success, organizational agility, business model innovation, circular economy performance, green innovation, and sustainable competitive advantage (Ahmed et al., 2022; f., 2021; Mao & Lu, 2023; Zhang et al., 2022). Nevertheless, findings are distributed across different sectors, methods, and theoretical perspectives. The relationship between BDA, strategic decision-making, and business performance therefore remains fragmented and requires an integrated synthesis.

This study addresses that need through a systematic literature review of recent research. It has three objectives: to explain how BDA supports strategic decision-making, to synthesize its contribution to business performance and organizational capabilities, and to identify dominant themes and unresolved research gaps. The study contributes to business systems and innovation research by positioning BDA as a strategic and socio-technical capability rather than as a stand-alone analytical tool.

2. Literature Review nad Theoretical Background

2.1. Big data analytics capability and strategic decision-making

Big data analytics capability combines technological infrastructure, data resources, analytical skills, managerial processes, and organizational routines. From a resource-based perspective, analytics technologies create value only when they are combined with complementary human and organizational resources. Strategic alignment between information technology and business priorities is therefore essential because it determines whether analytical outputs are translated into decisions and actions (Chen et al., 2022).

BDA improves strategic decision-making through several mechanisms. Descriptive analytics increases visibility into current operations; predictive analytics estimates future demand, risks, and market movements; and prescriptive analytics recommends possible actions. These functions reduce information asymmetry and help managers compare alternatives using evidence rather than intuition alone. Predictive methods such as decision trees are especially useful for business forecasting and classification tasks (Lee et al., 2022).

2.2. Business performance and dynamic capabilities

Dynamic capability theory explains how organizations sense environmental changes, seize opportunities, and reconfigure resources. BDA supports these processes by detecting weak signals, accelerating learning, and enabling rapid resource reallocation. The literature links analytics capability to agility, innovation, customer responsiveness, and performance because organizations can adjust strategies more quickly when they have reliable data-driven insights (Chatterjee et al., 2023; Zhang et al., 2022).

The performance outcomes of BDA are multidimensional. Operational outcomes include efficiency, productivity, resource optimization, and project success. Market outcomes include customer personalization and improved marketing performance. Strategic outcomes include competitive advantage, business model transformation, sustainability, and green innovation (Awan et al., 2021; Cruz & Rosário, 2025; Mao & Lu, 2023). These outcomes depend on governance, data quality, leadership support, and analytical competence.

2.3. Research gap and review questions

Although the literature reports substantial benefits, several gaps remain. Many studies emphasize prediction accuracy and performance effects without adequately addressing explainability, ethics, algorithmic bias, and human oversight. Evidence is also concentrated in large organizations and technology-intensive sectors, while small and medium-sized enterprises and organizations in developing economies remain underrepresented. In addition, real-time analytics and human-AI collaboration are frequently proposed but less often evaluated in operational settings.

Based on these gaps, the review addresses three questions: RQ1: How does BDA contribute to strategic decision-making? RQ2: How does BDA influence business performance and related organizational capabilities? RQ3: What dominant research themes and future directions characterize recent BDA literature?

3. Methodology

3.1. Review design

This study employed a systematic literature review to provide a transparent and reproducible synthesis of research on BDA, strategic decision-making, and business performance. The review process was structured according to PRISMA 2020, covering identification, screening, eligibility assessment, inclusion, data extraction, and synthesis (Page et al., 2021). Because the reviewed studies used heterogeneous designs and outcomes, thematic analysis was selected instead of statistical meta-analysis.

Figure 1 summarizes the review workflow from problem definition to synthesis. The procedure combined a structured search protocol with thematic coding so that technological, organizational, and performance-related findings could be analyzed within a common framework.

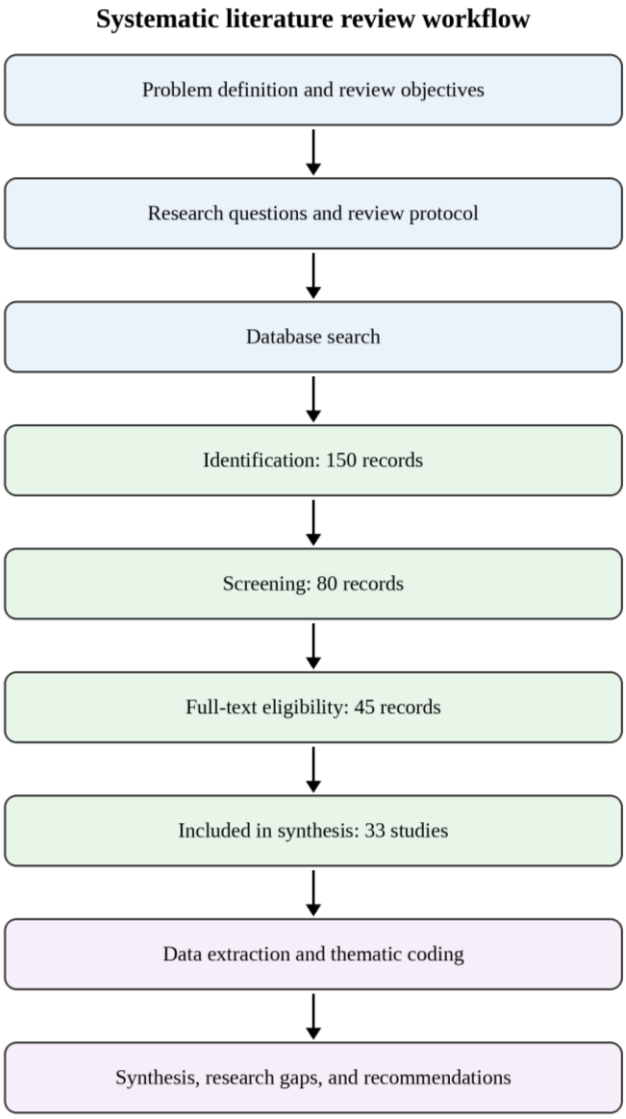

Figure 1 Systematic literature review workflow based on PRISMA 2020

3.2. Data sources and search strategy

The literature search covered Scopus, IEEE Xplore, ScienceDirect, SpringerLink, and Google Scholar. The databases were selected to capture peer-reviewed research in information systems, management, analytics, engineering, and business. The core search expression was: ("big data analytics" OR "business analytics") AND ("strategic decision-making" OR "business performance"). Additional terms, including "predictive analytics," "artificial intelligence," and "data-driven decision-making," were used to refine searches and identify relevant studies.

The review focused on publications from 2021 to 2026 to capture recent developments in analytics, artificial intelligence, and organizational transformation. Earlier sources were retained only when they provided essential theoretical or conceptual background.

3.3. Eligibility criteria

Studies were selected using predefined inclusion and exclusion criteria. Journal articles and conference papers were eligible when they were written in English, available in full text, and directly examined BDA in relation to strategic decisions, organizational performance, innovation, sustainability, or related capabilities.

Place tables near the first citation in the text. Table captions appear above the table. Use concise titles, define abbreviations in notes, and avoid vertical lines unless needed for clarity.

Table 1 Inclusion criteria

Criterion	Requirement
Publication period	2021-2026

Language	English
Topic	Big data analytics or business analytics
Primary focus	Strategic decision-making, business performance, or closely related organizational outcomes
Document type	Peer-reviewed journal article or conference paper
Sources	Scopus, IEEE Xplore, ScienceDirect, SpringerLink, and Google Scholar

Table 2 Exclusion criteria

Criterion	Decision
Duplicate record	Removed
Non-English publication	Removed
Topic not relevant to the review questions	Removed
Full text unavailable	Removed
Insufficient focus on organizational decision-making or performance	Removed

3.4. Study selection

The search identified 150 records. Title, abstract, and duplicate screening reduced the set to 80 records. Forty-five articles were then examined in full text, and 33 studies satisfied all eligibility criteria and were included in the synthesis. The selection results are presented in Table 3.

Table 3 PRISMA 2020 study selection results

Stage	Number of records
Identification	150
Screening	80
Full-text eligibility	45
Included in synthesis	33

3.5. Data extraction and thematic analysis

Each included study was coded according to author, publication year, outlet, research method, thematic focus, and main finding. The extracted evidence was compared iteratively and consolidated into six primary themes: strategic decision-making, business performance, artificial intelligence and predictive analytics, sustainability and innovation, marketing analytics, and organizational capability. Each analytical record was assigned a primary theme to support descriptive comparison, while cross-theme relationships were retained in the narrative synthesis. No human participants or personal data were involved. Ethical approval and informed consent were therefore not applicable to this literature review.

4. Results

4.1. Study profile and evidence base

The 33 included studies used surveys, structural equation modeling, regression, qualitative analysis, literature reviews, and bibliometric methods. The evidence covered strategic planning, project management, marketing, manufacturing, circular economy, sustainability, and organizational transformation. This methodological diversity indicates broad interest in BDA but also limits direct statistical comparison across studies.

Table 4 presents representative studies that generated the core thematic evidence. Several studies contributed to more than one theme; repeated analytical entries in the original extraction matrix were consolidated to avoid duplication and improve readability.

Table 4 PRISMA 2020 study selection results

Study	Method/context	Primary theme	Main contribution
Chen et al. (2022)	Empirical study; Decision Support Systems	Strategic decision-making	IT-business alignment and BDA capability improve decision quality and speed under disruption.
Awan et al. (2021)	PLS-SEM; manufacturing/circular economy	Performance and sustainability	Data-driven insights connect analytics capability with decision quality and circular economy performance.
Zhang et al. (2022)	Quantitative mediation analysis	Competitive advantage and innovation	Big data capability supports sustainable competitive advantage through ambidextrous innovation.
Mao and Lu (2023)	Quantitative dynamic-capability study	Green innovation	Big data management capabilities strengthen green product and process innovation.
Ahmed et al. (2022)	Survey; project environment	Project performance	BDA and decision-making contribute to project success and improved resource allocation.
Mozumder et al. (2024)	Empirical statistical analysis	Organizational decision-making	Analytics improves organizational efficiency, while leadership and governance remain important.
Lee et al. (2022)	Review of decision-tree analytics	AI and predictive analytics	Predictive analytics supports forecasting and evidence-based business planning.
Çinar (2024)	Conceptual review	AI and strategic planning	AI and BDA improve planning, customer satisfaction, and operational efficiency.
Hautakangas (2022)	Qualitative thesis	Marketing analytics and agility	BDA strengthens adaptability and responsiveness in strategic marketing decisions.
Guilhem and Klein (2024)	SEM; Brazilian industries	Sustainability	BDA capability supports sustainable manufacturing and circular economy practices.
Faúndez and de la Fuente-Mella (2023)	Informetric, NLP, and machine learning	Business intelligence and leadership	Business intelligence and analytics competencies support strategic leadership.

Burhanudin et al. (2025)	Bibliometric analysis	Prescriptive analytics	Prescriptive analytics supports data-driven managerial decisions.
Thayyib et al. (2023)	Bibliometric review	AI and Industry 4.0	AI and BDA jointly improve decision quality and competitive advantage.
Ausejo Sánchez et al. (2024)	Co-word bibliometric analysis	Business applications	BDA applications are prominent in marketing, supply chains, tourism, and healthcare.
Stanikzai and Mittal (2025)	Bibliometric SLR	Strategic alignment	Hybrid AI-driven decisions contribute to sustainable organizational performance.
Cruz and Rosário (2025)	SLR and bibliometric analysis	Data-driven marketing	Analytics-based decision-making improves personalization and marketing performance.
Fathin and Siregar (2026)	Systematic review	Entrepreneurship analytics	Data-driven entrepreneurship supports digital innovation.
Hamonangan et al. (2024)	Systematic review	Firm performance	Strategic decision-making has a positive relationship with firm performance.

Note: The table summarizes representative evidence. Multiple thematic contributions from the same study were consolidated into one row.

4.2. Study profile and evidence base

The thematic coding shows that strategic decision-making and business performance were the largest categories, each accounting for seven analytical records. Sustainability and innovation accounted for six records, followed by artificial intelligence and predictive analytics with five, organizational capability with five, and marketing analytics with three. The distribution indicates that BDA research increasingly connects technological capability with organizational adaptation and long-term value creation.

Table 5 Distribution of primary research themes

Theme	Number of analytical records
Strategic decision-making	7
Business performance	7
Sustainability and innovation	6
Artificial intelligence and predictive analytics	5
Organizational capability	5
Marketing analytics	3
Total	33

4.3. Big data analytics and strategic decision-making

Across the reviewed studies, BDA improved strategic decision-making by increasing the availability, timeliness, and objectivity of information. Organizations with stronger analytics capability were better able to identify trends, conduct risk analysis, forecast demand, and evaluate strategic alternatives. (Chen et al., 2022) particularly emphasized that IT-business alignment enables analytics resources to be converted into higher decision quality and speed.

Predictive analytics and artificial intelligence extended these benefits by supporting scenario analysis and automated pattern detection. These technologies reduce dependence on intuition, but their effectiveness depends on data quality and managerial interpretation. The evidence also suggests that BDA improves organizational agility because decision-makers can respond more rapidly to environmental change and operational disruption.

The main barriers were fragmented data, limited real-time integration, inadequate analytical skills, and weak governance. Several studies also noted that automated recommendations may be difficult to trust when models lack transparency. Therefore, decision support should combine algorithmic outputs with human judgment rather than replace managerial accountability.

4.4. Big data analytics and strategic decision-making

BDA was consistently associated with improved organizational outcomes. Operationally, analytics supported process optimization, productivity, project success, and more efficient resource allocation (Ahmed et al., 2022) Strategically, it strengthened innovation, market responsiveness, and competitive advantage by enabling organizations to sense opportunities and reconfigure resources.

The evidence also linked BDA with customer-facing performance. Data-driven marketing and customer analytics helped organizations understand behavior, predict preferences, and personalize services (Cruz & Rosário, 2025) However, performance gains were not automatic. Infrastructure quality, leadership commitment, data governance, and analytical competence influenced whether insights were embedded in decision routines.

Adoption challenges were more pronounced for small and medium-sized enterprises and organizations in developing economies. These organizations often face limited infrastructure, scarce analytical talent, and high implementation costs. Scalable cloud-based services and simplified analytics frameworks may reduce these barriers, but the literature provides limited empirical evaluation of such approaches.

4.5. Big data analytics and strategic decision-making

Artificial intelligence and predictive analytics were prominent technological themes. Machine learning models supported forecasting, risk assessment, customer analysis, and opportunity identification. Decision-tree methods were frequently discussed because they are relatively interpretable and can support classification and business forecasting (Lee et al., 2022).

AI-enhanced analytics also enabled automation and faster responses, but the literature identified concerns about explainability, ethical use, bias, and human-AI collaboration. Most studies focused on predictive accuracy and performance rather than on how managers understand, contest, or override algorithmic recommendations. This imbalance limits organizational trust and creates governance risks.

4.6. Artificial intelligence and predictive analytics

BDA increasingly supports sustainability and innovation objectives. Analytics capabilities help organizations monitor resource use, identify inefficiencies, and evaluate environmental outcomes. Awan et al (Awan et al., 2021) linked data-driven insights with circular economy performance, while Mao and Lu (Mao & Lu, 2023) showed that big data management capabilities support green product and process innovation. (Zhang et al., 2022) further demonstrated that innovation strategy can mediate the relationship between big data capability and sustainable competitive advantage.

These findings indicate that BDA can create value beyond short-term profitability. Nevertheless, sustainability analytics remains constrained by inconsistent environmental data, limited real-time monitoring, and weak integration between analytics and sustainability governance.

5. Discussion

5.1. Artificial intelligence and predictive analytics

The review demonstrates that BDA should be understood as a strategic organizational capability rather than a purely technical application. Technology produces value when data resources, analytical skills, leadership, governance, and decision processes are aligned. This interpretation explains why similar analytical tools may generate different results across organizations: performance depends on how effectively insights are absorbed and converted into action.

The findings also support a dynamic-capability perspective. BDA helps organizations sense changes through continuous data collection, seize opportunities through prediction and decision support, and transform operations through resource reconfiguration. These mechanisms connect analytics capability with agility, innovation, and sustainable performance. They also explain why strategic alignment and managerial capability repeatedly appear as enabling conditions.

5.2. Theoretical contributions

First, this review integrates fragmented evidence on decision quality, performance, innovation, and sustainability within one framework. Second, it connects resource-based and dynamic-capability explanations by showing that technological assets require complementary organizational routines. Third, it highlights the socio-technical nature of AI-enabled analytics: human interpretation, accountability, and trust are central to value creation, particularly when decisions are high-stakes or difficult to explain.

5.3. Practical implications

Managers should prioritize data governance, system integration, and analytical competence before expanding advanced AI applications. Investment decisions should be linked to specific strategic use cases and measurable outcomes rather than technology adoption alone. Organizations should also establish clear responsibility for data quality, model validation, ethical review, and human oversight.

For small and medium-sized enterprises, incremental adoption may be more feasible than large-scale transformation. Cloud analytics, shared platforms, and targeted workforce development can reduce cost and complexity. Public institutions and industry associations can support adoption through infrastructure, standards, training, and responsible AI guidance.

5.4. Research gaps and future directions

Four research priorities emerge. First, future studies should evaluate explainable and trustworthy AI in real organizational decisions, including how explanations affect trust, accountability, and decision quality. Second, research should examine human-AI collaboration rather than treating automation as a substitute for managerial judgment. Third, longitudinal and field-based studies are needed to assess real-time analytics and implementation outcomes beyond conceptual models and cross-sectional surveys. Fourth, more evidence is required from small and medium-sized enterprises, public organizations, and developing economies.

Future frameworks should be transparent, scalable, adaptive, and human-centered. They should integrate technical performance with governance, ethics, sustainability, and organizational learning. Comparative research across sectors and countries would also clarify the boundary conditions under which BDA produces strategic value.

5.5. Limitations

This review has several limitations. The search was limited to five databases and English-language publications, which may exclude relevant regional research. The included studies were methodologically heterogeneous, preventing statistical meta-analysis. The review also relied on thematic synthesis without a formal quality-scoring instrument or inter-rater reliability statistic. Finally, the rapidly changing nature of artificial intelligence means that emerging applications may not yet be represented in the published evidence.

6. Conclusion

This systematic literature review examined the role of big data analytics in strategic decision-making and business performance across 33 studies. The findings show that BDA improves decision quality, speed, forecasting, risk analysis, and organizational responsiveness by combining analytics capability, predictive methods, artificial intelligence, and data-driven

insights. It also supports operational efficiency, project success, customer personalization, agility, innovation, sustainability, and competitive advantage.

The central conclusion is that analytics value depends on alignment between technology, people, governance, and organizational routines. BDA is most effective when it augments managerial judgment and is embedded in accountable decision processes. The main unresolved issues concern explainable and ethical AI, human-AI collaboration, real-time analytics, and adoption in resource-constrained organizations. Addressing these gaps can support more transparent, inclusive, and sustainable business systems.

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Author Contributions (CRediT)

The literature search protocol, selection counts, thematic categories, and representative extraction data are reported in this article. The complete extraction matrix is available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare no conflict of interest.The authors declare no conflict of interest

Data Availability

The survey data and analysis code supporting the findings of this study are not publicly available due to privacy and ethical restrictions related to student participants. De-identified datasets and syntax files can be obtained from the corresponding author upon reasonable request for non-commercial academic purposes, subject to prior approval from the authors and compliance with institutional ethical guidelines. Any reuse of the data must include appropriate acknowledgment of the original study and may not attempt to re-identify individual participants.

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