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Designing a Big Data Analytics Model in Organizational Knowledge Management

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A B S T R A C T

This study was conducted with the aim of investigating and designing a comprehensive big data analytics model within the knowledge management system of the Khorasan Razavi Gas Company and enhancing data-driven decision-making. The research adopted a qualitative approach based on grounded theory methodology, and the statistical population consisted of 20 managers, deputy managers, technology experts of the company, and several academic specialists. Data were collected through in-depth semi-structured interviews, and the analysis was performed using open, axial, and selective coding methods in order to identify concepts, categories, and the relationships among them and to develop a valid conceptual model. The findings indicated that big data, with characteristics such as high volume, extensive variety, and rapid velocity of change, can serve as a valuable resource for creating organizational knowledge and improving decision-making; however, limitations such as weak technological infrastructure, human resource challenges, and security concerns remain significant barriers. Furthermore, the study demonstrated that cultural and organizational readiness, the development of data-driven skills, the utilization of cloud infrastructure and artificial intelligence, and the implementation of secure knowledge management systems are among the most critical success factors for leveraging big data effectively. The proposed model can serve as a roadmap for implementing integrated knowledge management and intelligent decision-making in similar service-oriented organizations.

Keywords: *Big data, large-scale data, knowledge management system, Khorasan Razavi Gas Company.*

1. Introduction

In today's knowledge-based economy, organizations increasingly rely on information and knowledge as strategic assets for achieving sustainable competitive advantage, enhancing organizational performance, and improving decision-making processes. The rapid expansion of digital technologies, internet-based platforms, and intelligent information systems has led to an unprecedented growth in the volume, variety, and velocity of data generated within organizations and their external environments. This transformation has fundamentally altered the nature of

organizational knowledge management and has created new opportunities for extracting valuable insights from large-scale datasets. Big data analytics has consequently emerged as one of the most influential technological and managerial developments of the contemporary era, enabling organizations to transform raw data into actionable knowledge and strategic intelligence (Dammann, 2018; Dehestani, 2020). In this context, organizations are increasingly recognizing that traditional methods of data processing and knowledge management are insufficient for handling complex and dynamic information environments. As a result, the integration of big data analytics into organizational knowledge management systems has become a critical priority for both public and private organizations seeking operational efficiency, innovation, and strategic adaptability (Farooq, 2024; Imhanzenobe et al., 2021).

Knowledge management refers to the systematic processes of creating, acquiring, storing, sharing, transferring, and applying knowledge to achieve organizational objectives and improve organizational learning. Contemporary organizations operate in highly competitive and uncertain environments in which effective knowledge management can significantly influence organizational resilience, innovation capability, and long-term sustainability (Bibi et al., 2021). The evolution of digital technologies has transformed traditional knowledge management systems into intelligent and integrated systems capable of collecting and analyzing massive amounts of structured and unstructured data from diverse sources. In recent years, researchers have emphasized that digital innovation plays a central role in modernizing knowledge management systems and facilitating organizational transformation through the use of advanced analytical tools and information technologies (Di Vaio et al., 2021). In this regard, organizations are increasingly adopting cloud computing, artificial intelligence, machine learning, and big data analytics to improve the effectiveness and efficiency of knowledge management practices and to support evidence-based managerial decisions (Deepa et al., 2022; Thayyib et al., 2023).

Big data is generally characterized by high volume, velocity, variety, veracity, and value, all of which create both opportunities and challenges for organizations. The extensive growth of data generated through organizational transactions, social media platforms, sensors, customer interactions, and digital infrastructures has provided organizations with unprecedented access to valuable information resources. However, the complexity and scale of these datasets require sophisticated analytical approaches and technological infrastructures to extract meaningful knowledge from them (Soleimani Roozbehani et al., 2022; Taghiyeh et al., 2025). Previous studies have demonstrated that organizations capable of effectively leveraging big data analytics can improve strategic decision-making, predict market trends, optimize operational processes, and identify new opportunities for innovation and organizational growth (Dahiya et al., 2022; Mikalef et al., 2021). Furthermore, the application of big data analytics enables organizations to improve responsiveness to environmental changes and enhance organizational agility in highly dynamic business environments (Ciasullo et al., 2022).

The integration of big data analytics into knowledge management systems has attracted considerable attention in recent years because of its potential to transform organizational decision-making processes. Big data analytics allows organizations to convert complex and fragmented data into meaningful knowledge that supports strategic planning and operational management. Researchers have argued that the effective use of data analytics capabilities strengthens organizational dynamic capabilities and enhances firms' ability to respond to uncertainty and environmental complexity (Mikalef et al., 2021). In addition, organizations that successfully integrate data analytics into their knowledge management practices are more likely to achieve higher levels of innovation, organizational learning, and competitive performance (Awan et al., 2021; Dahiya et al., 2022). The increasing importance of data-driven decision-making has therefore encouraged organizations to invest in analytical infrastructures, intelligent information systems, and digital transformation initiatives aimed at improving organizational knowledge processes.

The role of artificial intelligence and advanced analytics technologies in knowledge management has also become increasingly significant. Artificial intelligence technologies, including machine learning and deep learning algorithms, provide organizations with advanced capabilities for analyzing large datasets, identifying hidden patterns, and generating predictive insights. These technologies can improve the accuracy and speed of organizational decision-making and support the development of intelligent knowledge management systems capable of continuous learning and adaptation (Thayyib et al., 2023). Moreover, recent advancements in blockchain technology and distributed information systems have created new opportunities for securing big data environments and protecting organizational knowledge assets (Deepa et al.,

2022). The implementation of secure and intelligent knowledge management systems is particularly important for organizations operating in critical sectors such as energy, healthcare, and public services, where data security and information integrity are essential organizational concerns.

Despite the significant opportunities associated with big data analytics, organizations also face substantial challenges in implementing and managing these systems effectively. One of the primary challenges involves the technological infrastructure required for storing, processing, and analyzing large-scale datasets. Many organizations lack the necessary technological capabilities, integrated software systems, and computational resources needed to support advanced data analytics applications (Fu, 2021). In addition, organizations frequently encounter difficulties related to data quality, data integration, interoperability, and system scalability, which may reduce the effectiveness of knowledge management systems and limit the value derived from organizational data resources (Ravikumar et al., 2023). Another important challenge concerns data privacy and cybersecurity risks, particularly as organizations increasingly rely on digital platforms and interconnected information systems for managing organizational knowledge.

Human resource challenges also represent a critical barrier to the successful implementation of big data analytics and knowledge management systems. The effective utilization of big data requires employees and managers with specialized analytical skills, technological competencies, and data-driven decision-making capabilities. However, many organizations experience shortages of skilled personnel capable of interpreting complex analytical outputs and transforming them into practical managerial insights (Farooq, 2024). Resistance to organizational change, insufficient training programs, and weak organizational cultures may further hinder the successful adoption of data-driven knowledge management systems. Previous studies have emphasized that organizational culture and employee collaboration are among the most important factors influencing the success of digital transformation and knowledge management initiatives (Imhanzenobe et al., 2021; Yumhi et al., 2024). Consequently, organizations must simultaneously invest in technological development and human capital enhancement to maximize the benefits of big data analytics.

The strategic importance of big data analytics has become particularly evident in service-oriented and public-sector organizations, where large volumes of operational and customer-related data are continuously generated. Organizations in the energy sector, including gas and utility companies, rely heavily on accurate information and timely decision-making to manage operational risks, optimize resource allocation, and improve service quality. The integration of big data analytics into knowledge management systems can significantly enhance organizational performance in these sectors by improving forecasting accuracy, supporting strategic planning, and facilitating rapid decision-making processes (Sulaiman & Wolniak, 2024). Furthermore, the use of integrated knowledge management systems enables organizations to preserve institutional knowledge, reduce knowledge loss, and improve coordination among organizational units.

Recent studies have also highlighted the relationship between big data analytics capabilities and organizational innovation. Organizations that effectively utilize analytical technologies are better positioned to identify emerging trends, develop innovative products and services, and improve organizational sustainability (Hu et al., 2021; Singh et al., 2020). Big data analytics contributes to organizational innovation by enabling managers to generate evidence-based insights and make informed strategic decisions in uncertain and rapidly changing environments. In addition, organizations capable of integrating environmental knowledge, digital technologies, and analytical capabilities can achieve higher levels of resilience and long-term competitive advantage (Awan et al., 2021; Ciasullo et al., 2022). These findings suggest that the strategic value of big data extends beyond operational efficiency and includes broader organizational outcomes related to innovation, sustainability, and organizational learning.

Another important aspect of big data analytics involves the transformation of data into organizational knowledge through systematic analytical processes. Researchers have emphasized that the value of big data depends not only on the quantity of available data but also on the organization's ability to interpret, manage, and apply analytical findings effectively (Dammann, 2018). Advanced analytical tools and integrated data platforms facilitate the extraction of meaningful patterns and relationships from large datasets, thereby supporting organizational intelligence and evidence-based management practices (Xiong et al., 2022). Furthermore, the growing importance of data mining and knowledge discovery techniques has expanded the capabilities of organizations to identify hidden relationships and generate strategic insights from complex information environments (Mohaghegh Nasab & Mohammadi, 2023). As organizations increasingly rely on intelligent

technologies and digital infrastructures, the integration of big data analytics into knowledge management systems has become essential for sustaining organizational competitiveness and innovation.

Although previous studies have investigated various aspects of big data analytics and knowledge management, there remains a significant need for comprehensive conceptual models that explain the relationships among technological, organizational, human, and strategic factors influencing the implementation of big data analytics in organizational knowledge management systems. Many existing studies have focused primarily on technological dimensions while paying limited attention to organizational culture, human resource challenges, managerial strategies, and contextual conditions affecting the success of data-driven knowledge management initiatives (Di Vaio et al., 2021; Farooq, 2024). In addition, there is limited empirical research examining the integration of big data analytics into knowledge management systems within Iranian service-oriented organizations, particularly in the energy and utility sectors. Given the strategic importance of data-driven decision-making and integrated knowledge management in such organizations, further research is required to identify the critical factors, challenges, and strategies associated with the effective utilization of big data analytics.

Accordingly, the present study aims to design a comprehensive model of big data analytics in the organizational knowledge management system of the Khorasan Razavi Gas Company in order to identify the causal conditions, contextual factors, intervening conditions, organizational strategies, and consequences associated with data-driven decision-making and integrated knowledge management.

2. Methods and Materials

In this study, a qualitative method based on the grounded theory approach was employed to identify and analyze the patterns, relationships, and processes associated with the utilization of big data within the knowledge management system of the Khorasan Razavi Gas Company. The statistical population consisted of managers, deputy managers, and technology experts of the Khorasan Razavi Gas Company, among whom 20 individuals were identified and selected for interviews. In addition, to ensure the comprehensiveness of the data and concepts and to benefit from academic theoretical knowledge, several university experts were also considered at this stage. Sampling was conducted purposively and based on theoretical sampling; in other words, participants were selected according to their ability to provide accurate information and relevant practical experience related to data management and data-driven decision-making, and data collection continued until theoretical saturation was achieved (12 participants). Data were collected through in-depth semi-structured interviews so that the participants' perspectives, experiences, and practical knowledge could be accurately and systematically recorded, thereby enabling systematic analysis.

Data analysis was conducted using the grounded theory method, which included open, axial, and selective coding to identify concepts, categories, and the relationships among them. The data were continuously examined through comparative analysis in order to develop a theory grounded in empirical evidence and data. MAXQDA software was utilized for data analysis, providing facilities for managing, organizing, and coding the qualitative data obtained from the interviews. The analysis focused on identifying causal conditions, contextual conditions, human resource and technological challenges and limitations, organizational strategies, and the consequences of applying big data in knowledge management. This process enabled the development of a comprehensive conceptual model for enhancing data-driven decision-making and integrated knowledge management within the Khorasan Razavi Gas Company and ensured that the findings were documented, valid, and reliable.

3. Findings and Results

The demographic characteristics of the sample members, including gender, educational level, age, and work experience, were examined in this section and are reported in Table 1.

Table 1

Descriptive Variables of the Study

Variable	Frequency	Percentage	Cumulative Percentage
Gender			
Male	9	75.00	75.00
Female	3	25.00	100.00
Educational Degree			
Master's Degree	7	58.33	58.33
Doctoral Degree	5	41.67	100.00
Age			
30–40 years	3	25.00	25.00
41–50 years	4	33.33	58.33
Above 50 years	5	41.67	100.00
Work Experience			
10–15 years	4	33.33	33.33
16–20 years	2	16.67	50.00
21–25 years	2	16.67	66.67
Above 25 years	4	33.33	100.00

A total of 75% of the participants in the study were male and 25% were female. Furthermore, 58.33% of the participants held a Master's degree, while 41.67% possessed a doctoral degree.

Regarding age distribution, 25% of the participants were between 30 and 40 years old, 33.33% were between 41 and 50 years old, and 41.67% were above 50 years of age.

With respect to work experience, 33.33% of the participants had between 10 and 15 years of experience, 16.67% had between 16 and 20 years of experience, 16.67% had between 21 and 25 years of experience, and finally, 33.33% of the participants had more than 25 years of work experience.

In the grounded theory paradigm, data analysis consists of three stages of coding: (1) open coding, (2) axial coding, and (3) selective coding (Strauss & Corbin, 2010).

Based on the findings obtained from the interviews as well as the systematic review of previous research and studies in this field, a total of 388 initial codes were extracted. Following further examination, the merging of similar codes, and the removal of repetitive codes, 94 initial codes and concepts were ultimately identified. The summary of the extracted codes from each interviewee is presented in Table 2.

Table 2

Summary of Codes Extracted from Each Interview

Interview Code	Total Extracted Codes	Non-Repetitive Extracted Codes
INT 1	33	14
INT 2	37	12
INT 3	34	10
INT 4	35	10
INT 5	32	10
INT 6	26	9
INT 7	35	8
INT 8	35	7
INT 9	34	6
INT 10	32	4
INT 11	27	3
INT 12	28	1

The codes extracted under the title of "open or initial codes" that shared similar concepts were grouped under unified categories referred to as "axial codes." This classification is presented in Table 3.

Table 3

Concepts and Subcategories

Subcategory	Concepts / Initial Codes
Characteristics of Big Data	Excessive variety, very high velocity, heavy and powerful volume, precision, and complex details
Increasing Need for Data-Driven Decision-Making	Strategic decision-making, business objectives, managerial analysis, rapid decision-making, need for real-time decisions, large information-based organizations
Need to Maintain Data Security	Cyberattacks, internal threats, risk of information leakage, maintaining data security, data loss, dark and missing data, cybersecurity, protection of sensitive data, encryption, firewall, privacy
Regulations and Standards	Global standards, managerial policies, procedures and guidelines, laws and regulations
Organizational Culture	Shared culture, organizational culture, collaboration, collective and team beliefs
Technological Infrastructure	Microservices, technological infrastructure, access to up-to-date technologies, modern equipment
Human Resource Challenges	Employee information, performance, training, job satisfaction, organizational change management, employee resistance, employee productivity
Technological Limitations	Role-based access control, privacy challenges, scalability of feedback systems, lack of technological infrastructure, lack of integration between infrastructure and software
Financial Resource Limitations	Weak financial management, lack of budget, increased maintenance costs, lack of accurate financial planning, unclear financial performance
Integrated Knowledge Management	Knowledge acquisition, knowledge storage, knowledge organization, knowledge sharing, knowledge transfer, organizational learning, knowledge management, reduction of knowledge loss
Big Data Analytics	Big data, data analytics, time-consuming nature of big data analysis
Implementation of Cloud Infrastructure	Cloud infrastructure, software infrastructure, parallel processing, automation
Use of Artificial Intelligence for Data Analysis	Artificial intelligence, data analytics, machine learning, deep learning, predictive analytics, rapid data mining
Implementation of Secure Knowledge Management Systems	Knowledge management based on modern systems, cloud-based knowledge management, innovative and technological knowledge management, secure knowledge management, protection of information and knowledge
Continuous Monitoring and Improvement of Data	Data monitoring, data quality assessment, data accuracy assessment, data completeness assessment, data evaluation, data precision and transparency assessment
Effective Decision-Making	Strategic decision-making, decision support, reporting effectiveness
Reduction of Security Risks	Risk reduction, enhancement of data security, secure access, rapid and accurate access
Increased Innovation	Identification of improvement opportunities, high innovation, creativity in implementation, possibility of innovation and creativity
Increased Operational Costs	High costs, increased data collection costs, increased resource costs, heavy operational expenses

Selective coding, based on the results of open and axial coding, represents the main stage of theory development. This stage is presented in Table 4.

Table 4

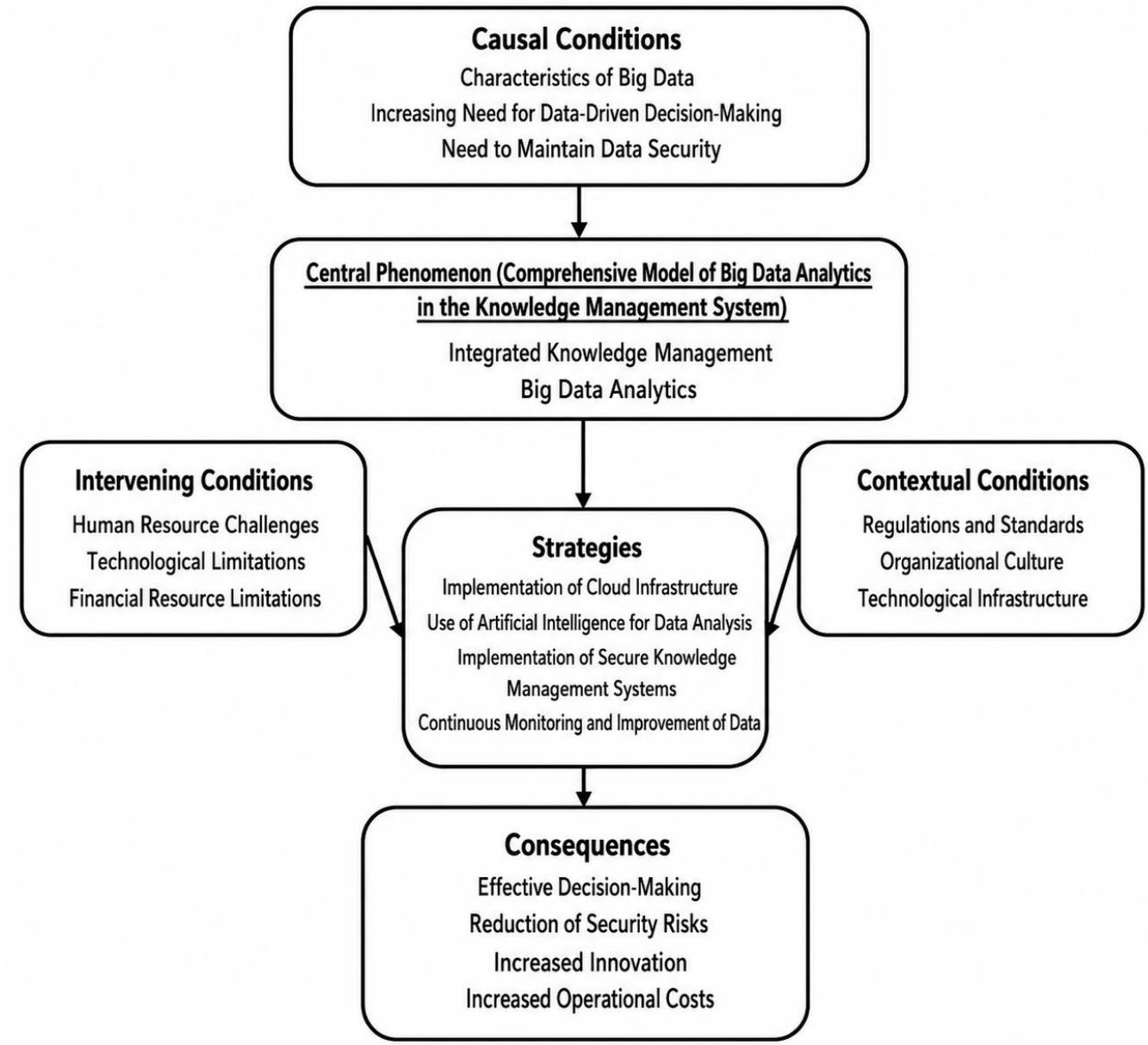
Classification of Selective Coding

Dimensions / Main Category	Subcategory
Causal Conditions	Characteristics of big data
	Increasing need for data-driven decision-making
	Need to maintain data security
Contextual Conditions	Regulations and standards
	Organizational culture
	Technological infrastructure
Intervening Conditions	Human resource challenges
	Technological limitations
	Financial resource limitations
Central Phenomenon	Integrated knowledge management
	Big data analytics
Strategies	Implementation of cloud infrastructure
	Use of artificial intelligence for data analysis
	Implementation of secure knowledge management systems
	Continuous monitoring and improvement of data
Consequences	Effective decision-making
	Reduction of security risks
	Increased innovation
	Increased operational costs

Figure 1 illustrates the coding paradigm model of the relationships among causal conditions, strategies, contextual and intervening conditions, and consequences within the research paradigm model.

Figure 1

Research Paradigm Model



4. Discussion and Conclusion

The present study aimed to design a comprehensive model of big data analytics in the organizational knowledge management system of the Khorasan Razavi Gas Company using a grounded theory approach. The findings demonstrated that the characteristics of big data, including high volume, extensive variety, and rapid velocity, represent the primary causal conditions influencing the development of integrated knowledge management and data-driven decision-making systems. The results further indicated that the increasing organizational need for rapid and evidence-based decision-making, together with the necessity of maintaining information security, have significantly accelerated organizational interest in big data analytics. These findings are consistent with previous studies emphasizing that modern organizations increasingly rely on large-scale datasets and analytical systems to support

strategic management and organizational intelligence (Dammann, 2018; Dehestani, 2020). The findings also support the argument that data-driven organizational environments require advanced analytical infrastructures capable of converting raw data into meaningful organizational knowledge (Dahiya et al., 2022).

One of the central findings of this study was the identification of integrated knowledge management and big data analytics as the core phenomena within the proposed conceptual model. The findings revealed that organizations can improve knowledge creation, storage, sharing, and application by integrating analytical technologies into organizational knowledge management systems. This result aligns with previous research emphasizing that modern knowledge management systems are increasingly dependent on digital innovation and intelligent technologies for organizational learning and strategic adaptation (Di Vaio et al., 2021). The integration of analytical capabilities within organizational knowledge systems allows organizations to extract hidden patterns from data and improve the quality and speed of managerial decision-making processes. In addition, the results are consistent with the perspective that knowledge management is no longer limited to storing organizational information, but rather involves dynamic processes of analyzing and transforming information into actionable organizational intelligence (Bibi et al., 2021; Imhanzenobe et al., 2021).

The findings further demonstrated that contextual conditions such as organizational culture, technological infrastructure, and regulatory frameworks play a decisive role in the successful implementation of big data analytics in organizational knowledge management systems. In particular, organizational culture emerged as one of the most influential factors affecting the acceptance and effectiveness of data-driven managerial practices. This finding is supported by previous studies indicating that collaborative cultures, organizational trust, and employee participation significantly influence the success of digital transformation initiatives and knowledge-sharing processes (Imhanzenobe et al., 2021; Yumhi et al., 2024). Moreover, the existence of adequate technological infrastructure, including cloud computing systems, advanced software architectures, and modern communication technologies, was identified as an essential requirement for effective big data implementation. These findings are consistent with prior studies emphasizing the importance of technological readiness and digital capabilities in supporting organizational innovation and knowledge integration (Di Vaio et al., 2021; Fu, 2021).

Another important finding of the study concerns the role of intervening conditions, including human resource challenges, technological limitations, and financial constraints. The results showed that a lack of specialized human resources, insufficient analytical competencies, resistance to organizational change, and limited financial support significantly hinder the implementation of integrated big data analytics systems. These findings are in line with the arguments of previous researchers who emphasized that organizations often face skill shortages and insufficient managerial competencies when implementing advanced analytical systems (Farooq, 2024). Similarly, Mikalef et al. argued that organizational inertia and resistance to technological transformation can reduce the effectiveness of big data analytics capabilities and delay organizational adaptation to digital environments (Mikalef et al., 2021). The findings also suggest that organizations require substantial investments in training programs and human capital development in order to maximize the strategic benefits of data-driven systems.

The study identified several organizational strategies for improving the implementation of big data analytics within knowledge management systems, including the use of cloud infrastructure, artificial intelligence technologies, secure knowledge management systems, and continuous data monitoring. Among these strategies, the use of artificial intelligence and machine learning technologies was identified as particularly significant for improving analytical speed, predictive capabilities, and organizational decision-making accuracy. These findings are strongly aligned with prior research demonstrating that artificial intelligence technologies can significantly enhance organizational analytical capabilities and support real-time decision-making processes (Thayyib et al., 2023). Furthermore, the findings confirm that organizations increasingly rely on cloud-based infrastructures to process large-scale data efficiently and reduce operational complexity. This observation corresponds with previous studies emphasizing that digital infrastructures and intelligent technologies are central to the development of modern knowledge management systems (Deepa et al., 2022; Fu, 2021).

The findings also demonstrated that secure knowledge management systems and cybersecurity measures are critical components of successful big data implementation. Participants emphasized the importance of protecting sensitive organizational information against cyber threats, data leakage, and unauthorized access. This result supports previous studies indicating that data security and privacy

concerns represent major organizational challenges in the era of digital transformation and large-scale data utilization (Deepa et al., 2022). As organizations become increasingly dependent on digital systems and interconnected technologies, the protection of organizational knowledge assets becomes strategically essential. The results therefore highlight the necessity of implementing advanced security mechanisms, encryption technologies, and integrated cybersecurity policies within organizational knowledge management systems.

Continuous monitoring and improvement of organizational data emerged as another important strategic factor in the proposed model. The findings suggested that organizations must continuously evaluate data quality, completeness, transparency, and accuracy in order to ensure the reliability of analytical outcomes and managerial decisions. These findings are consistent with previous research emphasizing that the value of big data depends largely on data quality and the organization's ability to interpret and utilize analytical outputs effectively (Ravikumar et al., 2023). In addition, the results support the argument that data governance and continuous analytical evaluation are essential for sustaining organizational learning and improving long-term organizational performance.

The consequences identified in the present study included effective decision-making, reduced security risks, increased innovation, and increased operational costs. The findings indicated that organizations capable of integrating big data analytics into their knowledge management systems can significantly improve strategic decision-making processes through enhanced access to accurate and timely information. This result is highly consistent with prior studies demonstrating that data analytics capabilities improve organizational agility, strategic responsiveness, and evidence-based management practices (Dahiya et al., 2022; Mikalef et al., 2021). The findings further suggest that analytical systems facilitate faster and more accurate managerial decisions, particularly in organizations operating in highly dynamic and information-intensive environments.

Another important consequence identified in this study was increased organizational innovation. The results demonstrated that big data analytics enables organizations to identify improvement opportunities, support creative problem-solving, and enhance innovation capacity. These findings align with prior research emphasizing that organizations with advanced analytical capabilities are better positioned to develop innovative products, services, and operational strategies (Awan et al., 2021; Hu et al., 2021). Similarly, Singh et al. argued that organizational innovation is strongly associated with technological transformation and strategic knowledge management practices (Singh et al., 2020). Therefore, the integration of analytical systems within organizational knowledge management can contribute not only to operational efficiency but also to broader organizational transformation and sustainable development.

The findings also indicated that the implementation of big data analytics systems may increase organizational operational costs due to infrastructure investments, software development, cybersecurity requirements, and employee training programs. Although these costs may initially represent a financial burden for organizations, the long-term strategic benefits associated with improved decision-making, organizational innovation, and operational efficiency can outweigh the initial investments. This interpretation is consistent with previous research suggesting that organizations investing in digital transformation and analytical capabilities often achieve greater resilience and competitive advantage over time (Ciasullo et al., 2022). Furthermore, the findings support the perspective that organizational sustainability increasingly depends on the ability to manage and utilize digital knowledge resources effectively.

The present study contributes to the existing literature by providing a comprehensive grounded theory model that integrates causal conditions, contextual factors, intervening conditions, organizational strategies, and consequences related to big data analytics in knowledge management systems. Unlike many previous studies that focused primarily on technological dimensions, the current study provides a more integrated understanding of organizational, human, strategic, and contextual factors influencing the implementation of big data analytics. The study also contributes empirical evidence from the Iranian energy sector, an area that has received limited attention in prior research. Given the strategic importance of energy organizations and their increasing dependence on digital infrastructures and intelligent information systems, the findings provide valuable insights for both scholars and organizational decision-makers seeking to improve integrated knowledge management and data-driven organizational performance.

One limitation of the present study was the relatively limited sample size and the concentration of participants within a single organization, which may reduce the

generalizability of the findings to other industries or organizational contexts. In addition, the qualitative nature of the study and reliance on interview data may have introduced subjective interpretations associated with participants' experiences and perspectives. Another limitation concerns the rapid evolution of big data technologies and digital infrastructures, which may affect the long-term applicability of some findings and organizational strategies identified in the present study.

Future research is recommended to examine the proposed conceptual model quantitatively using structural equation modeling and larger statistical samples across different organizational sectors. Comparative studies between public and private organizations or between service-oriented and manufacturing industries may provide deeper insights into the contextual differences affecting big data analytics implementation. In addition, future studies may investigate the mediating role of organizational culture, leadership style, digital maturity, and employee competencies in enhancing the effectiveness of integrated knowledge management systems and data-driven decision-making processes.

From a practical perspective, organizations should prioritize investments in modern technological infrastructure, cloud computing systems, and artificial intelligence technologies to improve their analytical and knowledge management capabilities. Managers should also develop organizational cultures that support collaboration, innovation, and evidence-based decision-making while simultaneously strengthening cybersecurity systems and data governance mechanisms. Furthermore, continuous employee training and skill development programs should be implemented to enhance analytical competencies and facilitate organizational adaptation to digital transformation and data-driven management practices.

Authors' Contributions

Authors contributed equally to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethics Considerations

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were considered.

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