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Data-driven strategic decisions: Leveraging business analytics and big data to improve decision-making insights in the international organizations

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A B S T R A C T

In the technological and digital revolution, the world is witnessing unprecedented environmental uncertainty as big data becomes more complex in the labor market. Hence, the study examined the relationship between business analytics, big data, and decision-making insights. The study design used a quantitative approach through a questionnaire distributed to a sample of 412 management levels from international organizations located in King Hussein Business Park in Jordan, named CISCO, Microsoft, Oracle, MBC, Samsung, Migrate, Aramex, Experia, and Ericsson. The data were managed through PROCESS Micro v3.5 software via SPSS packages to investigate the total effects of the study variables. The results confirmed the positive relationship between business analytics, big data, and decision-making insights at a statistically significant level ($p < 0.01$). The study presented a theoretical development of the role of management in achieving mature visions based on big data that constitute solutions to the complex interactions between technology and human orientation, facilitating the organizational complexities supported by the digital age and transforming them in favor of business decisions in the organizational environment of business companies.

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1. Introduction

In the modern world, especially in international organizations, the world is experiencing unprecedented environmental uncertainty in terms of an increasing number of people, customers, and their data which leads to the use of technology to manage big data analytics as strategic assets to make informed decisions (Lutfi, 2023). Business analytics and big data help organizations use the latest technologies to manage big data and use them to exploit and filter this data to enhance the decisions of leaders in their organizations (Nisar et al., 2021). The business sector is facing a huge expansion in the volume of information and its various forms, which need to be exploited as opportunities that improve innovation processes and come up with constructive ideas that encourage strategic initiatives in exploiting rational decisions (Aljumah et al., 2021b). Modern programs have helped extract and integrate data and transform it into value from historical data or visions of future technologies that enhance the improvement of goods and services radically and effectively enabling them to keep pace with the technological and digital transformation in the contemporary business world (Aljumah et al., 2021a).

There is no doubt that there is progress in the spread of big data and an increase in analytical software techniques, but this poses a threat to the effectiveness of the data because of the traditional decisions it receives, historical data, intuition, and stories that are not in line with the modern and rapidly changing environment in the business sector (Adewusi et al., 2024; Aljumah et al., 2021a, 2021b; Ashaari et al., 2021). This constitutes a technological gap in front of institutions that are exposed to criticism from quality management and institutional governance

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regarding the accuracy and validity of the data provided (Basile et al., 2023). This constitutes an obstacle for decision-makers to benefit from data and use it in its appropriate form to improve operations and mitigate risks related to hacking and electronic piracy that our current societies suffer from by distorting the quality and accuracy of data (Awamleh, 2022; Buhalis & Volchek, 2021).

In conclusion, this research aims to use big data with business analytics techniques to correct strategic decision-making processes. In light of this, the study question is: Can organizations benefit from business analytics in analyzing big data to improve Decision-Making Insights in organizations? It remains a challenge for international organizations, especially those located in Jordan.

2. Literature review and hypothesis development

The literature has reviewed the changes in business analytics and big data in achieving huge insights into organizational decision-making, as contemporary studies have clarified various viewpoints in the field of study, as they review different concepts in organizational strategies based on prescriptive, predictive, and descriptive analyzes and their role in maximizing big data (Buhalis & Volchek, 2021; Gupta et al., 2021; Nisar et al., 2021). Practical studies have also demonstrated the impact of business analytics on innovation, improving organizational performance, and achieving unique competitive advantages (Ashaari et al., 2021; Awamleh et al., 2024). The bottom line was constructive criticism of contemporary theories that enabled business analytics and information systems to interpret clear insights through the interpretation of big data to achieve better rational decision-making by consultants and decision-makers (Aljumah et al., 2021b; Del Vecchio et al., 2020; Nisar et al., 2021).

Business analytics includes a set of technological tools that constitute methodologies and techniques that transform data into visualization and display on a dashboard, from which rational decisions can be made within the business organization (Chatterjee et al., 2024). This data is formed in the form of information that is analyzed in its essence to achieve patterns, trends, and data interrelationships that lead to operational strategies and tactics (Del Vecchio et al., 2020). In terms of descriptive analytics, changes in business content and differences in performance standards are extracted from historical data to achieve predictive analytics that enables the use of algorithms and machine learning to predict future issues to improve the quality of institutions in the business environment to achieve sustainability supported by a competitive advantage (Gupta et al., 2020; Ibeh et al., 2024). Big data is the accumulation of data from various sources and knowledge, which is formed in the form of very large data, which may be in an organized or unorganized form, and is formed from social networks, mobile devices, corporate systems, and other various sources (Gupta et al., 2021). Data has different characteristics (such as velocity, volume, and variety), which gives new insights into challenges and provides unique opportunities to transform them into readable visualizations (Iqbal et al., 2020). Most technology has failed to use big data in a good way due to the large number of data containing different types and the complexity of its forms, which created the need to innovate new technology that can be designed to fit big data and use it in the right way through algorithms and machine learning, their data can be managed and filtered. Moreover, protecting data through a new cybersecurity innovation creates a strong firewall through which personal data can be strengthened from any hacking that threatens its users (Jabbar et al., 2020; Khanra et al., 2020).

Decision-making can be done using business analytics and big data to create new insights that help simplify the current world (Basile et al., 2023). Big data can be filtered to extract hidden data and used in new insights that help achieve rational decision-making and are consistent with the vision and mission of modern organizations (Di Vaio et al., 2022). The decision helps improve stakeholders' understanding of strategic decisions that help monitor future market trends to seize opportunities, which contributes to achieving a sustainable competitive environment (Gupta et al., 2020; Ibeh et al., 2024). Business analytics uses big data for decision-making by translating it into understandable visual insights (Iqbal et al., 2020). The use of different forms of data has contributed to the frequent feedback that guiding strategic decisions leads to their development and use in an actual form and clear visions of future trends (Khanra et al., 2020; Koot et al., 2021). Technology provides new tools that help analyze big data and achieve operational excellence by breaking down data and transforming it into interpretable insights on the ground that are more flexible and responsive to the strategic future (Lee et al., 2020; Li et al., 2022; Maheshwari et al., 2021). Decisions are shaped by integrating data with business analytics, creating a paradigm shift in improving organizational decision models (Moinuddin et al., 2024). This provides strategic value improvement opportunities that improve decision-making insights in a distinctive and unprecedented way (Nisar et al., 2021; Olabode et al., 2022). Integrations between big data and advanced business analytics form comprehensive insights into the business environment in improving its operations, detecting its customers in the market, and monitoring competitive risks, thus enhancing its competitive position in the business

environment and achieving more informed and flexible decisions (Olaniyi et al., 2023). Business analytics targets big data for organizations that go beyond traditional descriptive analytics to move towards prescriptive and predictive analytics, enabling organizations to seek strategic insights that drive business leadership and innovation (Sahoo, 2022; Sarker, 2021). However, different challenges regarding business analytics and big data require organizations to deal with these issues more dynamically and energetically (Lutfi, 2023). This includes verifying the integrity of the data and the nature of its management, and achieving quality assurance for the data and its consistency across multiple sources (Shamim et al., 2020; Tang & Liao, 2021). In addition, addressing organizational ethics related to achieving privacy and security of large organizational data related to users of all forms in the organization, whether from the private environment or the public environment (Troisi et al., 2020). Organizations must develop business analytics and big data capabilities to enhance ethics-based data decisions and strengthen their evidence-based organizational culture in continuous machine learning (Troisi et al., 2020).

In summary, direct communication between business analytics, big data, and decision-making insights achieves competitive advantages in the labor market that relies on data analysis and coming up with constructive ideas in today's unstable and complex work environment (Yalcin et al., 2022; Zhang et al., 2022). This opens opportunities for organizations to generate new opportunities for leadership and organizational innovation towards achieving the elite program for strategic decisions, and addressing problems and challenges in the corporate governance environment and international ethics followed in decision-making (Zhang et al., 2021). This technological progress creates a response for organizations to the dynamic changes in the local and global work environment, which interact with the integration of both business analytics and big data, which are the basis for deciding organizational decisions in achieving success and progress in a complex and uncertain work environment (Moinuddin et al., 2024; Sarker, 2021; Tang & Liao, 2021). It contributes to simplifying it and understanding its working mechanisms in achieving visions in the field of making. Rational organizational decisions and their orientation towards excellence, sustainability, and success in the workplace (Olabode et al., 2022).

The conceptual framework of the study explains the relationship between the variables of the study hypotheses, which is the relationship between Business Analytics on Big Data to Improve Decision-Making Insights in global organizations. Based on the above-mentioned intellectual and literary criticisms of contemporary issues, we conclude the following hypotheses:

H_1: *Business analytics has a positive and significant influence on big data.*
H_2: *Big data has a positive and significant influence on decision-making insights.*
H_3: *Business analytics has a positive and significant influence on decision-making insights.*
H_4: *Business analytics has a positive and significant influence on decision-making insights through big data as a mediator.*

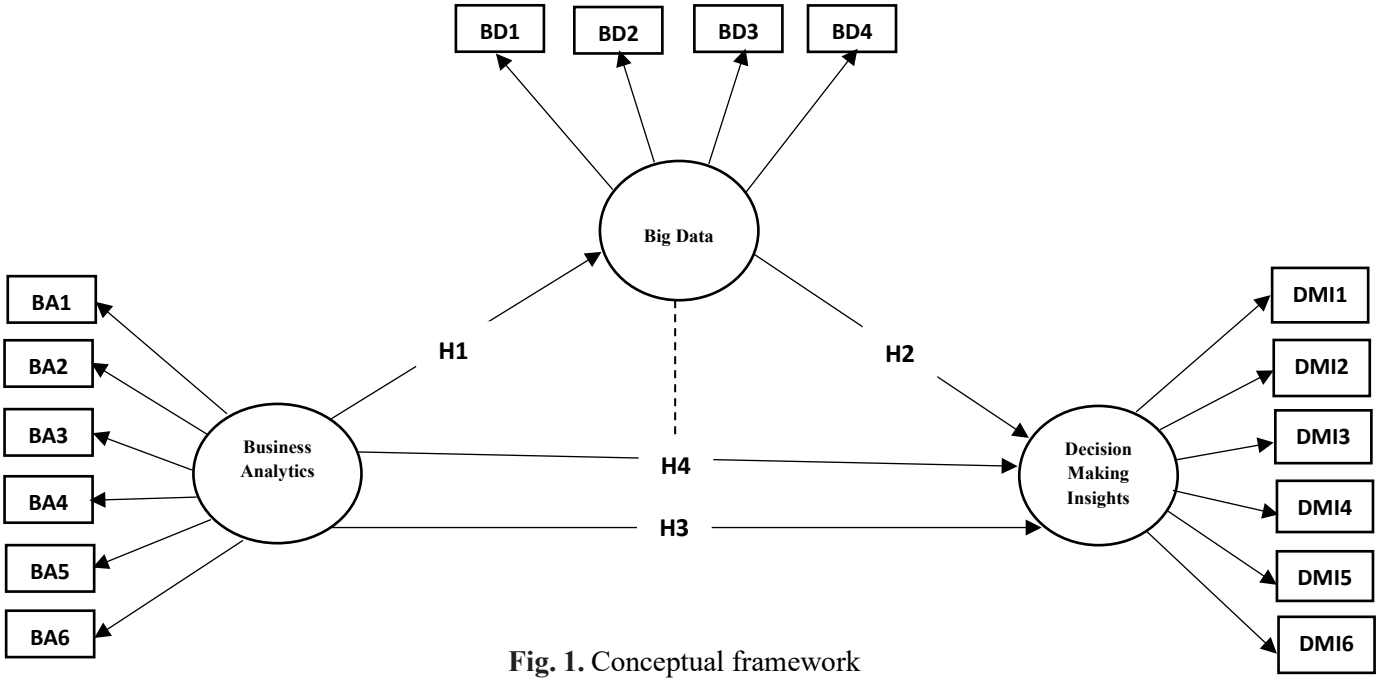

Fig. 1. Conceptual framework

3. Method

This study used a quantitative survey method, which is based on collecting data from the targeted sample and analyzing it to discover organizational decisions through the use of business analytics and big data by administrative agencies that have experience and knowledge in the field of study, which provides a comprehensive understanding of the phenomenon that was studied in the current research. Whereas, Table A1. The Respondent Survey Questionnaire mentioned in Appendix A illustrates the items that measure the study variables. The questionnaire was distributed to the study sample consisting of administrative employees in the global organization sector who adopt technology in big data analysis better than other sectors. The organizations were contacted and the questionnaire was distributed and retrieved smoothly because the organizations are located in one cluster it carries the located in "King Hussein Business Park" in Jordan, with names of CISCO, Microsoft, Oracle, MBC, Samsung, Migrate, Aramex, Experia, and Ericsson. Random probability sampling was also taken to discover a fair sample for the study population, where the data were valid for data analysis after deleting Invalid questionnaires to become 412 administrative levels in various types of international organizations located in King Hussein Business Park in Jordan Detailed in Appendix B. This diverse sampling approach ensures comprehensive coverage and improves the generalizability of results (Sekaran & Bougie, 2016). Before that event took place the pre-test sample was used at 33 administrative levels for various types of organizations in Jordan. A quantitative study is used in the questionnaire survey to reveal the relationship between study variables regarding business analytics and big data in providing decision-making insights. Validity and reliability were tested from previous research, relying on the five-point Likert scale that was used in this study to accurately rate the respondents to the study questions, ranging from 1 (strongly disagree) to 5 (strongly agree). Referring to contemporary literature, first, business analytics used six questions based on (Chatterjee et al., 2024; Del Vecchio et al., 2020; Lee et al., 2020). Second, Big Data used four questions based on which the study took points from various literature (Gupta et al., 2021; Iqbal et al., 2020). Finally, six questions were identified for the decision-making insights variable based on numerous studies in the same field of study, the most important of which is (Abu-AlSondos, 2023; Troisi et al., 2020).

4. Results

Quantitative analysis reveals compelling evidence of a positive relationship between the use of business analytics on big data and decision-making effectiveness. Organizations that effectively use advanced analytics techniques show improvements in decision quality, timeliness, and alignment with organizational goals. Qualitative findings complement these quantitative insights, providing nuanced perspectives on the transformative role of business analytics in improving decision-making processes and driving organizational performance. SPSS was relied upon to obtain reliability, validity, normal distribution, and arithmetic mean responses to clarify the relationships between business analytics, big data, and decision-making insights. The study used linear regression to test one side of the hypotheses. In addition, the study used PROCESS Micro v3.5 software to test the total relationship of the study variables to achieving its goal.

Table 1
Characteristics of the sample from the community of international organizations

Variable	Categories	Frequency	Percent
Gender	Male	236	57
	Female	176	43
Education	Diploma	45	11
	Bachelor	259	63
	Master	81	20
	Ph.D.	27	6
Experience of employees in the organization	> 3 Years	62	15
	3-7 Years	82	20
	8-11 Years	103	25
	< 11 Years	165	40
Position in the Organization	Top-level manager	26	6
	Middle manager	109	26
	First-line manager	152	37
	Team leader	125	31
Business Analytics & Big data experience	< 1 year	66	16
	1–2 years	154	37
	3–4 years	112	27
	> 4 years	80	20
	Total	412	100.0

Table 1 shows the characteristics of the sample from the international organization's community. The demographic characteristics table showed that the gender distribution was harmonious between males (57%) and females (43%), while the study sample showed that international organizations focused on the group holding bachelor's degrees (63%) more than other certificates. It is interesting and controversial that international organizations maintain their employees for long years exceeding 11 years, as evidenced by the study sample's response (40%). Furthermore, the majority of respondents were from middle administrative positions. Interestingly, the majority of the study sample has more than a year of experience in the field of business analytics and big data, and this indicates that the research community has sufficient awareness and experience in the field of the researched study, the results of which are reflected positively in strengthening the literature gap in the field of business analytics and big data in improving making- decisions insights. Table 2 shows the summary statistics and internal validity of the bivariate correlations. Internal validity was confirmed using Pearson's correlation test, which confirmed internal consistency in all statistically significant items with a significant correlation level at ($p < 0.01$). Also, all numbers in the table were between ($20 \leq R \leq 90$), which confirmed the independence of the data by showing that there is no weakness in the relationship between all elements and the absence of multicollinearity in the data for all items (Hair Jr et al., 2014).

Table 2
The internal validity through the Pearson Correlation test

Item	Business Analytics	Big Data	Decision Making Insights
Business Analytics	1.0		
Big Data	0.83**	1.0	
Decision Making Insights	0.65**	0.30**	1.0

** Correlation is significant at the 0.01 level; * Correlation is significant at the 0.05 level, Sample Size = 412.

Table 3 displays Tests of Reliability, Normality, Multicollinearity, and Descriptive statistics. The Cronbach alpha correlation coefficient showed the reliability of the data, which exceeded ($\alpha \geq 0.70$) for all study parameters (Hair Jr et al., 2014). The normal distribution of the coefficient of skewness and kurtosis also showed that the data is distributed between (±2.58) for all variables of the study, which shows that the data is distributed normally. The VIF indicated that there are no variables larger than 5, and this enhances the independence of the data. The arithmetic averages for both business analytics and big data achieved a high level of response, and for decision-making insights, a moderate level of response according to the responses of the research sample (Sekaran & Bougie, 2016).

Table 3
Tests of Reliability, Normality, Multicollinearity, and Descriptive statistics.

Item	Business Analytics	Big Data	Decision Making Insights	Total
Question	6	4	6	16
Alpha (α)	0.72	0.92	0.85	0.93
Skewness	-0.15	0.25	0.19	±2.58
Kurtosis	0.80	1.20	0.80	±2.58
VIF	2.1	1.80	2.7	VIF ≤ 5
Mean	3.76	3.70	3.43	HL & ML
SD	1.2	1.2	1.3	HL & ML

Alpha (α) ≥ 70; Skewness & Kurtosis = ±2.58; VIF ≤ 5; Mean & SD = High level (HL) & Medium level (ML).

Table 4 shows the Direct and Indirect Effects. The results of the study showed that the direct effect was (24%), the indirect effect through the mediator was (41%), and the total effect achieved a high degree of influence amounting to (65%), which achieved an additional degree of influence that was almost double the indirect effect (Hayes, 2015). The R_{Square} showed an impact score of (0.42) from business analytics for decision-making insights. With a percentage of (0.53) from big data for decision-making insights and a percentage of (0.66) from business analytics for decision-making insights through big data. The beta coefficient also showed that the more business analytics increased, the more decision-making insights increased (0.60). As big data increases by a unit, decision-making insights increase by (0.73), and as business analytics increases by a unit, decision-making insights increase by 0.79. Finally, the relationship also achieved a significant effect for the direct relationship at the level ($p \leq 0.5$) and the indirect relationship at ($p \leq 0.01$) (Hair Jr et al., 2014; Sekaran & Bougie, 2016).

Based on the above results, all hypotheses of the study were accepted as shown in "Figure 2 and Table 5" for the hypothesis (H1, H2, H3, and H4).

Table 4: Regression Analysis Using PROCESS Micro v3.5

Effect	variables	Effect	Coefficient	R Square	β	t	Sig.	Decision
Direct Effect	**BIA → DMI**	**0.24**	**0.80**	**0.42**	**0.60**	**5.33**	**0.04***	***Accepted**
Indirect Effect	**BD → DMI**	**0.41**	**0.45**	**0.53**	**0.73**	**3.75**	**0.01****	****Accepted**
Total Effect	**BIA → BD → DMI**	**0.65**	**1.25**	**0.66**	**0.79**	**6.94**	**0.00****	****Accepted**

** Regression is significant at the 0.01 level; * Regression is significant at the 0.05 level
Independent Variable: Business Analytics; Dependent Variable: Decision Making Insights; Mediating Variable: Big Data.

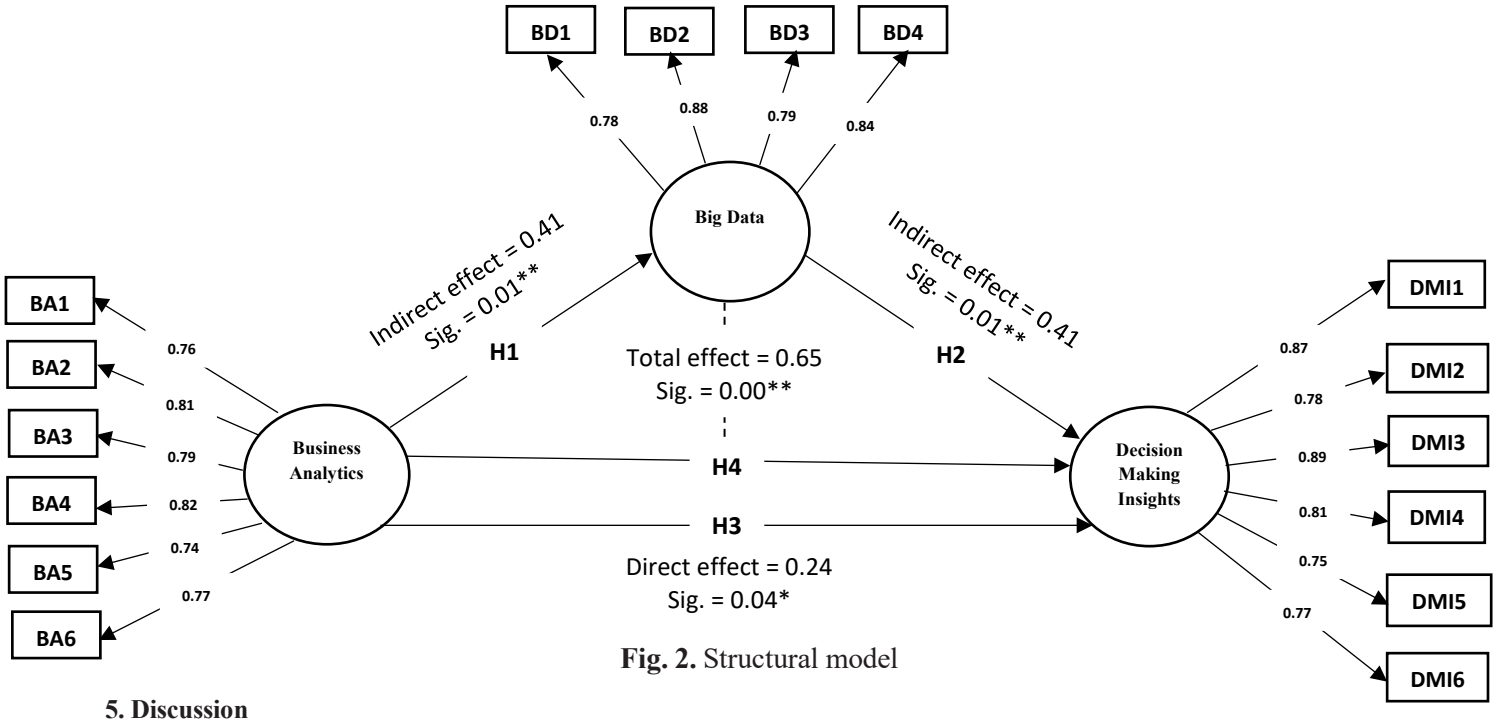

Fig. 2. Structural model

5. Discussion

The discussion section comprehensively interprets the results within the broader theoretical and empirical context, explaining how business analytics influences decision-making outcomes. Additionally, the discussion explores the implications of the findings for organizational theory and practice, highlighting the need to integrate business analytics into decision-making processes to foster a culture of data-driven innovation and agility.

Business analytics has a positive and significant influence on big data is accepted. In this regard, business analytics and their integration with big data help achieve clear and more comprehensive insights that enable rational decisions to be made (Moinuddin et al., 2024; Nisar et al., 2021). This helps understand customer needs, uncover market opportunities, and make more serious expectations for the future, which enhances the competitive position of organizations based on business analytics (Awamleh, 2022; Mikalef et al., 2020). The integration between business analytics and big data improves organizational performance and management practices based on it (Ibeh et al., 2024).

Big data has a positive and significant impact on decision-making insights. This was proven to be acceptable in the current study. It goes beyond traditional descriptive big data to provide predictive guidance that helps organizations make informed and clear decisions (Iqbal et al., 2020; Jabbar et al., 2020). Big data and business analytics enhance the organization's data-based culture, which helps speed up adaptation in the labor market and achieves strategic visions efficiently (Khanra et al., 2020).

Business analytics has a positive and significant influence on decision-making insights. This was proven to be acceptable in the current study. the integration of business analytics and big data may complicate matters, cause data to not be used properly, and may cause reputational and financial damage from targeted data breaches and misuse (Gupta et al., 2020; Ibeh et al., 2024).

Business analytics has a positive and significant impact on decision-making insights through big data as a facilitator. The study has shown that this significantly improves the overall relationship. Ethical considerations can lead to the misuse of private and public data, and this contributes to the waste, damage, or distortion of data adversely and negatively (Di Vaio et al., 2022; Gupta et al., 2021). This requires advancement in technology and training on it to improve the duration of data accuracy, which requires very huge financial costs for organizations (Ciampi et al., 2020). Ultimately, the adoption of business analytics and big data may contribute to neglecting the qualitative factors that depend on human judgment, which are extremely important and indispensable in the business context (Aljumah et al., 2021b; Ciampi et al., 2020; Gupta et al., 2021; Jabbar et al., 2020; Nisar et al., 2021).

Table 5
The results of the hypotheses

Hypothesis	Variable	Sig.	Results
H1	**Business analytics and big data**	**0.00**	****Supported**
H2	**Big Data and decision-making insights**	**0.01**	****Supported**
H3	**Business analytics and decision-making insights**	**0.04**	***Supported**
H4	**Business analytics and big data on decision-making insights**	**0.00**	****Supported**

In future research prospects, this study makes significant contributions to the existing body of literature by empirically demonstrating the multifaceted relationship between business analytics, big data, and decision-making outcomes within organizations (Adewusi et al., 2024; Awamleh et al., 2024). This lies in clarifying the nature of the work of the operational environment mechanisms, and the study provides theoretical development of the role of management in achieving mature visions based on big data, which constitute solutions to the complex interactions between technology and the human orientation in adopting sound strategies and developing strategic differences that improve work dynamics and improve the current study in the researched field (Adewusi et al., 2024; Del Vecchio et al., 2020; Jabbar et al., 2020; Mikalef et al., 2020; Tang & Liao, 2021). Furthermore, this study is informed by improving data into valuable information that helps administrative leaders benefit from business analytics in improving organizational decisions and improving work performance (Aljumah et al., 2021a; Ranjan & Foropon, 2021). Harnessing the best strategic practices that combine business analytics and data helps facilitate business matters without resorting to traditional observation and making inaccurate decisions that are not supported by huge historical or predictive details (Gupta et al., 2021). This study provided the necessary tools for administrative leaders to solve problems and facilitate organizational complexities supported by the digital age and transform them for the benefit of business decisions in the regulatory environment of business companies (Aljumah et al., 2021a; Ciampi et al., 2020; Koot et al., 2021; Ranjan & Foropon, 2021; Sarker, 2021; Troisi et al., 2020).

Although this study contributes to theoretical and practical enrichments, it is not without some limitations. First, the results cannot be generalized because the sample is limited to a specific geographical environment that does not reflect its impact on another environment unless the current results are compared to subsequent studies in the same researched field. Secondly, the use of big data may involve a bias toward data that matches the goals of the decision maker and ignoring other data, which threatens the reliability and accuracy of the results. In the end, targeting the current study on the results of decision-making may overlook new variables of organizational performance that respond to their impact on business analysis. Therefore, the current study calls for more future research to uncover other organizational solutions in the insanely renewed business world.

6. Conclusion

The study objective was to investigate the impact of the relationship between business analytics, big data, and decision-making insights in international organizations located in King Hussein Business Park in Jordan. The current study relied on advanced business analytics techniques that produce innovative activities through the use of data, which opens new opportunities for organizations to achieve strategic excellence that reaches a competitive advantage in the business workplace. The study results proved the existence of a positive relationship between business analytics and decision-making insights at ($p < 0.05$), which proved the mediating role of big data in improving the relationship between business analytics and decision-making insights at ($p < 0.01$).

This lies in clarifying the nature of the work of the operational environment mechanisms, and the study provides theoretical development of the role of management in achieving mature insights based on big data that constitute solutions to the complex interactions between technology and human orientation, facilitating the organizational

complexities supported by the digital age and transforming them for the benefit of commercial decisions in the regulatory environment of business companies. Thus, current studies contribute to the future by improving and facilitating the quality of life by visually understanding technology and strategy, which improves knowledge in practical and theoretical aspects that improve the field of business analytics and big data in achieving decision-making insights.

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Appendix A

Table A1
Respondent survey questionnaire

BA	Business Analytics	References
BA1	The organization seeks to obtain data which is most important to get an effective business analytics solution	(Chatterjee et al., 2024; Del Vecchio et al., 2020; Lee et al., 2020)
BA2	The organization uses statistical models and forecasting to provide accurate predictions of future events and the reasons for their occurrence	
BA3	The organization seeks to access data from outside the organization to get an effective business analytics solution	
BA4	The organization uses optimization and simulation to recommend one or more courses of action and show the likely outcome of each decision	
BA5	The organization seeks to use the right tool to get an effective business analytics solution	
BA6	The organization seeks to train on using the tools to get an effective business analytics solution	
BD	**Big Data**	
BD1	The organization uses a large database to direct the organization's resources	(Gupta et al., 2021; Iqbal et al., 2020)
BD2	The organization has technical and non-technical capabilities to achieve success in big data efforts	
BD3	The organization seeks to use appropriate strategies to build a workforce and retain the various skills needed for big data decision-making	
BD4	The organization uses effective protection systems to ensure the privacy and security of big data	
DMI	**decision-making insights**	
DMI1	The organization has the data for decision-making insights	(Abu-AlSondos, 2023; Troisi et al., 2020)
DMI2	The organization uses data-driven insights to create a new service/product	
DMI3	The organization relies on data-driven insights to make decisions	
DMI4	The organization is open to new insights that challenge current practice	
DMI5	The organization has insights to understand stakeholders more than competitors	
DMI6	The organization is more effective than competitors in responding quickly to change and making insights in real-time	

Appendix B

Table B1
Number of respondents to international organizations present in “the King Hussein Business Park” in Jordan

Company name	Administrative Staff
CISCO	41
Microsoft	55
Oracle	39
MBC	43
Samsung	44
Migrate	41
Aramex	54
Experia	47
Ericsson	48
Total	412

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