

Digital Transformation and Firm-Level Economic Performance: The Mediating Role of Business Intelligence Integration in Healthcare

Hala Mansour ALAYED

<https://orcid.org/0009-0004-2925-7448>

College of Business, Department of Business Administration
Amman Arab University, Jordan
h.alayed@aau.edu.jo

Fawwaz Tawfiq AWAMLEH

<https://orcid.org/0000-0002-3425-7379>

College of Business, Department of Business Administration
Amman Arab University, Jordan
f.awamleh@aau.edu.jo

Article's History

Received 5th of April, 2026; Revised 19th of May, 2026; Accepted 2nd of June, 2026; Available online: 30th of June, 2026. Published as research article in the Volume XXI, Summer, Issue 3(93), June, 2026.

Copyright© 2026 The Author(s). This article is distributed under the terms of the license [CC-BY 4.0.](https://creativecommons.org/licenses/by/4.0/), which permits any further distribution in any medium, provided the original work is properly cited.

Suggested Citation

Alayed, H. M., & Awamleh, F. T. (2026). Digital Transformation and Firm-Level Economic Performance: The Mediating Role of Business Intelligence Integration in Healthcare. *Journal of Applied, Economic Sciences*, Volume XXI, Summer, Issue 3(93), 935-950.
[https://doi.org/10.57017/jaes.v21.3\(93\).13](https://doi.org/10.57017/jaes.v21.3(93).13)

Abstract

This study analyzes the impact of digital transformation on firm-level economic performance and how business intelligence integration affects it in Jordan's healthcare industry. It is crucial to investigate this matter since modern organizations in the healthcare industry are adopting various digital technologies, which makes it necessary to find out their economic impact. Descriptive and analytical approaches to research have been used in this study, and a questionnaire survey of 389 managers and technical staff members from private hospitals and healthcare companies in Jordan has been conducted. To analyze relationships between the study variables, a structural equation modeling approach based on SmartPLS 4 has been utilized. According to the results obtained during the study, digital transformation has a statistically significant positive effect on firm-level economic performance. Furthermore, it was found that BI integration has a positive influence on economic performance and significantly mediates digital transformation impacts.

Overall, these results indicate that investments in digital technologies and integration of business intelligence systems can enhance economic performance through improved productivity, effective use of resources, and efficiency of operations. Therefore, this study adds to the field of healthcare economics and digital transformation, contributing to the understanding of digital economic impacts created in conjunction with business intelligence integration.

Keywords: digital transformation; firm-level economic performance; business intelligence integration; healthcare economics; Jordanian healthcare sector.

JEL Classification: M15; O32; D24; L25; I11.

Introduction

At present, there are many challenges for the healthcare industry emerging as a result of advancements in technology, growing demand from customers, stiff competition, and the constant need to achieve greater performance and service quality (Ayodeji et al., 2022). At present, it is not enough to offer high levels of medical services because organizations need to employ digital technologies that increase productivity and optimize the use of resources, as well as improve the economic performance of firms (Alghamdi & Al-Baity, 2022). In this regard, digital transformation becomes an integral tool for achieving innovation, operational efficiency, and decision-making using information (Abuhamra et al., 2026). Nevertheless, despite the significant investments in digital transformations, there are many healthcare organizations whose programs fail to yield their expected results due to inefficient implementation (Kitsios & Kapetaneas, 2022).

Thus, digital transformation could be regarded as one of the key organizational capabilities associated with enhanced productivity and economic performance (Omar et al., 2026; Sottie et al., 2026). The proper implementation of digital technologies leads to increased operational efficiency and optimization of resource utilization. At the same time, the majority of research works are dedicated to the impact of digital transformations on organizational outcomes without considering the way the benefits are achieved (Tetteh et al., 2025; Wang et al., 2023). Many organizations invest heavily in new technologies without successfully integrating them into managerial and operational processes, thereby limiting their potential contribution to firm performance (Haider et al., 2025).

One of the key mechanisms that may explain the economic impact of digital transformation is business intelligence integration. Business intelligence enables organizations to transform data from multiple sources into actionable insights that support strategic and operational decision-making. Effective BI integration facilitates forecasting, improves resource allocation efficiency, enhances operational performance, and supports productivity growth. However, despite its recognized benefits, the mediating role of business intelligence integration in linking digital transformation to firm-level economic performance remains underexplored. This gap is particularly evident in developing economies, including Jordan. Therefore, this study seeks to address this gap by examining the mediating role of business intelligence integration in the relationship between digital transformation and firm-level economic performance in the Jordanian healthcare sector. In doing so, the study also helps clarify how digital transformation initiatives at the organizational level can support broader economic modernization and digital transformation objectives within Jordan's healthcare system.

1. Research Background

Digital transformation is one of the most crucial organizational evolutions today, especially among industries marked by the quick evolution and adoption of technology (Tetteh et al., 2025). It involves the incorporation of digital technologies in organizational processes, management, communications, and strategy-making to make an organization more efficient and responsive to external changes (Kitsios & Kapetaneas, 2022). Digital transformation has come to be seen as indispensable for modern organizations that seek greater agility, automation, and informed decision-making based on available data (Abuhamra et al., 2026).

Digital transformation, for example, plays a role in increasing the efficiency and effectiveness of healthcare services due to the use of tools like cloud computing, artificial intelligence, and other technologies (Awamleh & Bustami, 2022). According to the resource-based view of the firm, technological capabilities can be used as strategic capabilities to ensure that organizations perform effectively (Yasmin et al., 2026). Critics of the resource-based view believe that digital transformation alone cannot lead to organizational success if not used in line with organizational culture and strategies (Shatila, 2026).

Economic performance at the firm level relates to an organization's capability of attaining superior economic performance by making efficient use of its resources, increasing efficiency, improving effectiveness, and creating sustainable value. It is connected with organizational capabilities like innovation, customer service, efficiency, and adaptability, which lead to performance improvement and growth over the long term (Adewusi et al., 2024; Sottie et al., 2026). The economic performance in the healthcare industry is characterized by efficient provision of health services, patient satisfaction, cost efficiency, effective use of resources, and rapid adaptation to external and technological changes (Iqbal & Sakib, 2024; Islam et al., 2023). Firms can achieve superior performance from an economic perspective by utilizing efficiency, innovation, and proper resource allocation. Nonetheless, due to technological advancement, the determinants of performance constantly change, and firms need to enhance their analytic and technological capabilities (Liu et al., 2026; Fontalvo et al., 2026).

The concept of BI integration relates to the integration of various analytical tools, databases, reporting mechanisms, and information into coherent solutions that provide opportunities for decision-making (Liu et al., 2026). Thus, BI integration allows for the transformation of large amounts of data into useful insights that enhance the accuracy of forecasting and help companies develop and implement effective strategies (de Castro, 2022). Integrated BI systems are widely used by healthcare organizations to monitor their performance and take actions to optimize operations and enhance managerial decisions (Hwang et al., 2026). As per the dynamic capabilities theory, the ability of organizations to integrate their knowledge and technological capabilities allows them to be more adaptable to external changes (Hasan et al., 2026). Nevertheless, scholars note that many organizations fail to derive any value from the use of BI systems, as they tend to emphasize the technical aspect without taking into account the human element (Almajali et al., 2025).

Hypothesis Development

It is becoming evident that digital transformation has become an increasingly important strategy for organizations, which allows them to increase efficiency, innovation, and adaptability to the changing environment (Omar et al., 2026). Organizational capabilities in implementing digital transformation processes lead to effective resource allocation, enhanced service delivery, and better economic performance at the firm level (Iqbal & Sakib, 2024). The resource-based view theory states that it is important for firms to gain technological capabilities that help create valuable resources and achieve high performance levels (Di Giuda et al., 2023).

In the healthcare sector, digital transformation helps facilitate better communication channels, faster service delivery, higher customer satisfaction, and better use of available resources, leading to improved firm-level economic performance (Kitsios & Kapetaneas, 2022). Researchers have pointed out the importance of organizations using digital technologies since they allow them to cope with environmental uncertainties efficiently.

Nonetheless, it is also argued that mere adoption of digital technology does not ensure improved performance levels for organizations due to the implementation obstacles and organizational change issues faced by them (Goraya et al., 2026). Others fail to integrate digital strategies into long-term organizational plans, limiting the economic benefits generated by digital transformation initiatives. Nevertheless, most contemporary studies support the view that digital transformation is essential for enhancing productivity, operational efficiency, and firm-level economic performance in a technologically evolving environment (Islam et al., 2023; Liu et al., 2026; Fontalvo et al., 2026). Therefore, the following hypothesis is proposed:

H1: Digital transformation positively affects firm-level economic performance

The digital transformation process is essential to provide the technological basis needed for effective BI integration within the organization (de Castro, 2022). Contemporary digital infrastructures contribute to the gathering, storage, processing, and exchange of information between the departments of an organization. Companies that have undergone digital transformations appear to be able to integrate analytical systems and increase their ability to gain access to the organization's knowledge bases (Tetteh et al., 2025). As the dynamic capabilities' theory claims, organizations possessing advanced technological infrastructure would be able to integrate their resources and analytical processes to make the decision-making process more efficient (Alraja et al., 2022).

Digital transformation in health care organizations allows for the integration of patients' records, databases, and reporting systems into one analytical system. Nonetheless, several scholars argue that digital transformation by itself does not ensure BI integration since technology and fragmentation within the organization may hinder it (Di Giuda et al., 2023). Insufficient competencies of employees and resistance to new technologies may negatively impact the success rate of BI integration as well. Some organizations are also facing difficulties in achieving high-quality data and the interconnectivity needed for BI integration (Chang, 2025). Even considering these disadvantages, one may say that the role of digital transformation in BI integration is rather positive (Abuhamra et al., 2026). Based on the discussed theories, the following hypothesis is proposed:

H2: Digital transformation positively affects BI integration

The importance of business intelligence (BI) integration in organizations is evident, as it enhances decision-making quality and supports improved organizational performance (Haider et al., 2025). Business intelligence integration enhances forecasting capabilities, performance monitoring, and evidence-based decision-making by transforming organizational data into strategic knowledge, thereby improving operational efficiency and economic performance (Awwad Al-Shammari et al., 2022; Ștefănescu et al., 2009). According to the knowledge-based view, organizations that are capable of creating and exploiting knowledge for strategic purposes are more likely to achieve superior productivity and firm-level economic performance (Awamleh et al., 2025). In healthcare facilities, BI integration facilitates efficient resource allocation, improves patient services, and supports timely managerial decision-making (Kitsios & Kapetaneas, 2022).

Previous studies indicate that organizations adopting analytical integration often achieve higher levels of efficiency, innovation, and operational effectiveness (Alraja et al., 2022). Some scholars also claim that BI integration is only beneficial to the company's performance to the extent that the results obtained from the analysis process are effectively applied. Over-reliance on analytics, especially data analytics, could constrain managers' creativity in tackling difficult

situations (Goraya et al., 2026). Another disadvantage associated with BI integration is the cost incurred in its implementation and effective management. Despite such limitations, the majority of academics view BI integration as an essential skill necessary for optimizing performance and effectiveness at the business level (Adiguzel et al., 2025). Based on these theoretical arguments, the following hypothesis is proposed:

H3: BI integration positively affects firm-level economic performance

First, it is important to state that not all companies might benefit from the relationship between digital transformation and economic performance because of the dependence of digital technologies' benefits on the transformation of technological assets to economic results (Omar et al., 2026). Integration of BI is considered to be an effective way to realize organizational performance due to the impact that digital transformation has on productivity, effectiveness, and economic performance. The role of digital transformation in organizations is the creation of new technological capabilities and connections; however, integration of BI provides actionable information for strategic decision-making and organizational performance (Iqbal & Sakib, 2024). According to Dynamic Capabilities Theory, higher organizational performance is associated with the combination of technological capabilities, knowledge management, and analytical capabilities of companies (Alraja et al., 2022). Therefore, digital transformation at healthcare institutions may lead to improved coordination, better use of resources, increased performance, and economic performance via BI integration (Shatila, 2026).

Despite the above consideration, there is another perspective on the topic because some theoretical approaches question the assumption that organizational performance is mediated via analytical integration (Adewusi et al., 2024). Some argue that BI should serve as a complementary organizational capability rather than a mediating one. Finally, despite having advanced digital technologies, companies might not benefit from BI integration and thus weaken the link between digital transformation and economic performance (Mehmood et al., 2025). However, contemporary literature increasingly suggests that business intelligence serves as a critical mechanism for translating digital transformation initiatives into improved organizational and economic performance (Chang, 2025). Therefore, organizations that successfully integrate digital transformation with BI capabilities are expected to achieve higher levels of productivity, efficiency, and firm-level economic performance (Wang et al., 2023; Sottie et al., 2026). Based on this reasoning, the following hypothesis is proposed:

H4: BI integration mediates the relationship between digital transformation and firm-level economic performance

2. Research Methodology

The current research followed a quantitative cross-sectional research design that helped explore the relationship between digital transformation, business intelligence (BI) integration, and firm-level economic performance in the healthcare industry. Quantitative research is appropriate, as it enables measuring relationships between research variables and testing hypotheses about such connections using different statistical methods. A structured survey method has been used to gather primary data from respondents—workers of healthcare companies. The chosen sector of the economy has been considered a reasonable background, as the healthcare sector is very information-intensive and has a rapid development of digital technology. At the same time, there is always a need for enhancing service quality and operational effectiveness of firms, which motivates healthcare providers to

use electronic systems, digital platforms, data-driven decisions, and other approaches aimed at boosting firm-level economic performance and effectiveness of activities performed by the firm. Thus, the healthcare industry is considered an adequate background for exploring relationships between digital transformation and firm-level economic performance due to BI integration. The unit of analysis has been chosen based on the nature of the phenomenon under study. The individual employee was selected as the unit of analysis in this case since he or she performs actions connected with digital transformation and BI integration.

The study population comprised employees at various private healthcare organizations and hospitals in Jordan, namely Jordan Hospital, Istiklal Hospital, Specialty Hospital, Arab Medical Center, and Al Khalidi Hospital. These organizations were selected for their heavy usage of digital transformation initiatives, electronic healthcare solutions, and business intelligence systems. It was expected that the respondents would be more competent in using technology and business intelligence solutions since they were directly responsible for utilizing them in organizational processes and performance-related activities. Stratified random sampling was used to select a proportionate sample from each stratum or category of employees based on organizational levels and job types. Four hundred thirty questionnaires were distributed, and 389 usable responses were obtained after excluding incomplete surveys. The sample size was sufficient for conducting SEM analyses (Simester et al., 2025).

A pilot study involving 30 employees from Jordanian healthcare organizations, who were not included in the final sample, was conducted to assess the questionnaire's clarity, logical consistency, and reliability. Based on participants' feedback, several items were revised and the question order was refined to improve comprehension and coherence. Reliability analysis confirmed acceptable internal consistency of the measurement scales, and the revised questionnaire was subsequently used for the main survey.

The measurement tool employed for data collection in this study comprised a structured self-administered questionnaire based on measurement scales used in previous research and adapted for use in the healthcare industry. This tool contained two parts. The first part consisted of demographic variables like gender, age, educational qualification, occupation, and tenure. The second part comprised questions measuring the three core constructs of this study, namely digital transformation, BI integration, and firm-level economic performance. The construct digital transformation was assessed by the measures like readiness for digitalization, process automation, usage of digital technology, and presence of digital culture in an organization (Omar et al., 2026; Tetteh et al., 2025). The construct BI integration was assessed by measures including data integration across systems, availability of tools for analysis, access to real-time information, and performance of decision support systems (de Castro, 2022; Di Giuda et al., 2023; Laakso, 2025).

The firm-level economic performance construct was measured by indicators such as operational efficiency, service quality improvement, innovation capability, cost reduction, and responsiveness to environmental changes (Sottie et al., 2026; Fontalvo et al., 2026). All the indicators used were assessed by employing a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). This measure is one of the most reliable tools used in research studies in the field of organizations and human behaviour. The content validity was assured by reviewing the items by academicians specializing in information systems and healthcare management disciplines.

Data collection involved an identified period of time during which an electronic version and a printed copy of the questionnaires were sent to healthcare organizations in Jordan. Both methods allowed more people to participate in the research and provided higher responses. Before participating in the survey, the respondents were told about the academic nature of the research, their voluntary involvement, and their ability to leave the study at any moment without negative outcomes. All ethical requirements were followed during the research, and confidentiality and anonymity of all the answers were secured. The personal data of respondents was not collected to avoid misuse. All collected information could be used only for academic purposes. The study was performed in line with the basic principles of scientific integrity that included honesty, transparency, and responsible data management. Several procedures were taken to overcome common method bias, and they included clear wording, randomization of the questions, and separation of the scales in the survey.

Data collected from the sample was analysed using the SEM technique via the SmartPLS 4 statistical package. It is appropriate for conducting complex predictive research based on multiple latent variables and the mediation effect. Data analysis was carried out in two stages. At the first stage, the measurement model was analysed to evaluate the internal consistency and discriminant validity of the variables. The internal consistency was evaluated by means of Cronbach's alpha and composite reliability statistics, and convergent validity was measured using the Average Variance Extracted criterion. The discriminant validity of each construct relative to other variables included in the model was estimated. At the next stage, the structural model was tested to reveal whether the predicted relationships between variables were confirmed. Path coefficients, t-values, and level of significance were estimated using the bootstrapping method. Moreover, the mediating effect of BI integration was tested by means of an analysis of an indirect effect. Model quality and predictive relevance were assessed by calculating R^2 , f^2 , Q^2 , and VIF statistics (Hair et al., 2025; Sarstedt et al., 2024).

3. Research Results

Demographic information about the sample used in the research is provided in Table 1.

Table 1: Demographic Characteristics of the Sample

Variable	Category	Frequency	Percentage
Gender	Male	212	54.5%
	Female	177	45.5%
Age	<30	96	24.7%
	30–39	148	38.0%
	40–49	102	26.2%
	≥50	43	11.1%
Experience	1–5 years	121	31.1%
	6–10 years	152	39.1%
	>10 years	116	29.8%
Job Role	Administrative	138	35.5%
	IT Staff	102	26.2%
	Medical Staff	149	38.3%

Source: compiled by the authors

Based on the results presented, there is almost an equal split between males (54.5%) and females (45.5%), making it possible for the sample to represent the population under investigation. It was found that the age group dominating the sample was 30-39 years old (38.0%), suggesting that the majority of the sample consists of the active professionals of the sector in question. As far as work experience is concerned, most participants had 6-10 years' worth of experience (39.1%), implying that those surveyed have adequate knowledge related to organization and technology necessary for researching the subject matter. Finally, as far as occupational roles are concerned, medical staff made up the majority of the sample (38.3%), with administrative employees and IT staff following with 35.5% and 26.2%, respectively.

Table 2: Descriptive Statistics of Study Variables

Construct	Mean	Std. Deviation
Digital Transformation (DT)	3.89	0.74
BI Integration (BII)	3.76	0.71
Firm-Level Economic Performance (FEP)	3.92	0.69

Source: compiled by the authors

The following Table 2 shows the descriptive statistics of the major variables of the study. From the results, it can be observed that firm-level economic performance attained the highest mean score (M = 3.92, SD = 0.69). This means that firm-level economic performance was relatively high among respondents' organizations. Digital transformation, which is another construct analyzed in the current research study, was found to attain a relatively high mean score (M = 3.89, SD = 0.74). It means that more organizations are embracing the concept of digital transformation through the implementation of various strategies. Likewise, BI integration attained a relatively high mean score (M = 3.76, SD = 0.71). It implies that more organizations are integrating analytics to facilitate decision-making. In summary, the standard deviations of all the constructs were relatively low, indicating a consistent perception among respondents.

Table 3: Reliability and Validity Analysis

Construct	Item	Loading	α	CR	AVE
DT	DT1	0.82	0.91	0.93	0.66
	DT2	0.85			
	DT3	0.80			
	DT4	0.83			
BII	BII1	0.84	0.89	0.92	0.64
	BII2	0.81			
	BII3	0.79			
	BII4	0.82			
FEP	FEP1	0.86	0.92	0.94	0.68
	FEP2	0.88			
	FEP3	0.84			
	FEP4	0.81			

Source: compiled by the authors

All measurement constructs have been found to be reliable and converged with the data at satisfactory levels, as shown in Table 3. Factor loadings of all measurement variables were in the range of 0.79 to 0.88, well above the threshold value of 0.70, thus reflecting reliable indicators. Alpha coefficients for all measures were within the range of 0.89 and 0.92, whereas Composite Reliability (CR) values varied from 0.92 to 0.94, implying an excellent internal consistency across the constructs. Additionally, Average Variance Extracted (AVE) values have been observed in the range of 0.64 to 0.68, greater than the threshold value of 0.50, thus establishing convergent validity (Hair et al., 2025).

Table 4: Discriminant Validity (Fornell–Larcker Criterion)

Construct	DT	BI	CA
DT	0.81		
BII	0.74	0.80	
FEP	0.69	0.72	0.82

Source: Compiled by the authors

The discriminant validity results through the use of the Fornell-Larcker criteria are shown in Table 4. As it can be observed from the analysis, it is evident that the square roots of the AVE of all constructs are greater than their corresponding correlations with other constructs. Specifically, the square root AVE of digital transformation is 0.81, which is more than its correlations with BI integration, which is 0.74, and firm-level economic performance, which is 0.69. Moreover, BI integration obtained a score of 0.80, which is higher than its correlation with firm-level economic performance, which is 0.72. Finally, the Firm-Level Economic Performance construct obtained a high score of 0.82 on the diagonal compared to its correlation scores (Hair et al., 2025).

Table 5. Structural Path Results (Hypotheses Testing)

Hypothesis	Path	β	t-value	p-value	Result
H1	DT → FEP	0.41	6.82	0.000	Supported
H2	DT → BII	0.68	12.15	0.000	Supported
H3	BII → FEP	0.36	5.94	0.000	Supported
H4	DT → BII → FEP	0.24	4.88	0.000	Supported

Source: compiled by the authors

The results from the structural path analysis are presented in Table 5. According to the findings, there is a significant positive association between digital transformation and firm-level economic performance ($\beta = 0.41$, $t = 6.82$, $p < 0.001$). Hence, organizational transformation towards digital technologies improves firm-level economic performance. Moreover, digital transformation and BI integration have a significant positive association ($\beta = 0.68$, $t = 12.15$, $p < 0.001$), which indicates the significant influence of digitalization on organizational abilities to conduct analyses and process information. In addition, BI integration had a positive impact on firm-level economic performance ($\beta = 0.36$, $t = 5.94$, $p < 0.001$). As a result, business intelligence practices were able to make an essential contribution to firm-level economic performance. Mediation analysis revealed the significant mediating role of BI integration between digital transformation and firm-level economic performance ($\beta = 0.24$, $t = 4.88$, $p < 0.001$). Therefore, digital transformation influences firm-level economic performance through enhancing BI integration (Sarstedt et al., 2024).

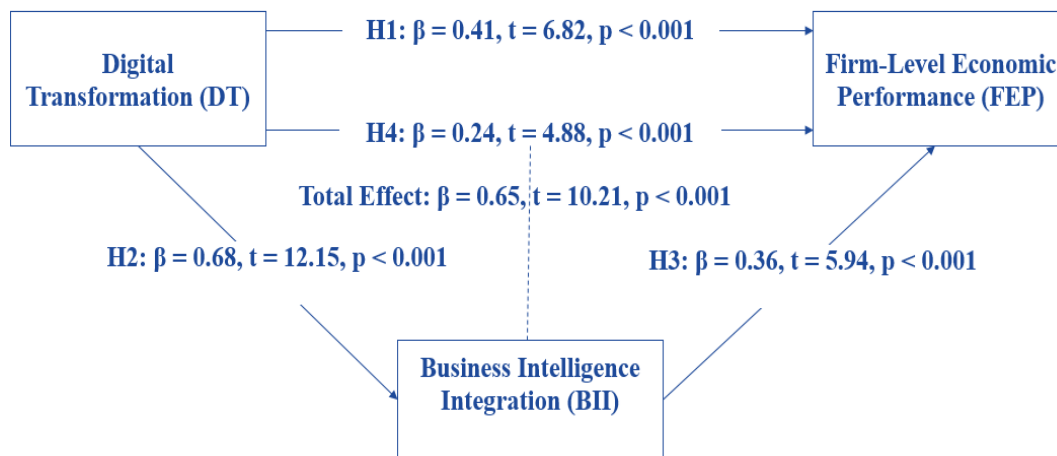
Table 6. Mediation Analysis Summary

Effect	β	t-value	p-value
Direct Effect (DT \rightarrow FEP)	0.41	6.82	0.000
Indirect Effect (DT \rightarrow BII \rightarrow FEP)	0.24	4.88	0.000
Total Effect	0.65	10.21	0.000

Source: compiled by the authors

Results from the mediation analysis of BI integration in the digital transformation and firm-level economic performance relationship are shown in Table 6 and Figure 1. The results indicate that there is a strong positive influence of digital transformation on firm-level economic performance ($\beta = 0.41, t = 6.82, p < 0.001$). This proves the significance of digitalization processes in enhancing firm-level economic performance. In addition, there is a strong indirect influence of digital transformation on firm-level economic performance through BI integration ($\beta = 0.24, t = 4.88, p < 0.001$). This confirms that BI integration partially mediates the relationship being investigated because BI integration changes digital assets into valuable assets (Sarstedt et al., 2024).

Figure 1: The Research Model of the Study



Source: Compiled by the authors

Table 7: Model Fit and Predictive Relevance

Indicator	Value
R ² (FEP)	0.620
R ² (BII)	0.460
Q ² (FEP)	0.410
SRMR	0.0610
VIF (max)	2.780

Source: Compiled by the authors

Statistics regarding model fit and predictive relevance for the structural model are presented in Table 7. The coefficient of determination (R²) for firm-level economic performance (0.62) shows a relatively high level of explanatory power because a substantial proportion of variance (62%) is explained. Similarly, R² of business intelligence integration (0.46) indicates a high level of explanatory power because digital transformation explains 46% of the variance of the construct. Predictive relevance is estimated by the q² statistic of 0.41, confirming the presence of predictive relevance. In other words, the model has sufficient predictive power

concerning firm-level economic performance. As far as the model fit is concerned, SRMR (0.061) is lower than 0.08, indicating a good fit. At last, as the highest value of the variance inflation factor (VIF) is 2.78, it is below 5, which rules out the risk of multicollinearity (Sarstedt et al., 2024).

4. Discussion

Based on the research findings, it can be said that the adoption of digital transformation brings about a major positive influence on firm-level economic performance within the healthcare sector. Companies in the healthcare sector that decide to use advanced digital technologies will have better chances of achieving high efficiency in operations, high quality of services, and successful adaptation to the changing business environment (de Castro, 2022; Islam et al., 2023; Fontalvo et al., 2026). This means that digital transformation is bound to create a positive impact on increasing productivity, improving resource utilization, and organizational flexibility, thus enhancing firm-level economic performance (Iqbal & Sakib, 2024; Liu et al., 2026).

Secondly, the results of the study show that digital transformation has a significant positive effect on BI integration. In other words, healthcare organizations with advanced digital capabilities will find it easier to integrate analytical systems and manage organizational data. Digital transformation will help healthcare organizations increase their connectivity, which will positively affect the effectiveness of BI systems (Kitsios & Kapetaneas, 2022; Tetteh et al., 2025). Moreover, BI integration will promote interdepartmental coordination as well as improve the performance of analytical systems in healthcare organizations (Gudala, 2022; Sun & Lim, 2026).

Third, the results of the study confirm that BI integration has a significant positive effect on firm-level economic performance. BI systems can help healthcare organizations to make better decisions, optimize resource allocation, and improve operational efficiency based on data-driven decision-making. It is worth noting that healthcare organizations capable of successfully implementing analytical systems will improve service quality and organizational performance (Awamleh et al., 2025; Laakso, 2025; Fontalvo et al., 2026). In this regard, healthcare organizations must focus on BI integration to implement innovations and organizational learning while improving productivity and economic performance (Almajali et al., 2025; Iqbal & Sakib, 2024).

Fourth, mediation analysis showed that BI integration significantly mediates the relationship between digital transformation and firm-level economic performance. In other words, BI integration acts as an intermediate step between digital transformation and firm-level economic performance, allowing for the successful integration of business intelligence systems (de Castro, 2022; Iqbal & Sakib, 2024; Sottie et al., 2026). In summary, healthcare organizations will achieve higher levels of firm-level economic performance if digital transformation programs are mediated by BI integration (Chang, 2025; Hwang et al., 2026).

Conclusion

The goal of this paper was to explore the role of digital transformation as well as its connection with firm-level economic performance, with special emphasis on the mediating role played by BI integration in the healthcare sector of Jordan. Thus, this research examines whether digital transformation is an effective way of improving firm-level economic performance and how BI integration works as the mediating factor in this relationship.

Based on the data obtained from the sample, the research shows that digital transformation has a highly positive influence on firm-level economic performance. Furthermore, the results also indicate that BI integration has a highly positive influence on organizational performance. It has been concluded that BI integration plays a partial mediating role in the relationship between digital transformation and firm-level economic performance.

From an operational perspective, it appears necessary to conclude that it is important for private healthcare facilities to take both matters into consideration. Hence, private healthcare facilities will have to engage in numerous innovations in terms of technology adoption while making sure that they are capable of having sufficient levels of BI to leverage digital transformation opportunities. Such measures may lead to higher productivity and better economic performance.

The main drawback of the presented research concerns the cross-sectional nature of the study and its concentration on healthcare facilities located in Jordan. To increase the effectiveness of the model, it appears necessary to conduct a longitudinal analysis and use it within the context of different industries and countries. Future research may explore the effects of digital transformation on productivity and operational performance.

Credit Authorship Contribution Statement

Alayed, H. M. contributed to the conceptualization of the study, research design, data collection, and preparation of the manuscript draft. Awamleh, F. T. contributed to the methodological design, formal data analysis, interpretation of the empirical results, supervision of the research process, and critical revision of the manuscript. Both authors participated in the development of the theoretical framework, reviewed and approved the final version of the manuscript.

Acknowledgments/Funding

The authors gratefully acknowledge the financial support provided by Amman Arab University, Jordan, and appreciate the cooperation of the participating healthcare organizations in this study.

Conflict of Interest Statement

The authors declare that they have no conflict of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Ethical Approval Statement

This study was conducted in accordance with applicable ethical standards. Informed consent was obtained from all participants before their inclusion in the study. Participation was voluntary, and all responses were treated confidentially and anonymously.

References

- Abuhamra, A., Chin, P. N., Ganesan, Y., & Amayreh, M. (2026). Business intelligence and digital transformations in strategic planning and entrepreneurship. *Management Decision*, 1–15. <https://doi.org/10.1108/MD-04-2025-1108>
- Adewusi, A. O., Okoli, U. I., Adaga, E., Olorunsogo, T., Asuzu, O. F., & Daraojimba, D. O. (2024). Business intelligence in the era of big data: A review of analytical tools and competitive advantage. *Computer Science & IT Research Journal*, 5(2), 415–431. <https://doi.org/10.51594/csitrj.v5i2.791>
- Adiguzel, Z., Sonmez Cakir, F., & Özbay, F. (2025). Big data analytics capability and sustainability in company innovation. *International Journal of Innovation Science*. <https://doi.org/10.1108/IJIS-08-2024-0231>

- Alghamdi, N. A., & Al-Baity, H. H. (2022). Augmented analytics driven by AI: A digital transformation beyond business intelligence. *Sensors*, 22(20), 8071. <https://doi.org/10.3390/s22208071>
- Almajali, W. I., Awamleh, F. T., Alarabiat, Y. A., & Tawalbeh, M. (2025). Business Intelligence Systems and Organization Performance the Role of Competitive Advantage as a Mediator Variable. *Economics-Innovative and Economics Research Journal*, 13(2), 333–349. <https://doi.org/10.2478/eoik-2025-0042>
- Alraja, M. N., Imran, R., Khashab, B. M., & Shah, M. (2022). Technological Innovation, Sustainable Green Practices and SMEs Sustainable Performance in Times of Crisis (COVID-19 pandemic). *Information Systems Frontiers*, 24(4), 1081–1105. <https://doi.org/10.1007/s10796-022-10250-z>
- Awamleh, F. T., & Bustami, A. N. (2022). Examine the Mediating Role of the Information Technology Capabilities on the Relationship Between Artificial Intelligence and Competitive Advantage During the COVID-19 Pandemic. *Sage Open*, 12(3). <https://doi.org/10.1177/21582440221119478>
- Awamleh, F. T., Shwawreh, S., Al-Kharabsheh, S. A. I., & Alzghoul, A. (2025). The integration of renewable energy adoption in sustainability practices for sustainable competitive advantage in Jordanian SMEs. *Challenges Sustainability*, 13(1), 135–145. <https://doi.org/https://doi.org/10.56578/cis130110>
- Awwad Al-Shammari, A. S., Alshammrei, S., Nawaz, N., & Tayyab, M. (2022). Green human resource management and sustainable performance with the mediating role of green innovation: A perspective of new technological era. *Frontiers in Environmental Science*, 10, 901235. <https://doi.org/10.3389/fenvs.2022.901235>
- Ayodeji, D. C., Oladimeji, O., Ajayi, J. O., Akindemowo, A. O., Eboseremen, B. O., Obuse, E., Ogedengbe, A. O., & Erigha, E. D. (2022). Operationalizing analytics to improve strategic planning: A business intelligence case study in digital finance. *Journal of Frontiers in Multidisciplinary Research*, 3(1), 567–578. <https://doi.org/10.54660/JFMR.2022.3.1.567-578>
- Chang, Y.-W. (2025). Analyzing the Impact of ERP and BI Integration on Business Performance: The Technology-Organization-Environment Framework and Balanced Scorecard Perspective. *Journal of Global Information Management*, 33(1), 1–25. <https://doi.org/10.4018/JGIM.389254>
- de Castro, J. P. A. (2022). *Digital Transformation: Bi Tools Integration with CRM and Sales Data* [Master's Thesis, Universidade de Aveiro (Portugal)]. <https://doi.org/10.4018/979-8-3693-2165-2.ch010>
- Di Giuda, G. M., Accardo, D., Gasbarri, P., Meschini, S., Tagliabue, L. C., & Scomparin, L. (2023). BIM-GIS and BI integration for facility and occupancy management of university assets: The UniTo pilot case. *Proceedings e Report*, 419–430. <https://dx.doi.org/10.36253/979-12-215-0289-3.41>
- Fontalvo, H. R., de la Puente, M., Torres, J., Guzmán, H., & Navarro, D. (2026). Environmental Strategy and Economic Performance: A Longitudinal Analysis of Sustainable Business Practices in Colombian Small Firms. *Journal of Entrepreneurship and Innovation in Emerging Economies*, 23939575261446645. <https://doi.org/10.1177/23939575261446645>
- Goraya, M. A. S., Yaqub, M. Z., Khan, M. A., Akram, M. S., & Alofaysan, H. (2026). Transforming performance: How agility, response, resilience and support shape success in digital strategies. *Information Technology & People*, 39(1), 325–353. <https://doi.org/10.1108/ITP-05-2024-0592>
- Gudala, M. (2022). Post-Merger ERP and BI Initiatives Integration Strategies and Frameworks for Success. *Journal of Artificial Intelligence Machine Learning & Data Science*, 1(1), 1230–1236. <https://doi.org/10.51219/JAIMLD/manoj-gudala/284>

- Haider, H. A., Naseer, A., Tanveer, M., Imran, M., Siddique, F., & Razaq, N. (2025). Integrating Artificial Intelligence into Strategic Decision-Making: Implications for Organizational Agility and Innovation. *Advance Journal of Econometrics and Finance*, 3(1), 135–140. <https://doi.org/10.63075/0cvckv13>
- Hair, J. F., Babin, B. J., Ringle, C. M., Sarstedt, M., & Becker, J.-M. (2025). Covariance-based structural equation modeling (CB-SEM): A SmartPLS 4 software tutorial. *Journal of Marketing Analytics*, 13(3), 709–724. <https://doi.org/10.1057/s41270-025-00414-6>
- Hasan, M. A., Mazumder, M. T. R., Motari, M. C., Shourov, M. S. H., & Sarkar, M. (2026). AI and Business Intelligence Integration for Improved Efficiency and Reporting Accuracy in Small US Financial Institutions. *Journal of Fintech, Business, and Development*, 3(1), 1–25. <https://economicjournals.org/index.php/JFBD/article/view/68>
- Hwang, B. N., Jitanugoon, S., & Puntha, P. (2026). AI integration in service delivery: Enhancing business and sustainability performance amid challenges. *Journal of Services Marketing*, 40(2), 263–281. <https://doi.org/10.1108/JSM-10-2024-0511>
- Iqbal, M., & Sakib, M. (2024). Integrating cloud computing, big data, and business analytics to determination digital transformation and competitive advantage in modern enterprises. *Journal of Primeasia*, 5(1), 1–8. <https://doi.org/10.25163/primeasia.5110380>
- Islam, S., Hossain, E., Rahman, M. S., Rahman, M. M., Khan, S. I., & Ashik, A. A. M. (2023). Digital transformation in SMEs: Unlocking competitive advantage through business intelligence and data analytics adoption. *Journal of Business and Management Studies*, 5(6), 177–186. <https://doi.org/10.32996/jbms.2023.5.6.14>
- Kitsios, F., & Kapetaneas, N. (2022). Digital transformation in healthcare 4.0: Critical factors for business intelligence systems. *Information*, 13(5), 247. <https://doi.org/10.3390/info13050247>
- Laakso, C. (2025). *Power BI integration for social services in Päijät-Häme County*. <https://www.theseus.fi/handle/10024/893331>
- Liu, D. Y., Zhang, J. Z., Sun, J. J., & Dai, B. (2026). AI Capability, Digital Agility, and Strategic Innovation: The Moderating Role of Government Intervention and Competitive Intensity. *Thunderbird International Business Review*, tie.70136. <https://doi.org/10.1002/tie.70136>
- Mehmood, K., Jabeen, F., Rashid, M., Alshibani, S. M., Lanteri, A., & Santoro, G. (2025). Unraveling the transformation: The three-wave time-lagged study on big data analytics, green innovation and their impact on economic and environmental performance in manufacturing SMEs. *European Journal of Innovation Management*, 28(6), 2189–2216. <https://doi.org/10.1108/EJIM-10-2023-0903>
- Omar, K., Zraqou, J., Alkhadour, W., & Gómez, J. M. (2026). The Role of Business Intelligence in Digital Transformation and Competitive Advantage. In *Strategic AI Integration in Business Intelligence* (pp. 229–250). IGI Global Scientific Publishing. <https://doi.org/10.4018/979-8-3373-6801-6.ch010>
- Sarstedt, M., Richter, N. F., Hauff, S., & Ringle, C. M. (2024). Combined importance–performance map analysis (cIPMA) in partial least squares structural equation modeling (PLS–SEM): A SmartPLS 4 tutorial. *Journal of Marketing Analytics*, 12(4), 746–760. <https://doi.org/10.1057/s41270-024-00325-y>
- Sottie, O. K., Meuwissen, M. P., Zepeda, A. C., Gavai, A. K., & Koppenberg, M. (2026). Impact of high-techs on firm-level economic performance and engineering resilience of fruit and vegetable food systems: A systematic review. *Agricultural Systems*, 235, 104687. <https://doi.org/10.1016/j.agsy.2026.104687>

- Shatila, K. (2026). From artificial intelligence strategy to strategic resilience: The roles of digital leadership, AI governance, and organizational agility. *Strategy & Leadership*, 1–30. <https://doi.org/10.1108/SL-01-2026-0020>
- Simester, D., Timoshenko, A., & Zoumpoulis, S. I. (2025). A Sample Size Calculation for Training and Certifying Targeting Policies. *Management Science*, 71(11), 9503–9522. <https://doi.org/10.1287/mnsc.2022.02947>
- Sun, J., & Lim, W. (2026). Exploring nonlinear impacts of big data analytics capabilities on ESG integration and sustainable business model innovation in Chinese manufacturing. *Journal of Asia Business Studies*, 20(1), 178–201. <https://doi.org/10.1108/JABS-08-2025-0468>
- Ștefănescu A., Ștefănescu L., & Ciora I. L. (2009). Intelligent tools and techniques for modern management. *Chinese Business Review*, 8(2): 46-55. <https://doi.org/10.17265/1537-1506/2009.02.007>
- Tetteh, F. K., Gyamerah, K. K., Nyamekye, B., Atiki, G., & Ashia, R. (2025). Digital transformation and business model innovation: The relevance of strategic orientations under varying conditions of competitive intensity. *Journal of Manufacturing Technology Management*, 36(3), 621–650. <https://doi.org/10.1108/JMTM-07-2024-0394>
- Wang, Z., Lin, S., Chen, Y., Lyulyov, O., & Pimonenko, T. (2023). Digitalization effect on business performance: Role of business model innovation. *Sustainability*, 15(11), 9020. <https://doi.org/10.3390/su15119020>
- Yasmin, A. S., Nurbaiti, N., & Harahap, M. I. (2026). Analysis of digital leadership, organizational agility, and employee readiness on the effectiveness of quick service business transformation. *Journal of Applied Business Administration*, 10(1), 224–238. <https://doi.org/10.30871/jaba.11315>