



International Journal of Economics and Business Research

ISSN online: 1756-9869 - ISSN print: 1756-9850

<https://www.inderscience.com/ijebr>

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DOI: [10.1504/IJEBR.2024.10066986](https://doi.org/10.1504/IJEBR.2024.10066986)

Article History:

Received:	23 February 2024
Last revised:	09 June 2024
Accepted:	28 June 2024
Published online:	04 November 2024

The impact of digital transformation on the effectiveness of electronic financial systems

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Abstract: Digital transformation's impact on Jordanian public shareholding industrial enterprises' electronic financial systems was examined in this detailed study. A thorough research methodology revealed that these firms have implemented digital transformation across various dimensions. This research's empirical foundation is strengthened by the statistically significant association between digital transformation throughout its dimensions and electronic financial system effectiveness. Using these empirical findings, the report recommends that Jordanian public shareholding industrial enterprises prioritise and strengthen digital transformation activities, notably in electronic finance systems. Many studies support this statement, arguing that digital transformation is essential for these firms to streamline operational processes and improve organisational efficiency in the changing digital context. Public joint-stock industrial businesses in Jordan must strategically identify goals and promote digital transformation, notably in electronic financial systems, according to the report. The experimental study uses a broad corpus of evidence to support its suggestions. In the dynamic digital context, digital transformation is strategic to improve operational processes and organisational effectiveness.

Keywords: digital transformation; effectiveness of electronic financial systems; Jordanian public shareholding industrial companies; Jordan.

Reference to this paper should be made as follows: Alomari, K., Salah, A. and Alshweesh, R. (2024) 'The impact of digital transformation on the effectiveness of electronic financial systems', *Int. J. Economics and Business Research*, Vol. 28, No. 6, pp.21–41.

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1 Introduction

The electronic financial information system holds paramount importance within business organisations, as it facilitates the provision of essential financial information for decision-making. This system serves as a cornerstone in shaping the organisation's future vision, enabling the alignment of available resources and capabilities with operational activities to achieve optimal resource utilisation. The rapid advancement of technology has led to a substantial increase in the volume of information and the complexity of processing procedures (Anggraini et al., 2024). Consequently, organisations have been compelled to adopt contemporary technological programs to make progress and enhance their operational performance (Shehadeh, 2022). The onset of the Fourth Industrial Revolution, with a strong emphasis on electronic devices and the development of communication networks (such as the Internet), has further cemented technology as a fundamental element that has facilitated the emergence of digital transformation (Khan, 2024).

This study aims to assess the impact of digital transformation on the effectiveness of electronic financial systems within Jordanian public shareholding industrial companies. By identifying key areas such as digital operations, business models, the impact on individuals, and digital customer activities, the research provides actionable insights for companies looking to optimise their operational processes. The practical application of these results includes enhanced decision-making capabilities, improved resource utilisation, and streamlined business operations, ultimately contributing to greater organisational efficiency and competitiveness. The added value of this research lies in its ability to guide companies through the digital transformation process, ensuring they can leverage technological advancements to achieve significant improvements in their financial systems' effectiveness. Despite the increasing importance of digital transformation, there remains a lack of comprehensive studies focusing on its specific impact on electronic financial systems within the industrial sector in Jordan. This research fills this gap by providing empirical evidence on the relationship between digital transformation and the effectiveness of electronic financial systems, offering strategic recommendations for enhancing these systems within public shareholding industrial companies.

This study is unique in its comprehensive approach to evaluating digital transformation across multiple dimensions and its direct correlation with the effectiveness of electronic financial systems. The research employs a descriptive-analytical methodology, analysing data collected from 365 employees across various administrative levels in Jordanian public shareholding industrial companies. This robust methodology ensures the reliability and validity of the findings, making them highly relevant for both academic and practical applications. The originality of this research lies in its detailed examination of digital transformation's impact on electronic financial systems, an area critical to the operational success of industrial companies. The relevance of this topic extends to public administration and national economy and industry, as digital

transformation is a key driver of efficiency and innovation in these fields. By focusing on the synergies between digital transformation and electronic financial systems, the study offers valuable insights that can be applied to enhance the strategic and operational capabilities of public shareholding companies, thereby contributing to national economic growth.

The integration of technical and technological aspects within organisations, particularly in financial and non-financial information systems, has generated vast amounts of data. The utility of information has increased significantly due to significant advancements in its transfer and storage mechanisms. As a result, organisational productivity has improved, and there has been a surge in innovative thinking within the information systems employed by these organisations (Tiutiunyk et al., 2021). According to Albukhitan (2020), digital transformation is widely recognised as imperative for organisations across various sectors, including both governmental and private entities. This recognition primarily stems from its capacity to enhance and refine the services offered and streamline their accessibility for the intended beneficiaries. According to Muehlburger et al. (2019), digital transformation offers substantial benefits in terms of reducing effort and costs, enhancing operational efficiency, and facilitating goal attainment through improved work organisation.

This study came to assess the effectiveness of financial systems implemented in Jordanian public shareholding industrial companies. Specifically, the study aims to evaluate the accuracy, speed, timeliness, recovery capability, flexibility, simplicity, control, and cost-effectiveness of these systems. Additionally, the study seeks to examine the potential impact of digital transformation on the performance of electronic financial systems, taking into account various dimensions such as digital operations, business models, the influence on individuals, and digital customer activities. Given the increasing demand for electronic services in today's business landscape (Eaint, 2024), which requires the comprehensive digitisation of all provided services, it is essential for the accounting field to align with the technological advancements in the business world. This involves integrating state-of-the-art technology into all operational processes.

The present study seeks to assess the effectiveness of electronic financial systems in the context of Jordanian public shareholding industrial companies, offer insights into the process of digital transformation within public shareholding industrial companies in Jordan, in addition to analyse the impact of digital transformation on the effectiveness of electronic financial systems in Jordanian public shareholding industrial companies, with a specific focus on various dimensions, including digital operations, business models, the impact on individuals, and digital customer activities. This Introduction outlines the purpose, uniqueness, and relevance of the research. The subsequent sections review the literature on digital transformation and electronic financial systems, detail the research methodology, present the findings, and discuss their implications. The final section offers conclusions and recommendations for future research and practice.

2 Digital transformation

The concept of digital transformation, as defined by Liere-Netheler et al. (2018), encompasses the utilisation of contemporary digital technologies and tools, including social networking sites, mobile phones, analytics, and embedded devices, with the aim of

enhancing business operations. This includes improving customer service, optimising operational processes, and fostering the development of novel business models. According to Rashwan and Qasim (2020), the concept of digital transformation entails the pursuit of an organisation's strategic objectives through the cultivation of inventive and adaptable business and operational frameworks (Meena et al., 2024). This is achieved through the allocation of resources towards technological investments, the cultivation of talent, the restructuring of operations, and the effective management of change (Adama et al., 2024). The ultimate goal is to generate novel value and enhance experiences for customers, employees, and other stakeholders. According to a study conducted by Vial (2021), numerous scholarly investigations concur that the notion of digital transformation encompasses the utilisation of contemporary digital technologies and mediums, including social networking platforms, mobile devices, analytics, and embedded systems, with the aim of enhancing business operations such as customer service, operational efficiency, and the establishment of novel business frameworks.

3 Electronic financial systems

According to Turner et al. (2017), the term 'financial information systems' refers to computerised systems developed and implemented by experts in the field. These systems use computers to generate financial information with all the essential qualitative attributes required for effective decision-making. According to Bouaziz (2021), an electronic financial information system is a cohesive framework implemented within an organisation that utilises existing resources and components to transform data into both financial and non-financial information.

This information is subsequently presented to users to facilitate their decision-making processes. According to Shnaishel (2022), electronic accounting information systems encompass a collection of interconnected components, including structures, software, data, and physical elements. These components collaborate and rely on each other to consistently record and process data, generate essential information, and deliver it to decision-makers in a timely and suitable fashion. The electronic financial system holds significant importance within organisations due to its capacity to streamline and facilitate decision-making processes, as well as its strong integration with administrative procedures (Awosejo et al., 2013).

The presence of a proficient electronic financial information system contributes to the success of an organisation and plays a crucial role in sustaining its growth and enhancing performance (Prakoso et al., 2024). This system facilitates effective communication, generates relevant and timely information sources, and enables more informed decision-making. The presence of a dependable electronic financial information system confers a significant strategic benefit, as it facilitates seamless and expeditious access to pertinent information for users and affiliated stakeholders, thereby enhancing all facets of organisational operations (Schroeder et al., 2019).

A multitude of studies have explored the impact of digital transformation on enhancing overall performance, particularly in terms of service delivery and financial efficiency. A study conducted by Al-Masdar and Nasrallah (2020) aimed to identify the primary benefits associated with promoting digital transformation within institutions, as well as the role that digital transformation plays in enhancing the performance of government services. The study revealed two significant findings: firstly, government

institutions in Palestine exhibit a limited level of digital transformation; secondly, the application of digitisation and digital transformation in the delivery of government services has a substantial and statistically significant impact on the effectiveness and quality of services provided by diverse Palestinian government institutions.

In their study, Tiutiunyk et al. (2021) investigated the impact of digital transformation on the attainment of competitive advantages within the economy. Their objective was to identify the advantages and risks associated with digital transformation in relation to macroeconomic stability. The study yielded several findings, with two key ones standing out. Firstly, a statistically significant correlation was observed between the degree of macroeconomic stability and the digital transformation index in the majority of European Union nations. Secondly, it is imperative to take into account the level of economic digitisation when formulating a comprehensive framework aimed at enhancing a country's macroeconomic stability.

A study conducted by Guo and Xu (2021) aimed to identify the advantages and disadvantages associated with digital transformation. Furthermore, the researchers aimed to empirically examine the effects of digital transformation on both the operational and financial performance of companies. A total of 2,254 manufacturing companies in China were surveyed between 2010 and 2020, yielding the collected data. The study yielded several findings, among which the most significant are: The study examines the extent to which digital transformation is implemented in a selected group of industrial public shareholding companies in China. It finds that the adoption of digital transformation positively affects the efficiency and effectiveness of process-oriented operations. Furthermore, the relationship between digital transformation and financial performance follows a U-shaped pattern, indicating that there is an optimal level of digital transformation that maximises profit-based outcomes. Additionally, the study reveals that the impact of digital transformation on operational performance is more enduring compared to its effect on financial performance.

The objective of Kraus et al. (2022) was to create a comprehensive framework illustrating the various stages involved in the process of digital transformation within the realm of management and business administration. The present study examines research endeavours pertaining to digital transformation within the domains of management sciences and business administration, while also highlighting the potential drawbacks associated with such transformational processes. The research findings indicate that, despite the extensive advocacy for digital transformation initiatives, it is crucial to thoroughly investigate the ethical aspects as well as the cultural and social implications of such transformations.

In their study, Khatib and Alshawabkeh (2022) sought to examine the influence of digital transformation as an independent variable, specifically its dimensions including digital operations, business model, impact on individuals, and customer experience, on the concept of strategic sovereignty. The research findings indicate that digital transformation has a significant and favourable influence on strategic sovereignty. Additionally, digital human resource management also has a positive impact on strategic sovereignty. Moreover, it was observed that digital human resource management acts as an intermediary and partial factor in the association between digital transformation and strategic sovereignty.

A study conducted by Do et al. (2022) sought to evaluate the influence of digital transformation on the operational effectiveness of variously sized commercial banks in

Vietnam. Additionally, the researchers aimed to quantify the political implications of digital transformation in enhancing banking performance. The research findings encompass several key outcomes, notably including the identification of a substantial degree of digital transformation within Vietnamese commercial banks. Furthermore, it was observed that such digital transformation exerts a favourable influence on the overall performance of these banks. Additionally, a positive correlation was established between the magnitude of digital transformation and the size of the banks, indicating that larger banks experience a more pronounced positive effect on their performance as a result of digital transformation.

The study conducted by Calderon-Monge and Ribeiro-Soriano (2023) offers a comprehensive overview of digitalisation within firms through a systematic literature review (SLR) focused on management, marketing, and finance and accounting. Analysing 119 articles from the Web of Science (WOS) published between 2018 and April 2022, the research identifies key trends, including the impact of digital technologies on consumer behaviour analysis, the role of digitalisation in green innovation, and the application of blockchain in financial services. The study contributes to the field by establishing connections between digitalisation and established perspectives in management, marketing, finance, and accounting. It aims to simplify the complexity of digitalisation, providing structure and clarity to the field while offering a comprehensive and up-to-date global perspective on the current state of knowledge in digitalisation (Calderon-Monge and Ribeiro-Soriano, 2023).

Recognising the inevitable nature of this paradigm shift and cultivating a collaborative mindset makes a significant contribution to advancing various sectors. This is evidenced by the improved adaptability and understanding of organisations, as well as their increased ability to anticipate and plan for the future in response to the global shift towards digital transformation. To successfully achieve these objectives, it is crucial to have a range of dimensions available to facilitate the digital transformation process. These dimensions have been identified by Khatib and Alshawabke (2022), Shehadeh (2022) and Tratkowska (2019).

3.1 Digital operations

The emergence of digital technology has ushered in substantial transformations in various operational domains. This encompasses a broad spectrum of electronic and automated systems, in conjunction with the related technical resources used for processing, generating, and storing data. Furthermore, digital technology facilitates the efficient utilisation of available technological resources.

H01 There is no statistically significant effect, at a significance level of $\alpha \leq 0.05$, of digital operations on the effectiveness of electronic financial systems in Jordanian public shareholding industrial companies.

3.2 Business model (new digital business)

Given the intense competition among business organisations and the wide array of services and products available, many organisations have adapted their business models to provide value in unconventional ways. This involves aligning their business models

with technological advancements. Organisations that have a strategy of digital maturity can create innovative, sophisticated, and competitive business models.

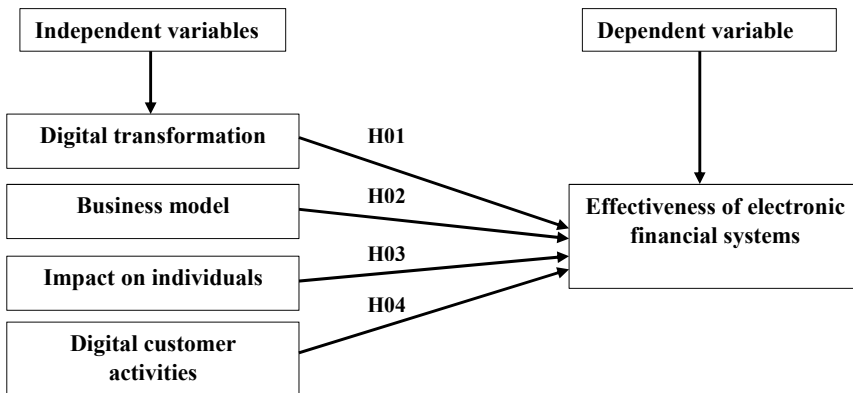
H02 There is no statistically significant effect, at a significance level of $\alpha \leq 0.05$, of the business model on the effectiveness of electronic financial systems in Jordanian public shareholding industrial companies.

3.3 The impact on individuals

The advent of the digital revolution has significantly transformed organisational operations and the demands of both employees and customers. Consequently, there is a heightened demand for digital competencies and talents since digital technology has become an essential and paramount component of organisational functioning. For the successful implementation of digital transformation, it is imperative that individuals and employees within the organisation actively embrace and facilitate this process. Effective leadership exhibited by the organisation as a whole and its various departments can accomplish this.

H03 There is no statistically significant effect, at a significance level of $\alpha \leq 0.05$, of individuals on the effectiveness of electronic financial systems in Jordanian industrial public shareholding companies.

Figure 1 Presents the research model



3.4 Digital customer activities (digitisation of customers and their relationships)

The process of digitising customers and their relationships, which is of significant interest in academic research and business practice, has implications for how customers search for and evaluate products and services. As a result, organisations are compelled to adapt their customer engagement strategies and continuously strive to enhance customer value by leveraging cutting-edge technological capabilities and establishing a digital value chain for customer service.

H04 There is no statistically significant effect, at a significance level of $\alpha \leq 0.05$, of digital customer activities on the effectiveness of electronic financial systems in Jordanian industrial public shareholding companies.

4 Data and methods

The researcher utilised a descriptive-analytical methodology, which was well-suited for achieving the study's objectives and goals (Kalaian et al., 2019). In this study, digital transformation variables were designated as independent variables, while the effectiveness of electronic financial systems served as the dependent variable. Subsequently, the responses of participants from Jordanian public shareholding industrial companies were analysed to test the hypotheses.

4.1 Study sample and population

The study sample encompassed all employees working in Jordanian public shareholding industrial companies across various administrative levels, including senior, middle, and supervisory positions. Participant selection was based on the information provided in the 2022 annual report of the Amman Stock Exchange, which indicated a total of 970 employees. To ensure representativeness, the researcher employed a proportional stratified sampling technique, resulting in a sample size of 380 employees. The study instrument was electronically distributed using the Google Drive platform, and a total of 365 valid questionnaires were collected and used for statistical analysis, constituting the actual sample for the study. To provide an accurate representation of the study sample's characteristics, frequencies and percentages were employed to analyse demographic and functional data, including educational qualifications, years of experience, and job levels as presented in Table 1.

Table 1 Respondents profile

<i>Variables</i>	<i>Categories</i>	<i>Rep.</i>	<i>%</i>
Education	Diploma – community college or lower	31	8.49%
	Bachelor's degree	221	60.55%
	Master's degree	89	24.38%
	Doctorate (PhD)	24	6.58%
	<i>Total</i>	<i>365</i>	<i>100.00%</i>
Age	Less than 30 years	14	3.84%
	30 – less than 40 years	125	34.25%
	40 – less than 50 years	200	54.79%
	50 years and above	26	7.12%
	<i>Total</i>	<i>365</i>	<i>100.00%</i>

Table 1 Respondents profile (continued)

<i>Variables</i>	<i>Categories</i>	<i>Rep.</i>	<i>%</i>
Experience	Less than 5 years	18	4.93%
	5 – less than 10 years	35	9.59%
	10 – less than 15 years	71	19.45%
	15 years and above	241	66.03%
	<i>Total</i>	<i>365</i>	<i>100.00%</i>
Job title	Director of directorate	21	5.75%
	Assistant director of directorate	54	14.79%
	Department head/supervisor	290	79.45%
	<i>Total</i>	<i>365</i>	<i>100.00%</i>

4.2 Validity of the study tool

The study tool provides a comprehensive overview of the paragraphs related to each study variable, as described by Zikmund and Babin (2010). Special attention has been given to accurately representing each study variable using appropriate sentences and phrases. The observed strength of the phenomenon under investigation is determined to be low, and its statistical significance is confirmed at the conventional significance level of ($\alpha \leq 0.05$).

Table 2 The validity of the construction for the variables and dimensions of the study

<i>Dimension</i>	<i>R-value</i>	<i>Sig. level</i>
<i>Independent variable (digital transformation)</i>		
1st dimension: digital operations	0.885	0.000**
2nd dimension: digital business model	0.856	0.000**
3rd dimension: impact on individuals	0.911	0.000**
4th dimension: digital customer activities	0.785	0.000**
<i>Dependent variable (effectiveness of electronic financial systems)</i>	0.733	0.000**

Note: **statistically significant at (0.01) level.

Based on the data presented in Table 2, it is clear that the correlation coefficients observed between the variables and the dimensions under investigation ranged from 0.733 to 0.911. These coefficients were found to be statistically significant at a significance level of 0.01. This observation indicates a high level of internal coherence among the dimensions related to digital transformation and the variable regarding the effectiveness of electronic financial systems.

4.3 Assessment of study tool's stability

To evaluate the stability of the study tool, internal consistency was assessed using the Cronbach alpha equation for all variables under investigation. Following the guidelines proposed by Sekaran and Bougie (2016), the items in the questionnaire are considered to

have internal consistency and stability if the Cronbach alpha coefficient reaches a minimum value of 70%. The results of the stability test are presented in Table 3.

Table 3 Stability of the study tool using Cronbach's alpha coefficient (n = 365)

<i>Dimension</i>	<i>Number of statement</i>	<i>α</i>
1st dimension: digital operations	6	0.863
2nd dimension: digital business model	6	0.893
3rd dimension: impact on individuals	6	0.917
4th dimension: digital customer activities	6	0.885
<i>The digital transformation variable as a whole</i>	24	0.944
<i>Effectiveness of electronic financial systems</i>	10	0.931

The results presented in Table 3 indicate that each dimension of digital transformation yielded a Cronbach alpha coefficient of 0.944. Furthermore, when examining the individual dimensions of the first axis, which includes digital operations, the Cronbach alpha coefficients were notably high. In particular, the coefficient for digital operations was 0.863, for the digital business model, it was 0.893, for the impact on individuals, it was 0.917, and for digital customer activities, it was 0.885. According to the mentioned criterion, it is evident that all values exceeded 70%, suggesting the stability of the constructs.

4.4 Data analysis and hypothesis testing

To determine the estimates of the sample participants employed in public shareholding industrial companies in Jordan, specifically within upper, middle, and supervisory levels of management, we computed the arithmetic means and standard deviations of their responses for the items and dimensions of the research instrument. The findings are presented in Table 4.

The data presented in the previous table reveals variations in respondents' estimations of the relative importance of digital transformation, ranging from 4.04 to 4.32. Among the dimensions of digital transformation, digital operations stood out with the highest average score of 4.32, signifying its significant importance. Closely following is the dimension of digital customer activities, with an average score of 4.24, also considered highly important. The dimension of impact on individuals received an average score of 4.07, indicating its high relative importance. Finally, the digital business model dimension received the lowest average score of 4.04, yet it still holds a high level of relative importance. The data in the preceding table demonstrates that participants' assessments regarding various aspects of the independent variable (digital transformation) had an average value of 4.17, indicating a substantial level of relative importance, implying that Jordanian public shareholding industrial companies have achieved a significant degree of digital transformation. In the preceding table, the data reveals that the average value of participants' assessments concerning various aspects of the dependent variable, specifically the effectiveness of electronic financial systems, was found to be 4.19. This value indicates a significant level of importance, suggesting that electronic financial systems are highly effective within the context of Jordanian industrial public shareholding companies.

Table 4 AM and RI of the respondents' estimates on the digital transformation variable and the effectiveness of electronic financial systems

<i>Rank</i>	<i>No.</i>	<i>Dimension</i>	<i>Mean</i>	<i>RI</i>
1	1	1st dimension: digital operations	4.32	High
2	4	2nd dimension: digital business model	4.04	High
3	3	3rd dimension: impact on individuals	4.07	High
4	2	4th dimension: digital customer activities	4.24	High
		<i>The digital transformation variable as a whole</i>	4.17	High
		<i>Effectiveness of electronic financial systems</i>	4.19	High

4.5 Normal distribution test

The researcher employed the Kolmogorov-Smirnov (K-S) test to verify the adherence of the data used for statistical analysis to a normal distribution. The findings in Table (5) indicate that the data in the current study conforms to the normal distribution model. Furthermore, the results demonstrate that there are no significant disparities between the distribution of variable values and the values of a normal distribution at a significance level of $\alpha \leq 0.05$.

Table 5 Normal distribution by applying the K-S test

<i>Dimension</i>	<i>Test value</i>	<i>Sig. level</i>
Digital operations	0.107	0.201
Digital business model	0.111	0.165
Impact on individuals	0.124	0.158
Digital customer activities	0.110	0.190
<i>Effectiveness of electronic financial systems</i>	0.155	0.290

4.6 Linear non-overlap test

The researcher employed variance inflation factor (VIF) and tolerance measures to assess the level of linear collinearity among the dimensions of the independent variables. The results, as shown in Table 6, indicate that there are no significant concerns regarding linear collinearity among the dimensions of the independent variable. Notably, the VIF values were observed to be below 5, and the tolerance values exceeded 0.01. This observation is consistent with the findings from Deniz and Alsaffar's (2013) research.

Table 6 Collinearity between the dimensions of the independent variable

<i>Variables</i>	<i>Collinearity statistics</i>	
	<i>VIF</i>	<i>Tolerance</i>
Digital operations	3.92	0.255
Digital business model	2.65	0.377
Impact on individuals	3.34	0.299
Digital customer activities	4.52	0.221

4.7 Multi-collinearity results

The Pearson correlation coefficient matrix was computed to examine the relationships between the variables being studied, with the goal of revealing any linear associations among them. The results of the correlation coefficients for these variables are presented in Table 7.

Table 7 Pearson results between the variables in the study

<i>Variables</i>	<i>Digital operations</i>	<i>Digital business model</i>	<i>Impact on individuals</i>	<i>Digital customer activities</i>
Digital operations	1			
Digital business model	0.478**	1		
Impact on individuals	0.585**	0.561**	1	
Digital customer activities	0.328**	0.427**	0.387**	1

Note: **statically significant at 0.01.

The results displayed in Table 6 reveal that most of the correlations between the study dimensions are both significant and statistically meaningful at a significance level of $\alpha \leq 0.05$. Moreover, the correlation coefficients observed between the dimensions of the independent variable were all below 0.80. Therefore, we can infer from the data that there is no complete correlation between the dimensions of the independent variable and those of the other variables (Hair et al., 2010).

5 Results

H01 There is no statistically significant effect, at a significance level of $\alpha \leq 0.05$, of digital operations on the effectiveness of electronic financial systems in Jordanian public shareholding industrial companies.

The results presented in Table 8 demonstrate a strong correlation between digital operations, a key dimension of digital transformation, and the effectiveness of electronic financial systems. Specifically, the correlation coefficient (R) is 0.668, indicating a highly positive relationship with a magnitude of 66.8%, which is considered substantial. Moreover, the coefficient of determination (R^2) is calculated to be 0.446, suggesting that the dimension of digital operations explains approximately 44.6% of the variability in the effectiveness of electronic financial systems.

Table 8 Results of a simple regression test for the impact of digital operations on the effectiveness of electronic systems

<i>Variable</i>	<i>Model summary</i>		<i>ANOVA</i>			<i>Coefficient</i>				
	<i>R</i>	<i>R²</i>	<i>F</i>	<i>DF</i>	<i>Sig. F*</i>	<i>Statement</i>	<i>β</i>	<i>SD</i>	<i>t</i>	<i>Sig. T*</i>
Effectiveness of electronic financial systems	0.668	0.446	271.943	1	0.000	Digital operations	0.751	0.046	16.491	0.000

As observed in the table of coefficients, the value of β is 0.751, signifying that a one-unit change in the independent variable (digital operations) results in a 75.1% change in the dependent variable (effectiveness of electronic systems), and this change is statistically significant (sig. = 0.000). This confirms the significance of the coefficient at a level of $\alpha \leq 0.05$.

Based on the comprehensive analysis above, the initial hypothesis is rejected in favour of the alternative sub-hypothesis, which posits that there is a statistically significant effect of digital operations on the effectiveness of electronic financial systems in Jordanian industrial public shareholding companies, at a significance level of $\alpha \leq 0.05$.

H02 There is no statistically significant effect, at a significance level of $\alpha \leq 0.05$, of the business model on the effectiveness of electronic financial systems in Jordanian public shareholding industrial companies.

Table 9 Results of the simple regression test of the impact of the digital business model on the effectiveness of electronic systems

Variable	Model summary		ANOVA			Coefficient				
	R	R ²	F	DF	Sig. F*	Statement	β	SD	t	Sig. T*
Effectiveness of electronic financial systems	0.772	0.595	497.006	1	0.000	Digital business model	0.726	0.033	22.294	0.000

The results presented in Table 9 indicate a significant correlation with a value of 0.772 (77.2%), which is considered high, between the digital work model, one of the dimensions of digital transformation, and the effectiveness of electronic financial systems. The determination coefficient, with a value of $R^2 = 0.595$, demonstrates that the digital work model explains approximately 59.5% of the variance in the effectiveness of electronic financial systems. Furthermore, from the coefficient table, $\beta = 0.726$ reveals that a one-unit change in the independent variable, the digital work model, leads to a change of about 72.6% in the dependent variable, the effectiveness of electronic systems, at a significant level (sig. = 0.000), confirming the coefficient's significance at a level of $\alpha \leq 0.05$.

Based on the analysis above, the second hypothesis is rejected, and the alternative sub-hypothesis is accepted. This sub-hypothesis states that there is a statistically significant impact at a significance level of $\alpha \leq 0.05$ for the digital work model on the effectiveness of electronic financial systems in Jordanian public shareholding industrial companies.

H03 There is no statistically significant effect, at a significance level of $\alpha \leq 0.05$, of individuals on the effectiveness of electronic financial systems in Jordanian industrial public shareholding companies.

The data presented in Table 10 reveals noteworthy findings concerning the correlation between the impact on individuals, as a dimension of digital transformation, and the effectiveness of electronic financial systems. The correlation coefficient (R) yielded a value of 0.819, signifying a strong association with a magnitude of 81.9%, which is

considered substantial. This implies a significant relationship between the impact on individuals and the effectiveness of electronic financial systems.

Table 10 Regression test: individuals' influence on electronic system effectiveness

Variable	Model summary		ANOVA			Coefficient				
	R	R ²	F	DF	Sig. F*	Statement	β	SD	t	Sig. T*
Effectiveness of electronic financial systems	0.819	0.671	690.055	1	0.000	Impact on individuals	0.735	0.028	26.269	0.000

Additionally, the coefficient of determination (R^2) was calculated as 0.671, indicating that 67.1% of the variance in the effectiveness of electronic financial systems can be attributed to the influence on individuals. Furthermore, upon scrutinising the transaction table, it was evident that the beta coefficient (β) equalled 0.735. This suggests that a one-unit change in the independent variable, namely the effect on individuals, results in a 73.5% change in the dependent variable, which is the effectiveness of electronic systems. The statistical significance of this relationship was confirmed with a significance level (sig.) of 0.000, indicating that the coefficient is significant at a level of $\alpha \leq 0.05$.

Based on the aforementioned analysis, the third hypothesis was rejected, and the alternative sub-hypothesis was accepted. This means that there is a statistically significant effect, at a significance level of $\alpha \leq 0.05$, of influencing individuals on the effectiveness of electronic financial systems in Jordanian public shareholding industrial companies.

H04 There is no statistically significant effect, at a significance level of $\alpha \leq 0.05$, of digital customer activities on the effectiveness of electronic financial systems in Jordanian industrial public shareholding companies.

The results presented in Table 11 demonstrate a significant correlation between digital customer activities, a key aspect of digital transformation, and the effectiveness of electronic financial systems. The correlation coefficient (R) is calculated to be 0.835, indicating a high correlation of 83.5% between these variables. Furthermore, the determination coefficient (R^2) is found to be 0.697, signifying that the digital customer activities dimension explains approximately 69.7% of the variation observed in the effectiveness of electronic financial systems. The coefficient of the digital customer activities variable (β) is determined to be 0.838. This indicates that a one-unit change in digital customer activities leads to an 83.8% change in the effectiveness of electronic financial systems. The level of significance (sig.) for this coefficient is 0.000, confirming its statistical significance at the ($\alpha \leq 0.05$) level. Based on the aforementioned analysis, the fourth hypothesis is rejected in favour of the alternative sub-hypothesis. Thus, it is established that digital customer activities have a statistically significant impact, at the $\alpha \leq 0.05$ level of significance, on the effectiveness of electronic financial systems within Jordanian industrial public shareholding companies.

Table 11 Regression results: digital customer activities and electronic system effectiveness

Variable	Model summary		ANOVA			Coefficient				
	R	R ²	F	DF	Sig. F*	Statement	β	SD	t	Sig. T*
Effectiveness of electronic financial systems	0.835	0.697	776.751	1	0.000	Digital customer activities	0.868	0.031	27.870	0.000

6 Discussion and conclusions

The results reveal that all dimensions of digital transformation, including digital operations, digital customer activities, impact on individuals, and the digital business model, were identified as highly significant in this study. Among these dimensions, digital operations received the highest average score of 4.32, indicating its utmost relative importance. Following closely, digital customer activities garnered an average score of 4.24, signifying their high relative importance. The impact on individual's dimension received an average score of 4.07, also indicating high relative importance. Finally, the digital business model dimension obtained an average score of 4.04, reflecting its high relative importance. These findings suggest that all dimensions of digital transformation play a pivotal role in the overall effectiveness of the transformation process. Given the growing inclination of Jordanian public shareholding industrial companies toward digital transformation, there is an increasing interest in pursuing this endeavour. This enthusiasm is fuelled by the belief in its significance and the potential positive outcomes it can yield, including enhanced work efficiency and optimised resource utilisation.

The researcher posits that the adoption of digital transformation in the business sphere constitutes a strategic decision for organisations at large. It is driven by the technological advancements witnessed in societies and the imperative of sustainable development. Consequently, digital transformation has emerged as a lasting solution benefiting individuals, organisations, national economies, and the global community. These findings align with the results obtained by Rashwan and Qasim (2020), which indicated a significant level of digital transformation adoption among banks operating within the Gaza Strip. Similarly, the study conducted by Do et al. (2022) aligns with the present analysis, indicating a substantial degree of digital transformation within Vietnamese commercial banks. Additionally, the research conducted by Guo and Xu (2021) supports these observations, revealing a notable level of digital transformation implementation among a selected group of industrial public shareholding companies in China.

The findings indicate a high level of significance regarding the effectiveness of electronic financial systems, with an average score of 4.19. This suggests that Jordanian public shareholding industrial companies prioritise the utilisation of advanced computer networks to ensure efficient connectivity. Additionally, these companies demonstrate a commitment to securing the communication networks employed in electronic financial systems. Furthermore, they have established a department website that offers interactive electronic services, surpassing the capabilities of traditional services. This website enables easy and convenient access to all relevant data. The researcher attributes this

outcome to the recognition by Jordanian public shareholding industrial companies of the significance of implementing electronic financial systems. These systems are designed as integrated structures that utilise available resources and components to transform data into both financial and non-financial information. The purpose of this transformation is to provide users with information that can be utilised in the decision-making process. Furthermore, the presence of effective electronic financial systems contributes to the success of these companies and enhances their performance. These systems facilitate effective communication, generate appropriate and timely information sources, enable more effective decision-making, and facilitate easy and timely access to relevant information for users and stakeholders. Consequently, these improvements enhance overall operations. The findings of this study are consistent with the findings of Shaqfa (2020), who observed a high level of accounting information systems implementation in Palestinian governmental institutions. Thus, this study's results are in agreement with the aforementioned studies.

The results related to the primary hypothesis reveal a statistically significant relationship between the various dimensions of digital transformation and the effectiveness of electronic financial systems in Jordanian public shareholding industrial companies. This suggests that these companies employ strategies aimed at strengthening the dimensions of digital transformation, which include digital operations, business models, the impact on individuals, and digital customer activities. Furthermore, the statistical analysis demonstrates that digital transformation has a substantial impact on the effectiveness of electronic financial systems.

The researcher attributes this outcome to the presence and utilisation of digital transformation dimensions within Jordanian public shareholding industrial companies, which serves to enhance the effectiveness of electronic financial systems. Digital transformation triggers a fundamental shift in operational methods and business models of enterprises, leading to the emergence of entirely new business models that were previously unfamiliar, primarily relying on digital technology platforms, such as electronic financial systems.

Moreover, the implementation of digital transformation enables business enterprises to achieve significantly higher levels of efficiency and productivity compared to those that have not fulfilled the prerequisites of digital transformation. This is because it facilitates the adoption of innovative approaches to enhance operational processes and achieve greater efficiency and effectiveness within financial systems. Consequently, institutions are empowered to enhance their efficiency and sustainability. This finding is in partial alignment with previous research on the effects of digital transformation. Several studies have found a relationship between the dimensions of digital transformation and various variables. For instance, Rashwan and Qasim (2020) found a statistically significant impact of digital transformation on improving the efficiency of banks' performance and attracting investments. Similarly, Al-Masdar and Nasrallah (2020) found that the application of digitisation and digital transformation in delivering government services had a significant and positive impact on the effectiveness and quality of services provided by Palestinian government institutions.

The findings of this study partially agree with those of the Tiutiunyk study, which demonstrated that digital transformation plays a role in enhancing the efficiency of government services provided to citizens in terms of time, cost, and quality. The findings of Tiutiunyk et al. (2021) are consistent with our study, indicating a statistically significant correlation between macroeconomic stability and the digital transformation

index across a majority of European Union nations. In addition to the research conducted by Guo and Xu (2021), which yielded findings suggesting that digital transformation positively influences the performance of process-oriented operations and exhibits a U-shaped relationship with profit-based financial performance, it is observed that the effects of digital transformation on operational performance are more enduring compared to its impact on financial performance.

The robust interest demonstrated by public shareholding industrial companies in Jordan across various dimensions, including digital transformation, internal auditing quality, and the effectiveness of electronic financial systems, is firmly substantiated by the wealth of research findings. The studies conducted by Guo and Xu (2021), Do et al. (2022), and Leso et al. (2023) provide a broader context and shed light on the intricate relationship between digital transformation and operational and financial performance. Guo and Xu's (2021) insights into the advantages and disadvantages associated with digital transformation align with the acknowledgment of positive outcomes by the Jordanian companies. The U-shaped relationship identified by Guo and Xu further resonates with the strategic considerations highlighted in the commitment to development and alignment with current business trends observed in Jordanian public shareholding industrial companies (Conclusion 2). This alignment underscores the companies' status as pioneering entities, positioning them at the forefront of contemporary administrative strategies and advanced practices.

Furthermore, the emphasis placed by Jordanian public shareholding industrial companies on digital operations, as highlighted in Conclusion 3, mirrors the prioritisation of digital operations in successful digital transformations outlined by Leso et al. (2023). The systematic review and case studies conducted by Leso et al. provide a comprehensive understanding of the thematic areas crucial for achieving digital maturity, reinforcing the strategic focus on digital operations by Jordanian companies. This synergy between research findings and the companies' priorities reaffirms their commitment to digital transformation and positions them as forward-thinking entities embracing the complexities of the digital landscape.

The keen interest of Jordanian public shareholding industrial companies in electronic financial systems, aiming to enhance efficiency and effectiveness (Conclusion 4), aligns seamlessly with the broader discourse on the impact of digital transformation on banking and financial services. The studies by Guo and Xu (2021) and Do et al. (2022) contribute valuable insights into the positive correlation between digital transformation and financial performance, as well as the enduring impact on operational performance. This substantiates the companies' endeavours to optimise electronic financial systems, recognising the positive outcomes in terms of service delivery and customer satisfaction.

7 Conclusions

The results of this study reveal that all dimensions of digital transformation – digital operations, digital customer activities, impact on individuals, and the digital business model – are highly significant for the effectiveness of electronic financial systems in Jordanian public shareholding industrial companies. Digital operations, in particular, were identified as the most important dimension. The study also confirms that these companies are actively pursuing digital transformation, recognising its importance in

enhancing operational efficiency and resource utilisation. The findings indicate a high level of effectiveness of electronic financial systems within these companies, facilitated by advanced computer networks and secure communication systems. The study underscores the critical role of digital transformation in improving decision-making processes, enhancing communication, and generating timely and relevant information.

In general, the research highlights the strategic importance of digital transformation in driving operational and financial performance improvements. Jordanian public shareholding industrial companies are positioned as forward-thinking entities, committed to leveraging digital technologies to optimise their processes and achieve sustainable growth.

- 1 Public shareholding industrial companies in Jordan demonstrate a strong interest in digital transformation, internal auditing quality, and the effectiveness of electronic financial systems.
- 2 These companies are well-regarded for their adoption of contemporary administrative strategies and advanced practices, with a particular focus on digital transformation.
- 3 Digital operations are prioritised as a key dimension for achieving successful digital transformation.
- 4 There is a strong interest in enhancing the efficiency and effectiveness of electronic financial systems to improve service delivery and meet customer needs.

7.1 Recommendations for practice

- **Prioritise digital operations:** Companies should focus on enhancing digital operations, as this dimension has shown the highest relative importance. This involves investing in advanced technologies and training employees to maximise efficiency and productivity.
- **Enhance digital customer activities:** To improve customer engagement and satisfaction, companies should develop strategies that leverage digital platforms for better customer interaction and service delivery.
- **Invest in employee training:** Continuous training and development programs should be implemented to ensure that employees are equipped with the necessary digital skills and competencies to facilitate the transformation process.
- **Develop robust business models:** Companies should create innovative and flexible business models that align with digital advancements to stay competitive and meet market demands.

7.2 Final statement

This study highlights the pivotal role of digital transformation in the effectiveness of electronic financial systems in Jordanian public shareholding industrial companies. By implementing the recommendations based on our findings, these companies can achieve significant improvements in operational efficiency, decision-making, and overall organisational performance. Embracing digital transformation not only enhances the

immediate capabilities of these companies but also positions them as leaders in the digital era, driving sustainable growth and competitive advantage in the national economy.

7.3 Further research directions

Future research could explore the long-term impacts of digital transformation on financial performance and customer satisfaction in various sectors beyond the industrial domain. Additionally, investigating the role of emerging technologies, such as artificial intelligence and block chain, in enhancing the effectiveness of electronic financial systems would provide deeper insights. Comparative studies across different countries and industries could also offer a broader perspective on the global applicability of digital transformation strategies.

7.4 Research limitation

This study is limited by its focus on Jordanian public shareholding industrial companies, which may not fully represent other sectors or regions. The reliance on self-reported data through questionnaires could also introduce bias. Future research should consider a more diverse sample and incorporate longitudinal data to validate and expand upon these findings.

Contributions statement

- Khalid Alomari: conception and design/analysis and interpretation of the data/final approval of the version to be published.
- Ali Salah: drafting of the paper, revising it critically for intellectual content.

Data availability

Based on a questionnaire researchers created and prepared, the researchers relied on primary data taken from the study sample. All information and data are available upon request.

Acknowledgements

This research is funded by Alhussein Bin Talal University (Fund Decision 2024/264).

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