-RESEARCH ARTICLE-

DIGITAL ACCOUNTING TRANSFORMATION AND FIRM PERFORMANCE: CLOUD COMPUTING AS A MODERATING ROLE IN COMMERCIAL BANKS

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─**Abstract**─

In the era of the digital economy, banks increasingly leverage digital accounting as a source of competitive advantage. This study investigated the effects of digital accounting transformation, encompassing Artifi-cial Intelligence (AI), Big Data Analytics (BDA), Blockchain, and E-commerce, on firm performance, with cloud computing acting as a moderating factor. Data were collected through questionnaires administered to 500 directors across 14 commercial banks in Jordan. The findings indicated that AI, BDA, Blockchain, and E-commerce significantly enhance bank performance, and that improvements in performance were further reinforced by organisational culture through interactions with E-commerce. The research proposed a theoretical model integrating the adoption of digital accounting tools, AI, BDA, Blockchain, and E-commerce with bank performance within the context of digital transformation. The results offer critical guidance for policymakers to support commercial banks in effectively implementing digital technologies to elevate organisational performance.

Keywords: Digital Accounting; Artificial Intelligence; Big Data; Blockchain; E-Commerce; Firm Performance; Cloud Computing.

INTRODUCTION

In the current era, digital transformation is expanding rapidly, accompanied by the swift advancement of digital technologies. For organisations and industries, this trend renders the adoption of digital technologies increasingly essential for survival in the contemporary digital landscape (Tajudeen et al., 2025). Digital transformation entails, among other aspects, the capacity to respond promptly to challenges arising from modern digital technologies (Daouk, 2025). It also involves leveraging opportunities generated by technological revolutions, which, in the banking sector, can translate into enhanced financial performance (Salhab et al., 2023). Importantly, digital transformation represents a component of broader digital trends, requiring firms to adapt their practices and tools to fully capitalise on the benefits of such changes (BinSaeed et al., 2023).

The business environment has experienced profound and comprehensive shifts due to the extensive digital revolution in internet and communication networks (Alqaraleh & Oudat, 2022). Companies must keep pace with these developments to ensure continuity across various domains, including accounting and management information systems. This necessitates a transition from traditional methodologies to contemporary digital approaches (Hatamlah et al., 2023; Shan et al., 2022). In this context, information systems encompass software and applications emerging from digital innovations (Endres, et al, 2022). Consequently, new patterns of business behaviour have emerged, driven by standards that enable firms to select technologies aligned

with their operational needs, such as Cybersecurity, AI, Cloud Computing, Blockchain, Internet of Things, and BDA (Mahmood, et al, 2024). In accounting information systems, these technologies offer numerous advantages, including greater transparency, cost reduction, time and effort efficiency, easier data access, enhanced security, and improved operational efficiency (Oncioiu et al., 2019; Salih Omar et al., 2024). In industrial sectors, higher levels of digital transformation in accounting processes enhance the quality of accounting information systems, which in turn positively impacts organisational performance (BALICKA, 2023).

The banking sector, like other industries, has also experienced rapid innovation in digital technologies, with commercial banking representing a primary beneficiary of these advancements (Oudat, 2021; Shan et al., 2022). Banking has been among the earliest sectors influenced by such innovations. Within accounting practices, modern technological tools have the potential to significantly improve overall performance, particularly through the integration of AI, BDA, Blockchain, and E-commerce into digital accounting platforms. Successful implementation, however, depends on the availability of a cloud computing infrastructure. Accordingly, this study investigates the effects of digital accounting transformation—comprising AI, BDA, Blockchain, and E-commerce—on firm performance in commercial banks, with cloud computing serving as a moderating factor.

LITERATURE REVIEW

Digital Transformation

Recent technological advancements across multiple domains have had far-reaching effects, marking the current period as the era of digitalisation. This trend has driven numerous business organisations to adopt digital transformation strategies to maintain competitiveness and relevance (Tajudeen et al., 2025). Within this context, the emergence and development of technologies such as Artificial Intelligence (AI), Cloud Computing, Blockchain, Internet of Things, and Big Data have influenced business operations across various functions, including accounting, thereby affecting overall organisational performance. The implementation of the digital economy is now observable across sectors including healthcare, education, energy, finance and financial technology (fintech), security, and communications. Firms aiming to achieve strategic objectives increasingly recognise the necessity of undergoing digital transformation, which has become a focal concern for company managers (Nazara et al., 2024; Zimonjić, 2024).

While much of the literature on digital transformation has concentrated on conceptual understanding and adoption processes, several studies have examined its impact on firm performance (Guo & Xu, 2021; Masoud & Basahel, 2023; Zhao et al., 2024). In particular, e-commerce has been identified as a critical component of digital

accounting transformation, as it facilitates higher trading volumes and promotes both internal and external trade expansion (Yang et al., 2023). The effectiveness of e-commerce utilisation is further influenced by fulfilment of its technical requirements and enhanced web security measures (Kumar et al., 2023).

In the banking context, Haddad (2021) investigated AI adoption within Jordanian banks and reported improvements in data accuracy and the efficiency of generating routine reports. Another key dimension, Blockchain, provides a decentralised and publicly accessible ledger enabling users to register ownership of diverse assets, including shares, securities, real estate, vehicles, artworks, and luxury items (Freeman, 2022). Blockchain has also been applied to store public records such as birth certificates, driving licences, and academic degrees (Eddy, et al 2024). El Midaoui et al. (2021) highlighted that real Blockchain networks can be tracked via GPS devices, represented using coloured coins or tokens, allowing financial and non-financial assets—including currencies, tangible, and intangible assets—to be symbolically recorded. Big Data, as another dimension of digital transformation, has seen increasing utilisation within accounting systems. Enterprises aim to leverage Big Data to enhance the security of their digital accounting processes (Jawabreh et al., 2024). Digital accounting systems rely on network channels to transmit diverse types of financial data (Jawabreh et al., 2024). Moreover, during software development, developers often incorporate encryption for the applications themselves, although the data transmitted through these digital accounting systems is sometimes left unencrypted (Lu, 2022; Salhab et al., 2023).

Cloud Computing

Cloud computing is a technological platform that provides extensive processing capabilities, large-scale storage, and robust communication servers (Ahmed, et al 2026). This technology proves highly beneficial for companies, particularly micro, small, and medium enterprises (MSMEs), as it grants access to powerful and efficient resources that would otherwise be unaffordable (Mujalli et al., 2024). Large organisations also benefit, as cloud computing enables them to operate effectively using substantial processing power and to store vast amounts of data through its high-capacity storage facilities (Alnaimat et al., 2024). Moreover, it facilitates efficient and seamless communication across organisational operations. Thanks to these capabilities, firms can perform operations without significant physical infrastructure investments, eliminating the need to expand equipment or facilities to enhance operational capacity (Alnaimat et al., 2024). Cloud computing offers organisations a range of financial and administrative advantages (Van et al., 2024). Within accounting, its adoption improves the efficiency of accounting information systems, simplifying system implementation (Van et al., 2024). Additionally, cloud computing enhances system flexibility, scalability, and measurability, while its high storage capacity contributes to more efficient accounting operations (Moudud-Ul-Huq et al., 2020).

In Saudi Arabia, the utilisation of cloud computing in public sector organisations has been limited (Jaradat et al., 2026), highlighting the need for comprehensive frameworks to support digital transformation initiatives in this sector. Kumar et al. (2023) emphasised cloud computing as a key instrument for digital transformation, offering a replacement for conventional information systems. Similarly, Moudud-Ul-Huq et al. (2020) demonstrated that cloud computing significantly enhances accounting practices. Consequently, technology sector organisations are expected to increase investments in cloud computing, as its benefits have made adoption increasingly indispensable (Mujalli et al., 2024).

Literature Review and Hypotheses Development

The adoption of digital accounting and the competitive advantages gained through E-commerce have emerged as primary drivers of firm performance improvement (Al-Okaily et al., 2023). In Saudi Arabia's services sector, Masoud and Basahel (2023) reported that digital transformation positively influences organisational performance. Similarly, within Jordanian banks, Al-Khasawneh (2022) identified a strong relationship between the utilisation of technologies—such as Internet of Things, BDA, Blockchain, and Robotics—in banking operations and the performance of accounting systems. Wang et al. (2022) further highlighted that digital transformation initiatives enhancing internal controls, promoting green innovation, and improving total factor productivity can contribute to the reduction of pollution emissions. Despite these benefits, knowledge and awareness regarding digital transformation remain limited, as reported by Toscano-Jara et al. (2024). Studies in other contexts also indicate significant effects of E-commerce on organisational performance, with Ji et al. (2025) demonstrating a strong impact in China, and Li et al. (2024) confirming that business E-commerce substantially influences industrial firm performance. Based on these insights, the following hypothesis was formulated:

H1: *Digital accounting transformation through e-commerce significantly affects the Jordanian Industrial firm's performance.*

There is considerable debate in previous studies regarding the relationship between digital transformation and company performance. It is a complex and dynamic relationship, with studies showing varying and even contradictory results. Many studies point to a significant relationship, while others focus on the conditions under which company performance may not improve directly. This is particularly important for companies looking to invest in digital transformation (Fabian, et al 2021).

Al-Okaily et al. (2023) identified digital accounting adoption, fintech innovations, and technological competition as major determinants of enhanced business performance. Within Saudi Arabia's services sector, Masoud and Basahel (2023) reported a positive effect of digital transformation on firm performance. In the context of Jordanian banks, Al-Khasawneh (2022) observed a strong association between the use of AI and

Robotics in banking transactions and the effectiveness of accounting systems. Furthermore, Giachino et al. (2025) demonstrated that AI-driven decision-making is significantly linked to organisational performance, with AI integrated with BDA positively influencing managerial decision-making processes. Based on these findings, the following hypothesis was proposed:

H2: *Digital accounting transformation through Artificial Intelligence significantly affects the Jordanian Industrial firm's performance.*

Within Jordanian banks, Al Shanti and Elessa (2023) reported that the implementation of Blockchain has contributed to more effective corporate governance. Similarly, in Saudi Arabia's services sector, Masoud and Basahel (2023) observed a positive influence of digital transformation on firm performance. Furthermore, Al-Khasawneh (2022) identified a strong relationship between the utilisation of Blockchain in banking transactions and the performance of accounting systems in Jordanian banks. Mohapatra and Rakshit (2025) also confirmed that Blockchain exerts a significant effect on firm performance. Based on these findings, the following hypothesis was formulated:

H3: *Digital accounting transformation through Blockchain significantly affects the Jordanian Industrial firm's performance.*

The adoption of BDA and Cloud Computing has the potential to enhance organisational performance (Jawabreh et al., 2024). This study focuses particularly on the rapid integration of Cloud Computing and BDA within accounting operations and the roles these technologies play in accounting firms. In the context of Jordanian banks, Al-Khasawneh (2022) reported a strong association between the use of BDA in banking transactions and the performance of the implemented accounting systems. Moreover, Giachino et al. (2025) demonstrated that AI supported by BDA positively influences both decision-making and overall firm performance. Based on these findings, the following hypothesis was proposed:

H4: *Digital accounting transformation through Big Data significantly affects the Jordanian Industrial firms' performance.*

Castellar et al. (2021) observed that several critical aspects of digital transformation remain underexplored in the existing literature. In particular, the implementation of Cloud Computing architectures integrating both legacy and modern technologies has received limited attention. In the Jordanian context, Alrawashedh and Shubita (2024) demonstrated that digital transformation significantly enhances client experience and IT innovation, with these improvements exerting a notable positive effect on organisational performance. The study further confirmed the substantial impact of client experience and IT innovation on performance outcomes. Conversely, Fabian, et al (2021) found no significant relationship between digital transformation and the

financial performance of banks. To address this gap, the present study introduces Cloud Computing as a moderating variable to strengthen the relationships between AI, E-commerce, Blockchain, BDA, and firm performance. Based on this rationale, the following hypotheses were formulated:

H5: *There is significant relationship between Cloud Computing and Firm Performance.*
H6: *Cloud Computing moderates the relationship between AI and Firm Performance.*
H7: *Cloud Computing moderates the relationship between E-commerce and Firm Performance.*
H8: *Cloud Computing moderates the relationship between Blockchain and Firm Performance.*
H9: *Cloud Computing moderates the relationship between Big Data and Firm Performance.*

METHODS OF THE RESEARCH

The research design outlines the methods used for data collection and analysis. SPSS version 30 and SmartPLS 4.1 were employed for statistical analysis and model estimation. Data were collected via a structured questionnaire administered to 500 directors from 14 commercial banks in Jordan. The questionnaire comprised seven sections: demographics, independent variables (Elements of Digital Accounting Transformation: AI, BDA, Blockchain, E-commerce), dependent variable (firm performance), and the moderating variable (Cloud Computing). Section one captured demographic information, while sections two through seven addressed the constructs of AI, BDA, Blockchain, E-commerce, Cloud Computing, and firm performance. Items were adapted from Jawabreh et al. (2024), and Salhab et al. (2023), and measured on a five-point Likert scale. Data preparation included cleaning, while reliability and validity were assessed through factor loadings, outer model evaluation, composite reliability, AVE, and R-squared. Structural model analysis examined relationships among constructs, with frequencies used to rank data. Internal consistency was verified via correlations and Cronbach's alpha (0.7–0.9), which, as noted by Hair et al. (2021) and Hair Jr (2023), confirms that items effectively measure a shared construct.

Framework of the Study

The theoretical framework of the study was constructed by identifying research gaps in previous studies, and the proposed assumptions and hypotheses were formulated accordingly. The framework was designed to assess the effects of AI, BDA, Blockchain, and E-commerce on firm performance, with Cloud Computing incorporated as a moderating variable.
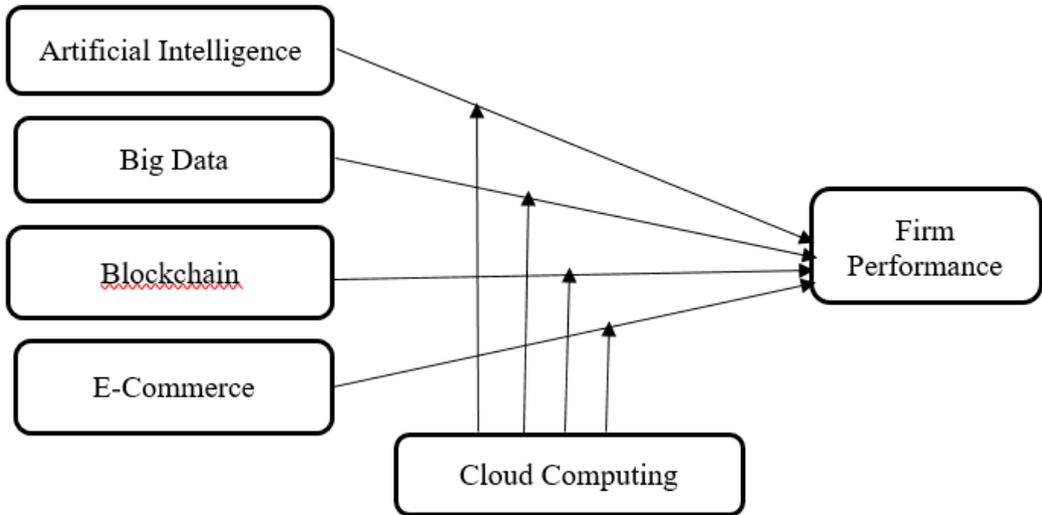
Figure 1: Theoretical Framework

Instrument Variables Research

The questionnaire consisted of a set of statements measured using a five-point Likert scale. Respondents were required to indicate their degree of agreement with each statement according to the following scale: 1 representing "Strongly Disagree," 2 "Disagree," 3 "Neutral," 4 "Agree," and 5 "Strongly Agree." The items, presented in Table 1, were designed to assess the effects of AI, BDA, Blockchain, and E-commerce on firm performance, with Cloud Computing incorporated as a moderating variable, as detailed in Table 1.

Table 1: Study Items

Variables of the Study	Indicators
Artificial Intelligence	1. Artificial intelligence allows the processing of events and accounting at industrial firms 2. Artificial intelligence facilitates managerial accountants in making decisions. 3. Artificial intelligence facilitates industrial firm managers to make effective decisions to successfully achieve their goals. 4. Artificial intelligence facilitates accountants to effectively make decisions in their accounting database designs. 5. Artificial intelligence facilitates accountants to effectively make decisions to resolve the accounting related problems.
Big Data	6. Big data is increasingly important because it allows social communication through the Internet. 7. Big Data facilitates companies in obtaining substantial access to customer data through private and open sources, and in verifying extra data sources like pump data and network connections. 8. Big data enables analysis and integration of parts of information spread within numerous databases for form an image of notable person or event.

	9. Big data facilitates the formation or increment of company profits, because companies that utilize big data in decision making gain more profits than those that don't.
	10. Big data is utilized by large and small companies and by finance and insurance companies in risk analysis and fraud detection.
Blockchain	11. Using blockchain technology, transaction contracts can be executed without supervision.
	12. The integration of blockchain technology in the accounting sector increases the autonomy of the accountant's work.
	13. Blockchain technology allows the sharing of ledger database and full traceability, while also assuring transparency and reliability.
	14. Using blockchain technology helps increase the security level, while retaining the data as is.
	15. Blockchain technology data is available to all relevant parties, and the information presented by blockchain is fully transparent.
E-Commerce	16. The global technological development has led to the increase in e-commerce usage in industrial firms.
	17. The global technological development has led to the increase in e-commerce usage in merchandising firms.
	18. E-Commerce is the major instrument employed by the industrial firms in financing export operations.
	19. Firms operate in adherence to the Customs and Unified Assets Bulletin No. 600 issued by the International Chamber of Commerce in Paris in 2007.
	20. Firms believe that despite the non-existence of the details on the consolidated assets and customs, the international standards for banking practices related to the examination of documents (ISBP) do exist.
Cloud Computing	21. Cloud computing drives the accomplishment of important technological developments, like mobile computing and big data.
	22. Cloud computing drives the accomplishment of important technological developments like artificial intelligence.
	23. Cloud computing facilitates businesses and governments in dealing with certain challenges like digital transformation and commercial transformation.
	24. Cloud computing facilitates businesses and governments in dealing with social challenges, like healthcare, the environment, and education.
	25. Ability to behave, innovation and low cost are the characteristics of cloud computing.
	26. Using cloud computing, anyone with no knowledge or experience can still obtain IT access through the Internet from anywhere and at any time.
Firm Performance	27. Board of Directors is the vital body in the selection of executives in improving the performance of the company.
	28. Board of Directors is the body that establishes the goals and strategies and strives to achieve them for the survival of the company.
	29. The Audit Committee initiates governance and improves the performance of company by supervising the company's preparation of financial reports and financial statements.
	30. The provision of a clear, written internal company system on rewards and promotion policies will improve company performance.
	31. The issuance of clearly defined objectives and the internal audit department tasks based on a scrutiny of the risks facing the company, will increase company performance.
	32. The external auditor improves company performance by promptly disclosing areas of weakness and faults inside the company.

RESULTS AND EMPIRICAL FINDINGS BY SMART PLS

The Outer Model of Measurement

Assessment of the measurement, or outer, model represents the initial stage in PLS-SEM and is conducted using four criteria outlined by Hair and Alamer (2022) and Hair Jr (2023). Indicator reliability is established when factor loadings reach 0.70 or above, whereas internal consistency is confirmed when composite reliability (CR) equals or exceeds 0.70. Convergent validity is verified when the average variance extracted (AVE) is at least 0.50. Discriminant validity is supported when the AVE of each latent construct surpasses the highest squared correlation between that construct and any other latent construct (Henseler et al., 2015). Furthermore, Hair and Alamer (2022) emphasised that the square root of each construct's AVE should be greater than its correlations with other latent constructs. Common procedures for assessing discriminant validity include the heterotrait–monotrait (HTMT) ratio, the Fornell–Larcker criterion, and the cross-loading method. Among these, the HTMT ratio is most frequently applied due to its superior sensitivity and specificity in identifying discriminant validity concerns (Henseler et al., 2015). As presented in Tables 2–5, all obtained values fall within acceptable thresholds, indicating that the structural model can be evaluated without concern.
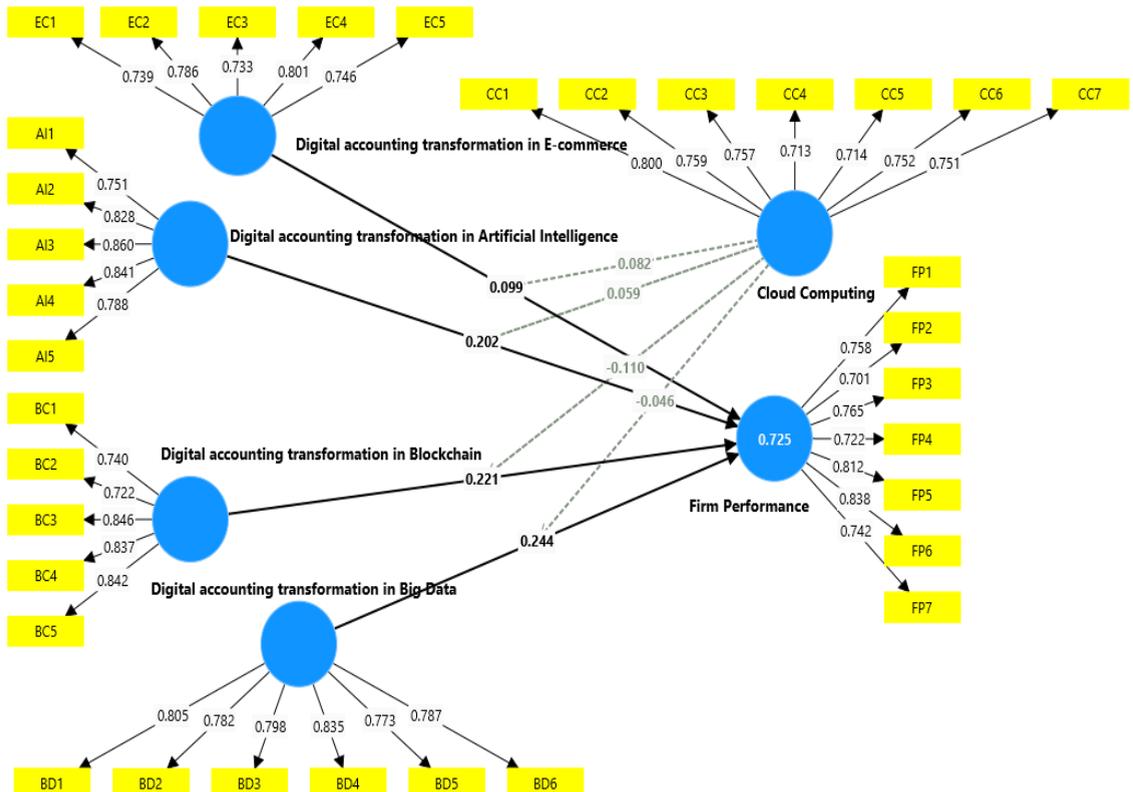

Figure 2: Outer Model

Table 2: Construct Reliability and Validity from the Reflected Measurement Model

	Cronbach's Alpha	Composite Reliability (rho_a)	Composite Reliability (rho_c)	Average Variance Extracted (AVE)
Cloud Computing	0.870	0.872	0.900	0.562
Digital Accounting Transformation through Artificial Intelligence	0.873	0.877	0.908	0.663
Digital Accounting Transformation through Big Data	0.885	0.887	0.912	0.635
Digital Accounting Transformation through Blockchain	0.858	0.865	0.898	0.639
Digital Accounting Transformation through E-Commerce	0.823	0.834	0.873	0.580
Firm Performance	0.881	0.885	0.907	0.583

Table 3: Outer Loadings of Items

	CC	AI	BD	BC	EC	FP
AI1		0.751				
AI2		0.828				
AI3		0.860				
AI4		0.841				
AI5		0.788				
BC1				0.740		
BC2				0.722		
BC3				0.846		
BC4				0.837		
BC5				0.842		
BD1			0.805			
BD2			0.782			
BD3			0.798			
BD4			0.835			
BD5			0.773			
BD6			0.787			
CC1	0.800					
CC2	0.759					
CC3	0.757					
CC4	0.713					
CC5	0.714					
CC6	0.752					
CC7	0.751					
EC1					0.739	
EC2					0.786	
EC3					0.733	
EC4					0.801	
EC5					0.746	
FP1						0.758

FP2						0.701
FP3						0.765
FP4						0.722
FP5						0.812
FP6						0.838
FP7						0.742

Table 4: Heterotrait-Monotrait Ratio (HTMT) – Matrix

	CC	AI	BD	BC	EC	FP	CC x AI	CC x EC	CC x BC
CC									
AI	0.877								
BD	0.707	0.734							
BC	0.869	0.877	0.765						
EC	0.167	0.146	0.188	0.130					
FP	0.825	0.837	0.795	0.869	0.235				
CC x AI	0.282	0.397	0.274	0.320	0.155	0.340			
CC x EC	0.164	0.194	0.101	0.208	0.041	0.228	0.071		
CC x BC	0.270	0.338	0.275	0.390	0.183	0.372	0.869	0.085	
CC x BD	0.249	0.323	0.428	0.309	0.096	0.366	0.695	0.216	0.727

Table 5: Fornell-Larcker Criterion

	CC	AI	BD	BC	EC	FP
CC	0.750					
AI	0.767	0.814				
BD	0.623	0.651	0.797			
BC	0.750	0.759	0.670	0.800		
EC	0.144	0.120	0.164	0.117	0.762	
FP	0.729	0.744	0.713	0.764	0.204	0.764

Structural Model Analysis

PLS bootstrapping was applied to test the proposed relationships, constituting the final stage of the PLS-SEM analysis. In PLS analysis, the evaluation of path coefficients represents a central procedure. According to Hair et al. (2021), hypotheses should be rejected when the estimated paths are statistically insignificant or when the direction of the relationship contradicts theoretical expectations. Conversely, significant paths aligned with the hypothesised direction provide empirical support for the proposed causal relationships. The assessment of path coefficients requires bootstrapping with a minimum of 5,000 resamples, ensuring that the number of bootstrap samples corresponds closely to the number of observations in the original dataset (Hair et al., 2021). In the present study, 5,000 resampling iterations were conducted, with the bootstrap cases matching the initial sample size of 500. This procedure enabled the estimation of standard errors and the generation of t-values. Structural path analysis was performed using standardised path coefficients for hypothesis testing, with the
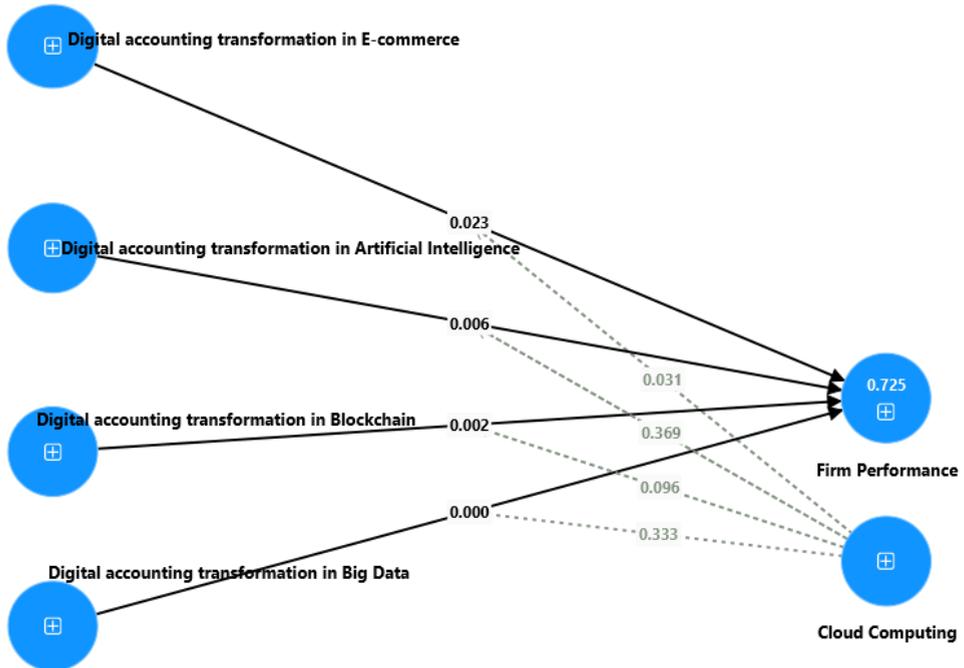
results presented in Table 6 and Figure 3.

Figure 3: Investigating Structural Models

Table 6: Outcome of Hypotheses

Hypothesis Results	Original Sample (O)	Sample Mean (M)	(STDEV)	T Statistics	P Values
Cloud Computing -> Firm Performance	0.198	0.201	0.067	2.967	0.003
Artificial Intelligence -> Firm Performance	0.202	0.199	0.073	2.762	0.006
Digital Accounting Transformation in Big Data -> Firm Performance	0.244	0.245	0.057	4.317	0.000
Blockchain -> Firm Performance	0.221	0.222	0.070	3.138	0.002
E-Commerce -> Firm Performance	0.099	0.104	0.044	2.270	0.023
Cloud Computing x Artificial Intelligence -> Firm Performance	0.059	0.051	0.066	0.898	0.369
Cloud Computing x E-Commerce -> Firm Performance	0.082	0.078	0.038	2.158	0.031
Cloud Computing x Blockchain -> Firm Performance	-0.110	-0.104	0.066	1.665	0.096
Cloud Computing x Big Data -> Firm Performance	-0.046	-0.043	0.047	0.967	0.333

RESEARCH FINDINGS

The SmartPLS analysis results confirmed the presence of significant interrelationships concerning the effects of the four independent variables—AI, BDA, Blockchain, and

E-commerce—on firm performance, with Cloud Computing acting as a moderating variable in Jordanian commercial banks. The coefficients derived from hypothesis testing are presented in Table 6.

H1: *There is significant relationship between E-commerce and Firm Performance.*

The findings indicate a positive effect of E-commerce on firm performance. However, compared with the other technologies examined, its influence is relatively weaker and remains at a moderate level (T-statistic = 2.270; P-value = 0.023). This suggests that while the adoption of E-commerce contributes to performance enhancement, the magnitude of its impact is comparatively less pronounced. These results are consistent with prior evidence reported by Ji et al. (2025) and Li et al. (2024).

H2: *There is significant relationship between Artificial Intelligence and Firm Performance.*

The results demonstrate a statistically significant positive effect of AI on firm performance (T-statistic = 2.762; P-value = 0.006). The low P-value confirms the robustness of the relationship, indicating that AI plays a substantial role in enhancing organisational performance. This finding is consistent with the evidence reported by Giachino et al. (2025).

H3: *There is significant relationship between Big Data and Firm Performance.*

The findings reveal a statistically significant effect of BDA on firm performance (T-statistic = 4.317; P-value = 0.000). This indicates that the utilisation of BDA contributes substantially to improvements in organisational performance. The result is consistent with the findings reported by Giachino et al. (2025).

H4: *There is significant relationship between Blockchain and Firm Performance.*

The results indicate a statistically significant relationship between Blockchain and firm performance (T-statistic = 3.138; P-value = 0.002). This suggests that the utilisation of Blockchain technology contributes positively to organisational performance. The finding is consistent with the evidence reported by Mohapatra and Rakshit (2025).

H5: *There is significant relationship between Cloud Computing and Firm Performance.*

The findings demonstrate that Cloud Computing has a statistically significant positive effect on firm performance (T-statistic = 2.967; P-value = 0.003). Given that the P-value is below the 0.05 threshold, it can be concluded that Cloud Computing adoption contributes meaningfully to improved organisational performance.

H6: *Cloud Computing moderates the relationship between AI and Firm Performance.*

The results indicate that the interaction between Cloud Computing and AI does not exert a statistically significant effect on firm performance (T-statistic = 0.898; P-value = 0.369). This suggests that, although both Cloud Computing and AI individually contribute to performance, their combined interaction does not lead to a significant additional improvement in firm performance.

H7: *Cloud Computing moderates the relationship between E-commerce and Firm Performance.*

The results indicate a positive and statistically significant effect of the interaction between Cloud Computing and E-commerce on firm performance (T-statistic = 2.158; P-value = 0.031). This suggests that the combined adoption of these two technologies can enhance organisational performance.

H8: *Cloud Computing moderates the relationship between Blockchain and Firm Performance.*

The results reveal that the interaction between Cloud Computing and Blockchain has a positive but statistically insignificant effect on firm performance (T-statistic = 1.665; P-value = 0.096). This suggests a potential influence of the combined use of these technologies, although further investigation is required to confirm the strength and significance of this relationship.

H9: *Cloud Computing moderates the relationship between Big Data and Firm Performance.*

The results indicate that the interaction between Cloud Computing and BDA does not have a statistically significant effect on firm performance (T-statistic = 0.967; P-value = 0.333). This suggests that the combined utilisation of these two technologies does not produce a significant additional impact on organisational performance.

Table 6: R-Squared Values

	R-Square	R-Square Adjusted
Firm Performance	0.725	0.714

The R-squared results, presented in Table 6, indicate a value of 0.725, suggesting that 72.5% of the variation in firm performance can be explained by the variables included in the research model. This demonstrates that the model accounts for a substantial portion of performance variability. Table 6 also reports an adjusted R-squared value of 0.714, slightly lower than the unadjusted R-squared. The adjusted value accounts for potential prediction errors arising from the inclusion of additional predictors beyond the control variables. Therefore, the model effectively explains a significant

proportion of the variation in firm performance across organisations.

STUDY IMPLICATIONS

The findings of this study carry significance for both theoretical and practical perspectives. From a theoretical standpoint, the results demonstrate the effects of innovative technologies—including Cloud Computing, AI, BDA, Blockchain, and E-commerce—on firm performance, particularly within the banking sector. Practically, the findings provide empirical evidence that technology-driven strategies enhance organisational performance, confirming the influence of information, communication, and technological tools on banking outcomes. For banks in Jordan, the adoption of technologies such as BDA, Cloud Computing, and Blockchain can substantially improve performance. To achieve superior results, banks may consider utilising certain technologies individually or in combination; for example, the integration of Cloud Computing with E-commerce has been shown to enhance performance. Finally, these findings can guide banks in strategic decision-making, technology adoption, and investment planning, ultimately supporting greater operational efficiency and competitive advantage.

CONCLUSIONS, CONSTRAINTS, AND SUGGESTIONS FOR FURTHER INVESTIGATION

This study demonstrates that technologies such as Cloud Computing, AI, BDA, Blockchain, and E-commerce exert a significant influence on the performance of commercial banks in Jordan. The findings indicate that these technologies have substantial potential to streamline banking operations, enhance decision-making, and improve overall organisational efficiency. While some technologies, when implemented in combination, further boost performance, other combinations do not produce additional improvements. Specifically, the integration of Cloud Computing and E-commerce was found to enhance performance, whereas the combination of Cloud Computing with AI or BDA showed limited impact. Consequently, Jordanian banks should consider these insights when formulating their technology adoption strategies to maximise performance benefits. However, this study has certain limitations. First, it focuses exclusively on commercial banks in Jordan, which may restrict the generalisability of the findings to other sectors, industries, or banks in different countries. Banking environments can vary significantly across regions, and the impact of these technologies on firm performance may be influenced by local market conditions, regulatory frameworks, cultural factors, and other contextual variables. Additionally, this study did not account for internal organisational factors that might affect the successful adoption of these technologies, whether individually or in combination. Given these limitations, future research could explore several directions. Examining the impact of these technologies across other sectors, industries, and countries could enhance the generalisability of the results.

Furthermore, investigating the role of internal factors, such as innovation capability, in facilitating successful technology adoption may provide deeper insights into the challenges and opportunities associated with implementing these technologies in banks and other organisations.

REFERENCES

Ahmed, S., Pasha, A., Kumer, T., Akhtaruzzaman, M., & Hossain, M. (2026). Advancements in Air Quality Monitoring Systems: A Comprehensive Review of Emerging Technologies for Enhancing Environmental Health. Indoor Air, 2026(1), 3080684. https://doi.org/10.1155/ina/3080684

Al-Khasawneh, R. (2022). Impact of digital technologies on banking accounting systems in Jordanian banks Journal of Entrepreneurship Education, 25(3), 1-16. https://www.abacademies.org/articles/impact-of-digital-technologies-on-banking-accounting-systems-in-jordanian-banks-14741.html

Al-Okaily, M., Alsmadi, A. A., Alrawashdeh, N., Al-Okaily, A., Oroud, Y., & Al-Gasaymeh, A. S. (2023). The role of digital accounting transformation in the banking industry sector: an integrated model. Journal of Financial Reporting and Accounting, 22(2), 308-326. https://doi.org/10.1108/JFRA-04-2023-0214

Al Shanti, A. M., & Elessa, M. S. (2023). The impact of digital transformation towards blockchain technology application in banks to improve accounting information quality and corporate governance effectiveness. Cogent Economics & Finance, 11(1), 2161773. https://doi.org/10.1080/23322039.2022.2161773

Alnaimat, M. A., Kharit, O., Mykhailenko, I., Palchyk, I., & Purhani, S. (2024). Implementation of cloud computing in the digital accounting system of logistics companies. Acta Logistica, 11(1), 99-109. https://doi.org/10.22306/al.v11i1.461

Alqaraleh, M. H., & Oudat, M. S. (2022). The mediating role of organizational culture on the relationship between information technology and internal audit effectiveness. Corporate Governance and Organizational Behavior Review, 6(1), 10.22495. https://doi.org/10.22495/cgobrv6i1p1

Alrawashedh, N. H., & Shubita, M. F. (2024). Impact of digital transformation on the organization's financial performance: A case of Jordanian commercial banks listed on the Amman Stock Exchange. Banks and Bank Systems, 19(1), 126. https://doi.org/10.21511/bbs.19(1).2024.11

Balicka, H. (2023). Digital technologies in the accounting information system supporting decision-making processes. Zeszyty Naukowe. Organizacja i Zarządzanie/Politechnika Śląska. (169). https://doi.org/10.29119/1641-3466.2023.169.4

BinSaeed, R. H., Yousaf, Z., Grigorescu, A., Radu, V., & Nassani, A. A. (2023). Digital revolution and digitization process to promote AIS as a vector of financial performance. Systems, 11(7), 339.

https://doi.org/10.3390/systems11070339

Castellar, G. B., Querido, M. F. R., & de Souza Meirelles, F. (2021). To the top: the impact of digital transformation on the market value of Magazine Luiza. International Journal of Innovation, 9(3), 439-473. https://doi.org/10.5585/iji.v9i3.18621

Daouk, A. (2025). Navigating the digital transformation landscape: Education, opportunities, and challenges for entrepreneurs. Entrepreneurship—digital transformation, education, opportunities and challenges, 113. https://books.google.com.pk/books?id=tghEEQAAQBAJ&printsec=frontcover#v=onepage&q&f=false

Eddy, T. T. M., Georges, B. B., Salomon, N. E. P., & Boniface, E. M. V. (2024). Birth Certificates Delivery, Traceability and Authentication Using Blockchain Technology. International Journal of Advanced Computer Science and Applications, 15(9). https://doi.org/10.14569/IJACSA.2024.0150957

El Midaoui, M., Laoula, E. B., Qbadou, M., & Mansouri, K. (2021). Logistics tracking system based on decentralized IoT and blockchain platform. Indonesian Journal of Electrical Engineering and Computer Science, 23(1), 421-430. https://doi.org/10.11591/ijeecs.v23.i1.pp421-430

Endres, H., Huesig, S., & Pesch, R. (2022). Digital innovation management for entrepreneurial ecosystems: services and functionalities as drivers of innovation management software adoption. Review of Managerial Science, 16(1), 135-156. https://doi.org/10.1007/s11846-021-00441-4

Fabian, N. E., Broekhuizen, T., & Nguyen, D. K. (2021). Digital transformation and financial performance: Do digital specialists unlock the profit potential of new digital business models for SMEs?. In Managing Digital Transformation (pp. 240-258). Routledge. https://doi.org/10.4324/9781003008637-25

Mahmood, H. S., Abdulqader, D. M., Abdullah, R. M., Rasheed, H., Ismael, Z. N. R., & Sami, T. M. G. (2024). Conducting in-depth analysis of AI, IoT, web technology, cloud computing, and enterprise systems integration for enhancing data security and governance to promote sustainable business practices. Journal of Information Technology and Informatics, 3(2), 297-332. https://www.researchgate.net/publication/383087255

Freeman, D. (2022). Metaverse Investing: The Step-By-Step Guide To Understand Metaverse World And Business, Virtual Land, Defi, NFT, Crypto Art, Blockchain Gaming, And Play To Earn. Darell Freeman. https://books.google.com.pk/books?id=A11qEAAAQBAJ&printsec=frontcover#v=onepage&q&f=false

Giachino, C., Cepel, M., Truant, E., & Bargoni, A. (2025). Artificial intelligence-driven decision making and firm performance: a quantitative approach. Management Decision, 63(10), 3454-3476. https://doi.org/10.1108/MD-10-2023-1966

Guo, L., & Xu, L. (2021). The effects of digital transformation on firm performance:

Evidence from China's manufacturing sector. Sustainability, 13(22), 12844. https://doi.org/10.3390/su132212844

Haddad, H. (2021). The effect of artificial intelligence on the AIS excellence in Jordanian banks. Montenegrin Journal of Economics, 17(4), 155-166. https://doi.org/10.14254/1800-5845/2021.17-4.14

Hair, J., & Alamer, A. (2022). Partial Least Squares Structural Equation Modeling (PLS-SEM) in second language and education research: Guidelines using an applied example. Research Methods in Applied Linguistics, 1(3), 100027. https://doi.org/10.1016/j.rmal.2022.100027

Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). Partial least squares structural equation modeling (PLS-SEM) using R: A workbook. Springer. https://doi.org/10.1007/978-3-030-80519-7

Hair Jr, J. F., Sarstedt, M., Ringle, C. M., & Gudergan, S. P. (2023). Advanced issues in partial least squares structural equation modeling. . saGe publications. https://uk.sagepub.com/en-gb/eur/advanced-issues-in-partial-least-squares-structural-equation-modeling/book279526

Hatamlah, H., Allahham, M., Abu-AlSondos, I., Mushtaha, A., Al-Anati, G., Al-Shaikh, M., (2023). Assessing the moderating effect of innovation on the relationship between information technology and supply chain management: an empirical examination. Applied Mathematics & Information Sciences, 17(5), 889-895. https://doi.org/10.18576/amis/170515

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. Journal of the Academy of Marketing Science, 43(1), 115-135. https://doi.org/10.1007/s11747-014-0403-8

Jaradat, Z., Al-Hawamleh, A., Al-Tahat, S., & Mohammed, A. (2026). Exploring the impact of cloud computing-based accounting information systems on Sustainable Development Goal 8: evidence from the industrial sector in Saudi Arabia. Competitiveness Review: An International Business Journal, 36(1), 39-60. https://doi.org/10.1108/CR-09-2024-0189

Jawabreh, O., Mahmoud, R., & Ali, B. J. (2024). Big data in the hospitality industry: a methodical review. TELKOMNIKA (Telecommunication Computing Electronics and Control), 22(4), 838-845. https://doi.org/10.12928/telkomnika.v22i4.25543

Ji, C., Dong, X., & Lin, W. (2025). The effects of e-commerce adoption on the financial performance of agri-food enterprises in China. Electronic Commerce Research, 25(5), 3589-3607. https://doi.org/10.1007/s10660-024-09810-z

Kumar, B., Roy, S., Singh, K. U., Pandey, S. K., Kumar, A., Sinha, A., Shukla, S., Shah, M. A., & Rasool, A. (2023). A Static Machine Learning Based Evaluation Method for Usability and Security Analysis in E-Commerce Website. IEEE Access, 11, 40488-40510. https://doi.org/10.1109/ACCESS.2023.3247003

Li, W., Sun, C., Li, Y., & Ertz, M. (2024). Effects of business to business e-commerce platform-governance mechanisms on seller firms' performance. Research in International Business and Finance, 67, 102121. https://doi.org/10.1016/j.ribaf.2023.102121

Lu, Z. (2022). Encryption management of accounting data based on DES algorithm of wireless sensor network. Wireless Communications and Mobile Computing, 2022(1), 7203237. https://doi.org/10.1155/2022/7203237

Masoud, R., & Basahel, S. (2023). The effects of digital transformation on firm performance: The role of customer experience and IT innovation. Digital, 3(2), 109-126. https://doi.org/10.3390/digital3020008

Mohapatra, M. R., & Rakshit, B. (2025). Does the Adoption of Blockchain Technology Necessarily Improve Firm Performance? Application of Meta-Analysis. Emerging Markets Finance and Trade, 61(14), 4366-4383. https://doi.org/10.1080/1540496X.2025.2509772

Moudud-Ul-Huq, S., Asaduzzaman, M., & Biswas, T. (2020). Role of cloud computing in global accounting information systems. The Bottom Line, 33(3), 231-250. https://doi.org/10.1108/BL-01-2020-0010

Mujalli, A., Wani, M. J. G., Almgrashi, A., Khormi, T., & Qahtani, M. (2024). Investigating the factors affecting the adoption of cloud accounting in Saudi Arabia's small and medium-sized enterprises (SMEs). Journal of Open Innovation: Technology, Market, and Complexity, 10(2), 100314. https://doi.org/10.1016/j.joitmc.2024.100314

Nazara, D. S., Sutrisno, A., Nersiwad, N., & Muslimin, M. (2024). Digital transformation in operations management: Leveraging technology to improve business efficiency. Journal of Operations Management, 1(5), 77-84. https://pdfs.semanticscholar.org/b92b/0d18d9abfa27237e564d1dd88efd07592073.pdf

Oncioiu, I., Bîlcan, F. R., Stoica, D. A., & Stanciu, A. (2019). Digital transformation of managerial accounting-trends in the new economic environment. EIRP Proceedings, 14(1). https://proceedings.univ-danubius.ro/index.php/eirp/article/view/1919

Oudat, M. (2021). Board characteristics and intellectual capital performance: empirical evidence of bahrain commercial banks. Academy of Accounting and Financial Studies Journal. https://doi.org/10.2139/ssrn.5147096

Salhab, H., Allahham, M., Abu-Alsondos, I., Frangieh, R. H., Alkhwaldi, A., & Ali, B. (2023). Inventory competition, artificial intelligence, and quality improvement decisions in supply chains with digital marketing. Uncertain Supply Chain Management, 11(4), 1915-1924. https://doi.org/10.5267/j.uscm.2023.8.009

Salih Omar, S., Mohamed Nayef, J., Hashim Qasim, N., Tomaa Kawad, R., & Kalenychenko, R. (2024). The Role of Digitalization in Improving Accountability and Efficiency in Public Services. Investigación Operacional, 45(2). https://revistas.uh.cu/invoperacional/article/view/9522

Shan, R., Xiao, X., Dong, G., Zhang, Z., Wen, Q., & Ali, B. (2022). The influence of accounting computer information processing technology on enterprise internal control under panel data simultaneous equation. Applied Mathematics and Nonlinear Sciences, 1-9. https://doi.org/10.2478/amns.2022.2.0157

Tajudeen, F., Moghavvemi, S., Thirumoorthi, T., Phoong, S., & Bahri, E. (2025). Digital Transformation Issues and Challenges: Solutions for Malaysian SMEs. In (pp. 69-89). https://doi.org/10.1108/978-1-83662-168-320251005

Toscano-Jara, J., Loza-Aguirre, E., Segura, M., & Franco-Crespo, A. (2024). Digital Transformation. Innovar: Revista de ciencias administrativas y sociales, 34(93), 1-26. https://www.jstor.org/stable/27367199

Van, H. V., Afifa, M. A., & Saleh, I. (2024). Accounting information systems and organizational performance in the cloud computing era: evidence from SMEs. Sustainability Accounting, Management and Policy Journal. https://doi.org/10.1108/SAMPJ-01-2024-0044

Wang, L., Liu, S., & Xiong, W. (2022). The impact of digital transformation on corporate environment performance: evidence from China. International Journal of Environmental Research and Public Health, 19(19), 12846. https://doi.org/10.3390/ijerph191912846

Yang, Y., Chen, N., & Chen, H. (2023). The digital platform, enterprise digital transformation, and enterprise performance of cross-border e-commerce—from the perspective of digital transformation and data elements. Journal of Theoretical and Applied Electronic Commerce Research, 18(2), 777-794. https://doi.org/10.3390/jtaer18020040

Zhao, X., Li, X., Li, Y., & Wang, Z. (2024). The impact of digital transformation on firm performance. Industrial Management & Data Systems, 124(8), 2567-2587. https://doi.org/10.1108/IMDS-09-2023-0661

Zimonjić, M. (2024). Impact of digital transformation on the competitive advantage of companies. Megatrend revija, 21(1), 13-22. https://doi.org/10.5937/MegRev2401013Z