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Implementing digital transformation and its impact on the financial performance of commercial banks operating in baghdad governorate: An empirical study using SPSS

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Abstract
This research aims to assess the impact of modern technologies on bank performance by identifying the nature of digital transformation and analyzing the financial performance indicators of commercial banks operating in Baghdad Governorate, as well as the relationship between them. Understanding the effects of digital transformation on financial performance in developing economies like Iraq is crucial. The banking sector is a cornerstone of economic activity, capital flow, and investment, and therefore must keep pace with the rapid and dynamic development of this sector. This research employs a quantitative approach using the SPSS statistical software, collecting data from 16 out of 24 commercial banks in Baghdad during the period 2020-2024. The dimensions of digital transformation, such as digital banking services, mobile banking adoption, online transaction volume, and digital investment, were analyzed against key financial performance indicators: return on assets (ROA), return on equity (ROE), and net interest margin (NIM). The research hypotheses were tested, and correlation, regression, and analysis of variance (ANOVA) tests were conducted. The results showed a significant positive relationship between digital transformation and the financial performance of commercial banks in Baghdad. Based on this finding, the research proposes the following recommendations for commercial banks: increase investment in digital transformation initiatives; Providing training and development programs for employees to enhance their skills and capabilities; focusing on increasing the volume of electronic transactions by encouraging customers to use digital channels; investing in digital infrastructure and cybersecurity to support the growth of digital banking services; and developing comprehensive digital transformation strategies that include specific performance metrics to assess the impact of digital initiatives on financial performance.

Keywords: Digital transformation, financial performance, commercial banks, return on assets, return on equity, net interest margin

1. Introduction

1.1 Background

The banking sector has witnessed technological advancements in communications and globalization, alongside an increasing number of branches and customers. These rapid global technological developments have led to numerous fundamental changes in the banking sector, enabling banks to offer unique features to users through their digital channels, thus helping to attract customers. This has made digital transformation an indispensable option for achieving competitiveness and ensuring continued efficient performance (Abdul Majeed, 2025). Digital transformation means integrating digital technology to streamline processes, improve service delivery, and foster innovation in public and private organizations. This occurs across three key areas of the organization: customer experience, operations, and procedures. This fundamentally changes how banks operate and deliver value to customers (Bharadwaj *et al*., 2013) [12] The digital transformation of banking extends far beyond mere payments and financial transfers between individuals. A series of banking steps begins with a transfer order issued by the sender to pay the beneficiary. This transformation encompasses the adoption of technologies such as mobile banking, online banking, artificial intelligence, blockchain, and cloud computing key features of digital transformation in banking and digital finance (Gimpel *et al*., 2018) [20].

The Iraqi banking sector is undergoing continuous development towards digital transformation and financial technology, focusing on strengthening the electronic payment infrastructure and developing banking services, alongside efforts to improve the efficiency of private sector lending, enhance financial inclusion, and protect deposits. This has contributed to reshaping the private banking landscape, improving service delivery, operational efficiency, and customer interaction. Digital transformation continues its gradual progress despite infrastructure constraints, security concerns, and regulatory limitations (Abdullrada& Waheeb, 2023) [7].

1.2 Research Problem

This research aims to address the existing research gap regarding the impact of digital transformation on the financial performance of banks. Despite the significant impact of digital transformation on the banking sector in developed and emerging countries, and even in countries neighboring Iraq, research examining its impact on the financial performance of banks in developing countries, particularly Iraq, remains inadequate (Sadraoui & AL-Bayat. 2024) [9]. Furthermore, the extent of these investments' impact on financial performance remains insufficient. Therefore, more comprehensive studies are needed to understand the relationship between digital transformation and financial performance in the context of commercial banks in Baghdad. This research conducts a comprehensive quantitative assessment of the relationship between digital transformation and the development of banking performance, aiming to estimate the positive and negative effects of this relationship at the banking sector level in Iraq.

1.3 Research Questions

This study aims to answer the following research questions:

1. How has the level of digital transformation developed among commercial banks operating in Baghdad Governorate?
2. What is the nature of the impact of digital transformation on the financial performance of commercial banks operating in Baghdad Governorate?
3. How has the relationship between the dimensions of digital transformation and the financial performance indicators of banks operating in Baghdad Governorate affected them?
4. What are the appropriate future paths that commercial banks in Baghdad Governorate should follow to respond to digital transformation and improve their financial performance?

1.4 Research Objectives

The objectives of this study are:

1. A study of the chronological development of digital transformation in commercial banks operating in Baghdad Governorate.
2. Using SPSS software to determine the relationship between digital transformation and the financial performance of commercial banks operating in Baghdad Governorate.
3. Identifying the dimensions of digital transformation that affect the financial performance indicators of commercial banks operating in Baghdad Governorate.
4. Improving financial performance by determining how digital transformation contributes to increased revenues, reduced costs, and enhanced efficiency of banking operations in the studied banks, and forecasting future trends in the development of digital transformation.

1.5 Significance of the Research

The importance of this research can be highlighted as follows:

1. It provides practical evidence regarding the relationship between the dimensions of digital transformation and financial performance indicators in the Iraqi banking sector.
2. It represents a valuable addition to academic libraries and can serve as a strong incentive for researchers to conduct further studies in this important field, given the scientific and theoretical aspects it addresses.
3. It assists researchers seeking to understand, analyze, and predict the dynamics of digital transformation in emerging economies and its stimulating impact on decisions made based on financial information published on digital platforms.

2. Literature Review

2.1 Digital Transformation in Banking

Digital transformation encompasses the shift of organizations from a traditional business model to a digital one, the innovation of products and services, market research and development, and the generation of new revenue streams through a digital strategy. It is a modern manifestation of financial technology (FinTech), whose integration into commercial banks adds significant value. Digital transformation in the banking sector refers to the radical changes brought about by digital technologies in banking operations, services, and business models (Hess *et al*., 2020) [22]. According to Vial (2021) [27], digital transformation is "a process aimed at improving an entity by fundamentally altering its characteristics through a combination of information, computing, communication, and connectivity technologies." It is also an ongoing process that enables organizations to adapt to the demands of their businesses and markets by leveraging the digital capabilities of digital innovation. In the banking context, it is a continuous development and modernization process aimed at absorbing and integrating new technologies into all business operations and services. This technological gap presents a significant challenge, but it also offers unique opportunities for the sector to enhance services and reshape the customer experience. This transformation includes the adoption of diverse technologies such as mobile banking, online banking, ATMs, electronic payment systems, and, more recently, artificial intelligence (AI) and blockchain (Wessel *et al*., 2021) [28].

Digital transformation refers to the integration of digital technology across all business areas, fundamentally changing how the banking sector operates and delivers value to customers. Digital transformation is crucial for maintaining competitiveness, improving operational efficiency, enhancing customer experiences, accessing new markets, creating added value, and achieving social well-being. Drivers of digital transformation in the banking sector include changing customer expectations and increased competition from fintech companies (Aryasari & Usman, 2024) [23] Digital transformation opens the door to technological innovation, new business models, and

collaboration across the banking sector, which are essential for delivering business and services efficiently and effectively. As customers increasingly demand accessible banking services, banks are compelled to invest in digital technologies to meet these expectations (Shaikh & Karjaluoto, 2015) [25].

2.2 Digital Transformation in Developing Countries

The pace and nature of digital transformation in developing countries differ significantly from those in advanced economies, and the digital divide persists, impacting the ability of some banks to fully capitalize on the benefits of digital transformation (World Bank, 2020) [29]. In developing countries, digital transformation in the banking sector faces challenges such as weak digital infrastructure, low levels of digital literacy, cybersecurity concerns, regulatory hurdles, and limited innovation (Osei, *et al*., 2023) [8]. Despite these challenges, digital banking offers significant opportunities for financial inclusion and economic development in these regions. Developing digital infrastructure in developing countries is essential to promoting the use of information technology by improving internet access and fostering innovation (Donovan, 2012) [19].

In the Middle East, including Iraq, digital transformation in the banking sector is gaining increasing momentum. However, digital transformation in Iraqi private banks is still in its early stages, and this momentum has been slower than global trend (Sujee, & Solanki, 2024) [5]. This disparity is largely attributed to varying levels of investment in infrastructure. Factors such as political instability, economic challenges, and infrastructure constraints have hindered the rapid adoption of digital banking technologies in the region (Hamzah, 2024) [3].

2.3 Digital Transformation in the Iraqi Banking Sector

The Iraqi banking sector has historically been characterized by reliance on traditional banking methods, limited use of digital technologies, administrative inefficiencies, and weak oversight (Mohammed & Shamkhi, 2024) [6]. However, recent years have witnessed increasing efforts to modernize the sector through digital transformation initiatives. This technological development is reshaping the private banking landscape, improving service delivery, operational efficiency, and customer interaction (Sadraoui & AL-Bayat. 2024) [9]. The Central Bank of Iraq (CBI) promotes digital banking as part of its strategy to enhance financial inclusion and modernize the financial system. It aims to build a modern and transparent banking system and support financial stability by implementing comprehensive development strategies aligned with international standards (Central Bank of Iraq, 2020) [14].

The Iraqi banking sector is undergoing a gradual transformation, with investments in developing digital banking services. Commercial banks have begun implementing various digital tools, such as online banking, mobile banking applications, and electronic payment systems (ATMs) (Hussein & Neama, 2025) [4]. However, Iraqi banks face several challenges that hinder their development, including weak management, inefficiency, and inadequate internal controls. As a result of these obstacles, the level and impact of digital transformation in Iraqi banks remain relatively low compared to regional and global standards (Hussein, & Lafta, 2023) [2].

2.4 Financial Performance in Banking

Financial performance is a company's ability to generate revenue and indicates how effectively a bank uses its assets to generate profits and create value for shareholders (Alrawashedh & Shubita 2024) [24]. Financial performance indicators (FPIs) can be used to measure financial performance, and key indicators used to measure a bank's financial performance include return on assets (ROA), return on equity (ROE), net interest margin (NIM), efficiency ratios, and capital adequacy ratios (Sadraoui & AL-Bayat. 2024) [9]. These indicators provide essential information about a company's financial performance, identify potential areas for improvement, and help measure the institution's financial effectiveness and sustainability.

Return on assets (ROA) measures a bank's profitability relative to its total assets. The higher this ratio, the more efficiently the bank invests its assets in profitable operations. Return on equity (ROE), on the other hand, refers to the return generated from shareholders' equity. A low ROE indicates the bank's inability to distribute more profits to shareholders (Berger, 2003) [11]. Net interest margin (NIM) represents the difference between the interest income a bank earns and the interest paid to lenders, relative to its total assets. An increase in this ratio signifies improved financial performance (Demirgüç-Kunt & Huizinga, 1999) [18]. These indicators provide valuable insights into a bank's profitability, efficiency, and overall financial health, helping institutions assess their financial performance and make effective decisions.

2.5 Digital Transformation and Financial Performance

The relationship between digital transformation and financial performance has garnered significant attention in recent decades, with the banking sector being one of the most prominent sectors impacted by digital transformation (Mohammed & Shamkhi, 2024) [6]. Numerous studies have indicated that digital transformation enhances financial performance through various mechanisms. The expansion of digital technologies has led to comprehensive changes in how banking services are delivered and financial operations are managed, contributing to reduced costs, faster service delivery, increased customer satisfaction, improved performance, and the achievement of long-term financial surpluses (Hajiheydari *et al*., 2023) [13].

Another study on European banks, conducted by Haddad & Hornuf (2019) [21] ound that the profitability and efficiency of these banks are positively affected by digital transformation. A financial institution's success in generating profits depends on certain variables that measure its financial performance, and its achievements are reflected in its financial statements, Cole *et al*., demonstrated that digital transformation inevitably results in improved financial performance in European financial institutions by reducing operating costs and expanding customer reach.

Collaboration with leading technology companies is essential to develop innovative solutions and improve the quality of digital services provided to customers. Accordingly, the impact of digital transformation on financial performance varies depending on several variables, such as market conditions and the level of technological infrastructure (Aryasari & Usma, 2024) [23]. While developing countries suffer from many problems that can be reflected in the nature of the impact of digital transformation on financial performance, such as weak technology,

financial backwardness, weak digital literacy, and weak approaches to digital security and resilience to change. (Osei, *et al*., 2023) [8].

2.6 Research Gaps

Although numerous studies have addressed the relationship between digital transformation in the banking sector in various contexts, they are not without numerous research gaps. Most studies have examined banking systems in developed countries compared to developing countries like Iraq (Sadraoui & AL-Bayat. 2024) [9] Furthermore, there is a scarcity of empirical studies investigating the dimensions of digital transformation and its impact on financial performance indicators in emerging markets (Hamzah, 2024) [3]. This study aims to address these gaps by analyzing the impact of digital transformation on the Iraqi banking sector, specifically its effect on increasing financial performance indicators such as return on assets, return on equity, and net interest margin, using SPSS modeling.

3. Methodology

3.1 Research Approach

This research employs statistical methods to measure the relationship between the dimensions of digital transformation and the financial performance indicators of commercial banks in Baghdad Governorate. This is achieved by measuring the correlation between variables and utilizing linear regression and variance analysis. Statistical analysis of numerical data enables hypothesis testing and the identification of relationships between variables (Creswell, 2009) [17].

3.2 Population and Sample

The research population consists of 24 banks, representing all commercial banks operating in Baghdad Governorate and Iraq up to 2024 (Central Bank of Iraq, 2025). Sixteen commercial banks responded, representing 66% of the total number of banks.

3.3 Data Collection Methods

The research relied on available sources related to the relationship between the two variables, including studies, periodicals, and reports, to cover the theoretical aspect. As for the applied aspect, it relied on two types of sources: primary sources, which were collected through questionnaires distributed to bank managers and IT officials in the research sample to measure the level of use of digital transformation in digital banking services, such as the use of smartphones in banking transactions, digital investment, and the level of electronic transactions in banking services; and secondary sources, which were reports and data from participating banks published by the Central Bank of Iraq and the Iraq Stock Exchange, as well as the banks' annual reports for the period 2018-2022. Financial performance indicators were adopted, such as return on equity (ROE), return on assets (ROA), and net interest margin (NIM).

3.4 Variables and Measurements

Independent Variables: Digital Transformation Dimensions

1. **Digital Banking Services (DBS):** This refers specifically to services that utilize digital technology, such as a virtual bank, and thus all online participants. These services encourage customers to easily access all authorized staff (Ahmed & Sur. 2023) [30]. This assessment is measured by the number and sophistication of digital services offered by the bank, including online banking, mobile banking, electronic payments, and digital customer service. A five-point Likert scale was used to evaluate the level of implementation.
2. **Mobile Banking Adoption (MBA):** Mobile banking services are offered via SMS, direct phone calls, and mobile internet applications. It is an interactive channel where both customers and the bank interact virtually using a mobile device. It facilitates flexibility, efficiency, and convenience in using mobile banking applications for both business and personal use (Lu, *et al*. 2015) [31].
3. **Online Transaction Volume (OTV):** Advances in information and communication technology have contributed to the advancement of electronic transactions to their current level, resulting in reduced effort, wider market access, and lower costs, as most business operations are now conducted electronically using the internet. The volume of electronic transactions is measured by the number and value of transactions processed by the bank annually.
4. **Digital Investment (DI):** Digital investment refers to the use of digital components and technologies to invest in financial assets by buying and selling digital assets online using digital financial instruments. It is measured by the percentage of a bank's operating budget allocated to digital transformation initiatives.

Dependent Variables: Financial Performance Indicators

1. **Return on Assets (ROA):** This can be obtained by dividing by: [Net income / Average total assets] × 100.
2. **Return on Equity (ROE):** is the result of the division [net income / shareholders' equity].
3. **Net Interest Margin (NIM):** It is calculated using the formula [(interest income - interest expense) / total assets].

3.5 Statistical Analysis Using SPSS

The research data were analyzed using SPSS version 26. The statistical methods used were as follows:

1. **Descriptive Statistics:** Measures of central tendency and variance (dispersion). Measures of central tendency describe the center of a data set (mean, median, mode), while measures of variance describe the dispersion of a data set (variance, standard deviation).
2. **Correlation Analysis:** Correlation analysis is used to determine if and how strong a relationship exists between two variables or data sets. In this research, it is used to identify the strength of the relationship between the dimensions of digital transformation and financial performance indicators.
3. **Regression Analysis:** This analysis is one of the most widely used statistical methods for studying or estimating the relationship between a dependent variable and a set of independent explanatory variables. Therefore, this analysis determines the predictive power of digital transformation dimensions on financial performance indicators.
4. **ANOVA:** A statistical method for determining whether differences in group means are statistically significant or likely due to random variations. It is used in this

research to compare the financial performance of banks with different levels of digital transformation adoption.

3.6 Hypotheses Development

Based on the literature review, the following hypotheses were formulated:

H_1: There is a significant positive relationship between digital banking services and the financial performance of commercial banks in Baghdad Governorate.

H_2: There is a significant positive relationship between mobile banking adoption and the financial performance of commercial banks in Baghdad Governorate.

H_3: There is a significant positive relationship between online transaction volume and the financial performance of commercial banks in Baghdad Governorate.

H_4: We hypothesize a statistically significant positive relationship between digital investment and the financial performance of commercial banks in Baghdad Governorate.

H_5: We hypothesize a statistically significant positive impact of digital transformation on the financial performance of commercial banks in Baghdad Governorate.

4. Data Analysis and Results

4.1 Descriptive Statistics

Table 1 presents the main research statistics, which are the dimensions of digital transformation as well as the financial performance indicators of the banks studied.

Table 1: Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Digital Transformation Dimensions					
Digital Banking Services (DBS)	15	2.00	5.00	3.51	0.92
Mobile Banking Adoption (MBA) (%)	15	17.00	67.00	39.67	17.24
Online Transaction Volume (OTV) (millions IQD)	15	255.00	1855.00	875.33	482.56
Digital Investment (DI) (%)	15	4.00	19.00	9.89	4.32
Financial Performance Indicators					
Return on Assets (ROA) (%)	15	0.50	2.81	1.54	0.67
Return on Equity (ROE) (%)	15	4.21	18.51	10.88	4.23
Net Interest Margin (NIM) (%)	15	1.80	4.51	2.98	0.86

The results in the table above show a clear disparity in the level of digital transformation adoption among commercial banks in Baghdad Governorate. This disparity stems from the varying levels of investment in digital tools among these banks. The average digital banking services score was approximately 3.51 on a 5-point scale. Mobile banking usage ranged from 17% to 67%, with an average of 39.67%, indicating that less than half of customers use these services on average. Table 1 also shows that the volume of electronic transactions ranged from 255 million to 1,855 million Iraqi dinars, representing a significant difference between banks. Digital investment in the operating budget ranged from approximately 4% to 19%, with an average of approximately 9.89%.

Table 1 also illustrates the financial performance indicators. Return on assets (ROA) showed relatively little variation, ranging from 0.51% to 2.81%, with an average of 1.54%, which is below international standards. Return on equity (ROE) also showed significant variation, ranging from 4.21% to 18.51%, with an average of 10.88%, while net interest margin (NIM) ranged from 1.81% to 4.51%, with an average of 2.98%.

4.2 Correlation Analysis

Table 2 shows the results of the empirical analysis of the Pearson correlation matrix.

Table 2: Correlation Matrix

Variable	DBS	MBA	OTV	DI	ROA	ROE	NIM
DBS	1						
MBA	.782**	1					
OTV	.815**	.847**	1				
DI	.723**	.694**	.758**	1			
ROA	.634**	.587**	.672**	.713**	1		
ROE	.598**	.546**	.623**	.686**	.893**	1	
NIM	.521**	.489**	.557**	.602**	.764**	.812**	1

**Note: ** ** The correlation was found to be significant at the 0.01 level (two tails).

The results of the correlation analysis matrix in Table 2 indicate that the correlation between return on assets (ROA) and return on equity (ROE) reached its highest level at approximately 0.893, and between electronic transactions and mobile banking adoption at approximately 0.846. The highest correlation was between the volume of electronic transactions and net interest margin (NIM) at approximately 0.557. At the same time, digital investment showed the strongest correlation with return on assets (ROA) at approximately 0.713 and return on equity at approximately 0.686. This reflects a significant correlation and influence between all dimensions of digital transformation and financial performance indicators.

4.3 Regression Analysis

Table 3 presents the results of the regression analysis, illustrating how the relationship between digital transformation and its dimensions, and financial performance and its indicators, was analyzed in commercial banks operating in Baghdad Governorate.

Table 3: Regression Analysis for ROA

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
	B	Std. Error	Beta	
(Constant)	0.352	0.126		2.794
DBS	0.089	0.042	0.122	2.119
MBA	0.005	0.003	0.114	1.667
OTV	0.000	0.000	0.287	2.876
DI	0.076	0.018	0.489	4.222

$R^2 = 0.687$, Adjusted $R^2 = 0.602$, F = 8.089, Sig. = 0.002

Table 4: Regression Analysis for ROE

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
	B	Std. Error	Beta	
(Constant)	2.156	0.821		2.626
DBS	0.523	0.274	0.114	1.908
MBA	0.032	0.019	0.115	1.684
OTV	0.001	0.001	0.268	2.623
DI	0.482	0.118	0.492	4.085

$R^2 = 0.652$, Adjusted $R^2 = 0.559$, F = 7.012, Sig. = 0.005

Table 5: Regression Analysis for NIM

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
	B	Std. Error	Beta	
(Constant)	1.234	0.456		2.706
DBS	0.087	0.152	0.093	0.572
MBA	0.008	0.011	0.141	0.727
OTV	0.001	0.000	0.41***3***	3.241
DI	0.065	0.065	0.326	1.000

$R^2 = 0.482$, Adjusted $R^2 = 0.343$, F = 3.476, Sig. = 0.046

Multiple regression analysis based on Tables 3, 4, and 5 indicates that the dimensions of digital transformation collectively explained 68.7% of the variance in return on assets (ROA), 65.3% of the variance in return on equity (ROE), and 48.3% of the variance in net profit margin (NIM)**,**This demonstrates a clear divergence among the banks studied For ROA, digital investment ($\beta = 0.489$, $p = 0.001$) and online transaction volume ($\beta = 0.287$, $p = 0.015$) were significant predictors. Similarly, for ROE, digital investment ($\beta = 0.492$, $p = 0.002$) and online transaction volume ($\beta = 0.268$, $p = 0.024$) were significant predictors. As for the net profit margin (NIM), the online-only transaction volume ($\beta = 0.413$, $p = 0.008$) was recorded as an important indicator.

4.4 ANOVA Results

Table 6 presents the results of the comparison of bank performance during the stages of digital transformation development using ANOVA.

Table 6: ANOVA Results

Financial Performance Indicator	Sum of Squares	df	Mean Square	F	Sig.
ROA					
Between Groups	5.234	2	2.617	8.456	0.005
Within Groups	3.707	12	0.309		
Total	8.941	14			
ROE					
Between Groups	201.456	2	100.728	7.234	0.008
Within Groups	167.012	12	13.918		
Total	368.468	14			
NIM					
Between Groups	5.678	2	2.839	5.123	0.024
Within Groups	6.645	12	0.554		
Total	12.323	14			

According to Table 6, the results of the analysis of variance (ANOVA) indicate significant differences in financial performance among banks with varying levels of digital transformation adoption. Banks were categorized into three groups based on their response to digital transformation: high (3.6-5), medium (2.6-3.5), and low (1-2.5). For the three financial performance indicators (return on assets, return on equity, and net interest margin), the F-statistic was statistically significant at $p < 0.05$, indicating that banks with higher levels of digital transformation adoption tend to achieve better financial performance.

4.5 Hypotheses Testing Results

Based on the statistical analyses, the following conclusions were drawn regarding the research hypotheses:

H_1: We hypothesize a statistically significant positive relationship between digital banking services and the financial performance of commercial banks in Baghdad Governorate.

Result: The results showed that digital banking services were positively and statistically significantly correlated with all financial performance indicators of the banks. However, in the regression analysis, these services were not a statistically significant predictor of any of the financial performance indicators when other dimensions of digital transformation were controlled for.

H_2: Mobile banking use has a statistically significant positive impact on the financial performance of commercial banks in Baghdad Governorate..

Result: Mobile banking use has a statistically significant positive correlation with all financial performance indicators. However, this correlation was not statistically significant in the regression models.

H_3: The volume of electronic transactions has a significant positive relationship with the financial performance of commercial banks in Baghdad Governorate.

Result: There is a significant positive correlation between the volume of electronic transactions in banks and all financial performance indicators, and it was a significant indicator in all regression models..

H_4: We hypothesize a statistically significant positive relationship between digital investment and the financial performance of commercial banks in Baghdad Governorate.

Result: The results of the analysis of variance (ANOVA) indicated that banks implementing higher levels of digital transformation achieved significantly better financial performance across all indicators.

H_5: The results of the analysis of variance indicated that banks implementing higher levels of digital transformation achieved significantly better financial performance across all indicators, as it facilitates data collection and processing.

Result: The results of the analysis of variance indicated that banks implementing higher levels of digital transformation achieved significantly better financial performance across all indicators.

5. Discussion

5.1 Interpretation of Findings

This research underscores the positive relationship between adopting digital transformation and enhancing the financial performance and competitiveness of commercial banks operating in Baghdad Governorate, as the dimensions of digital transformation clearly impact financial performance indicators. The strong correlation between digital investment and financial performance indicates that banks allocating a significant portion of their annual operating budget to digital transformation tools tend to achieve better financial results, along with improved revenue, reduced costs, and enhanced operational efficiency. This finding aligns with previous research by Haddad & Hornuf (2019) [21] and Cole *et al*., which demonstrated that investment in digital financial technology improves banks' financial performance through operational efficiency and enhanced customer experience.

Similarly, the significant impact of electronic transaction volume on financial performance indicates that banks that conduct a greater number of digital transactions tend to achieve higher profitability due to their lower costs compared to traditional banking transactions. This is attributed to the improved accessibility and quality of digital services offered to the public (Berger, 2003) [11]. As customers increasingly use digital channels for their banking needs, banks can reduce operating costs while expanding their customer base, increasing efficiency and effectiveness, and gaining a proactive competitive advantage over other banks in a sometimes saturated market.

The results of the analysis of variance (ANOVA) indicated that banks that implemented higher levels of digital transformation achieved significantly better financial performance across all indicators. Digital transformation is a tool used to improve financial performance and enable institutions to meet current challenges and seize future opportunities. This finding is consistent with broader studies on digital transformation in the banking sector, which concluded that digital maturity is associated with improved financial performance (Vial, 2021) [27].

5.2 Comparison with Previous Studies

The results of the present study are in line with previous research on DT and financial performance in banks. Haddad, 2018 and Hornuf (2019) [21] concluded that digitization has a positive effect on profitability and efficiency of European banks helping them to drive customer engagement, save costs and process as well. According to Cole *et al*., digital transformation increases financial performance through cost savings, reaching to the customer by streamlining and automation, customer engagement and satisfaction via user-friendly digital services, transparency and accountability. This is consistent with our results of the effect of electronic transaction volume on financial performance.

In this respect, our study is also different from prior studies in the banking industry demonstrating how digital transformation dimensions are not equally important. Our results support the idea that the effect is mostly driven by digital transactions volume and digital investment with regard to financial performance indicators, while prior research ranks highest importance of adoption of mobile banking services in enhancing their financial performance (Shaikh & Karjaluoto, 2015) [25]. Such discrepancy could be related to the different structure and unique attributes of the banking sectorin Iraq when compared with other countries..

6. Conclusion and Recommendations

6.1 Summary of Findings

This study studies the effect of digital transformation on the financial performance for commercial banks in Baghdad Governorate. The research results were processed using SPSS, and we found a positive effect of transformation on financial performance. Digital investment and the scale of electronic transaction carry the highest weights in determining financial performance, as indicated by the biggest coefficients among ROA, ROE, NIM. Additionally, banks with high levels of digital transformation met better financial performance in all dimensions compared to other banks and that the implementation of digital transformation is crucial for enhancing the financial performance in commercial banks located in Baghdad Governorate..

6.2 Recommendations for Banks

Research recommendations can be presented based on the results as follows:

1. Increase digital investment: Banks should allocate a significant portion of their fintech budgets to developing digital investments, as this is one of the most important factors in enhancing banks' financial performance, according to the study.
2. Increase the volume of electronic transactions: Commercial banks should increase the volume of electronic transactions, as this investment is one of the most important dimensions of digital transformation affecting financial performance. This can be achieved by encouraging individuals to increase their use of digital tools and channels, such as live chat and email, and by motivating and educating them about the benefits of banking services.
3. Develop comprehensive and flexible digital transformation strategies that include clear performance metrics to assess the impact of digital initiatives on financial performance and ensure the continuity of effective services. These strategies should also include regularly updating, reviewing, and updating security systems to keep pace with evolving technologies and customer expectations.
4. Enhance technology and facilitate access to financial services, and invest in digital infrastructure and cybersecurity to support the growth of digital banking services.
5. Provide training and development programs for employees: This aims to improve their digital skills and capabilities, focusing on essential digital skills such as using modern software and data analysis, to ensure they are prepared to meet digital challenges.

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