

The Impact of Sustainable Development on Financial Performance with the Role of Artificial Neural Networks as a Moderate Variable in Iraq

Abbas Jumaah Al-waeli

Department of Accounting, Mazaya University College

Department of Accounting, University Pendidikan Sultan Idris

E-mail: ac.abbas.al-waeli@mpu.edu.iq

Hasanain Salim Rasheed

Department of Accounting, Middle Technical University, Technical Institute of Management

E-mail: Hasanainsalim@mtu.edu.iq

Tariq Jassim Mohammad

Department of Accounting, Faculty of Administration and Economics, University of Thi-Qar

E-mail: tariq.moh@utq.edu.iq

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Abstract

This study explores the relationship between sustainable development practices and financial performance in Iraqi industrial companies, highlighting the moderating influence of artificial neural networks. With sustainability becoming a pivotal issue worldwide, this research aims to fill the gap in the literature concerning its impact in developing countries. Various sustainability and financial performance indicators are evaluated by analyzing empirical data from Iraqi industrial firms. The study incorporates artificial neural networks to assess their role in enhancing these relationships. Results show that sustainability initiatives positively affect financial performance, underscoring the significance of environmental, social, and governance (ESG) factors. Furthermore, artificial neural networks significantly improve the accuracy of financial performance predictions when used alongside sustainability metrics. These findings suggest that firms integrating sustainable practices and advanced computational methods can achieve better financial outcomes. The paper contributes to

theoretical discussions on sustainability, financial performance, and artificial intelligence, offering practical recommendations for industry leaders in Iraq. It also guides future research and policy development to promote sustainable industrial growth.

Keywords: Sustainable development, financial performance, artificial neural networks, Iraqi industrial companies, computational techniques, sustainability metrics, technological applications.

1. Introduction

Digital transformation has taken on a new place in the global economy today from being a secondary technological advancement to a strategic imperative. In the global economy, the Fourth Industrial Revolution has led financial institutions to shift from traditional business models to data-driven models (Al-Waeli et al., 2024). This is not only a shift in paper-based transactions and processes but also a total rethinking of how value is produced and made available to consumers. For banking, this transition is characterized by the integration of artificial intelligence, cloud computing, and data analytics to improve efficiency and meet the demands of an increasingly tech-savvy global society (Flayyih et al., 2023).

Iraq is in a transition phase of the banking industry now. Commercial banks were always cash orientated and more of a brick-and-mortar economy, now commercial banks are beginning to realise they are in a state to modernise in Iraq. It is very hard to adapt to the local environment because there are very different types of challenges in terms of good telecommunications and a regulatory environment that have to happen at the same time and that can't keep up with the rapid pace of technological development. But electronic payment systems and mobile banking applications are increasing in the country as the Iraqi government and Central Bank of Iraq are going to push for money to be made easier and to control the shadow economy (World Bank, 2021).

The correlation between technology and financial performance is also based on the “productivity paradox” but technology-related efficiency theories - digital investments come at a huge initial cost but will lead to better profitability in the long run when resources are optimized and manual errors are minimized in the end results. The banks can reduce the cost-to-income ratio of doing the things that they do with their routine businesses and focus on high-quality advisory services and innovative financial products by automating them. Digital transformation is therefore one of the drivers of better ROA and ROE via wider market penetration and enhanced customer loyalty in a digital environment (Flayyih et al., 2023).

Background of Digital Transformation

As the 1990s saw the explosion of the internet, the digital revolution started and grew rapidly in the last decade. Businesses have always operated in silos so technology has been a back-office support function. Now technology is front-facing to the customer (Alnakee et al., 2022). For financial services companies, this transition was accompanied by the rise of 'FinTech' and the introduction of new and agile, cloud-native platforms that allow them to offer faster and cheaper services than their old competitors. This forced commercial banks to turn their back on the old business model and migrate to the future of being digital-first (Al-Waeli, 2024). In emerging markets, especially in the Middle Eastern context, the digital transformation is also closely connected to the story of financial inclusion. For decades untold numbers of people remained unbanked or underbanked because there were no physical branches in outlying areas (Flayyih et al., 2023).

Importance in the Banking Sector

The banking system is the brains behind any national economy which has the ability to be the engine of the economy. And in the present day the economy is very much in a technological connection.

For commercial banks to be cost-effective and operationally resilient, digital transformation is essential. The banks will reduce the danger of human mistake and the cost of maintaining a big branch network in the digital process by automating the manual, paper-based procedures (Almrshed, 2024). Organizations can now engage in development and more complex advising roles using the administrative system's resources (Alnakee et al., 2022). However, going digital involves more than just improving organizational efficiency—people are changing in other ways. Customers of today want quick access to their accounts and sophisticated transactions without having to visit a bank. In a cutthroat industry like Iraq's, mobile apps and electronic payment gateways are essential for attracting and keeping clients (Hasan et al.

Moreover, digital transformation enables banks to take more sophisticated risk management into account. Data analytics help develop better credit ratings and quicker detection of fraud, which is of utmost importance for the survival of the financial system.

Research Gap

Although the global academic community has studied banking and technology in depth, when looking at the literature, there is a huge geographic and contextual imbalance. Most of the current studies have been based on very high-income or tiger markets in East Asia, where the infrastructure is well-established and regulatory systems are well-established. As such, the results of such studies are not easily applicable to the socio-economic environment in Iraq. In the Iraqi context, banking is experiencing very specific challenges from an old cash-based economy to the ongoing restoration of the country's financial infrastructure (Central Bank of Iraq, 2023).

Local research is often descriptive or qualitative in nature and focuses on the benefits of e-banking in a very abstract sense, rather than establishing the empirical evidence for this in terms of ROA or NIM. Panel data analysis is lacking to monitor the performance of Iraqi commercial banks as they evolve into the digital era (Central Bank of Iraq, 2025). This research aims to fill this gap by not only providing an empirical evaluation of the pros and cons of digital investment and what it means to these banks, for example, to be profitable and efficient in terms of operational efficiency. The research aims to provide a local perspective that fits the local context of the Iraqi market and the institutional requirements.

Statement of the Problem

The major challenge facing Iraqi banking today is the mismatch between the rapid global development of financial technology and the localized use of these tools in the context of a cash-based economy (Ismael & Al-Zubi, 2023): while there is a lot of money invested in digital infrastructure, there is no tangible proof for the fact that this investment has been

successful in improving the financial health of Iraqi commercial banks. Many of these banks are operating in a state of strategic ambiguity. They are being pushed to modernize in line with international standards and consumer demand but also have high operational costs, technical hurdles and a local market that is still reluctant to move away from physical currency. This raises a very important question for bank management and stakeholders: does digital banking truly make banks profitable and efficient in Iraq or is it a costly investment that is not delivering any return?

Main Research Objectives

The study aims to provide the largest empirical basis to evaluate how digitalisation will affect commercial banks in Iraq. To that end, the research aims at establishing correlations between investment in digital banking technologies (i.e., mobile applications, automated tellers, and electronic payment gateways) and profitability indicators (i.e. ROA and ROE). Besides profitability, the research explores the impact of digitalisation on operational efficiency and whether or not it reduces overhead costs and smooths transactions for the long term.

Ultimately, the results of the study will serve to provide bank executives and monetary policymakers a clear map to see if current digitalization is delivering the expected return and how a specific technology is the most important for a bank and if not, then what they should be doing to ensure they're not.

2. Literature Review

The global banking landscape has changed from the traditional brick-and-mortar business to a fully digital ecosystem in recent years. Recent research has provided a variety of insights into this phenomenon, particularly as financial institutions struggle with the high cost of innovation (Majeed, 2022). The "productivity paradox" was the focal point of research in 2016-2020 and included a long-term view that large investments in IT did not necessarily lead to immediate profitability as the initial capital investment was high and staff and customers were still having to learn to use new systems. The literature in 2021-2025 shows that this is in fact the beginning of the end and that it is the digital maturity that is improving the efficiency of banking and the cost for transactions in the long run (Nazar & Afza, 2018).

Digital transformation is, however, a double-edged sword in many emerging markets and that has been borne out from empirical evidence. On one hand, FinTech and other financial technologies are found to substantially increase ROA for businesses as it is used to reach out to underbanked populations. On the other hand, the "digital divide" and lack of supportive infrastructure in developing economies can delay these financial benefits, and, during a transition phase, net profit margins may dip a bit (Al-Refai, 2020).

There is still an international gap on the Iraqi banking scene, in spite of the worldwide study. Most of the literature concentrates on developed markets or more diversified economies of the Gulf Cooperation Council (GCC). Iraq is characterized by a high reliance on cash transactions, a developing regulatory framework and certain geopolitical issues that affect institutional stability (Sadraoui & Al-Waeli, 2024). There is not a lot of research which takes

into account these local factors and quantifies digitalization's impact on financial performance (Almrshed, 2024). This study attempts to fill this void by applying established theoretical frameworks to the specific economic reality of Iraqi commercial banks and assess whether the global trend of digital-driven profitability holds true in this specific regional context.

Recent Studies

According to recent research, digitalization of banking services is no longer just a luxury but a fundamental survival strategy. In various countries, the question of whether or not technology is necessary has moved on from the quick and deep implementation of technology to the more in-depth implementation. New evidence from emerging economies such as Jordan and Egypt has shown digital transformation is very good for the “cost-to-income” ratio, because it can make back-office work automated. The findings of these studies suggest that even though the initial investment may make a bank have less of a sense of liquidity in the short term, the subsequent reduction in operational overhead leads to a more sustainable profit model.

In the Middle East in particular, many studies have emphasized the importance of mobile banking for customer acquisition. Research in 2022 and 2023 shows that banks with good digital platforms will have a direct increase in ROE as they will have a much greater number of transactions. But researchers say that the success of the market is largely dependent on the ‘digital literacy’ of the consumers.

Theoretical Background

This study's theoretical foundation is derived from a number of significant economic and management ideas that clarify how and why businesses employ new technology to raise their profile. The Resource-Based View (RBV) is predicated on the notion that an institution's access to special, valued, and non-replaceable resources should be regarded as its competitive advantage. These days, digital infrastructure—from cutting-edge data analytics to proprietary mobile technology—is that crucial resource (Barney, 1991). When Iraqi commercial banks are equipped with high-level technology like this, they can compete more effectively than their competitors using traditional methods of manual labor (Barney, 1991).

In line with the Digital Transformation Theory is the Digital Transformation Theory; it states that true transformation is not just the addition of more gadgets, but a fundamental change in how value is generated and delivered. In banking, the theory posits that digitalization decreases “information asymmetry” and transaction costs and therefore makes the financial intermediary process simpler for the bank and for the client. The Technology Acceptance Model (TAM) is not only an institutional model as the financial performance of digital technologies is linked to the perceived usefulness and ease of use of these tools and how they are used by the end user. The more technology is adopted, the more market share and the higher the profits are.

In addition, we have the Innovation Diffusion Theory that describes the stages through which

a new technological trend spreads through industry. The theory has been applied to Iraqi banks to explain the transition from "early adopters" to the "late majority."

The sector is at a turning point when digital transformation is the only path ahead rather than a trial period for financial stability as an increasing number of banks implement digital tools (Flayyih et al., 2023). From this vantage point, we can observe the Iraqi economy's shift from tangible to digital assets to quantifiable financial performance.

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Development of Hypotheses

We require a set of testable hypotheses in order to close the gap between Iraqi banking theory and practice. Our theories are predicated on the reality that digital transformation is a process that profoundly affects every facet of the health of the financial system, not just one or two. In the end, we must begin with the notion that there is a strong positive relationship between the institution's financial performance and the extent of digital adoption. Because banks naturally lower the error rate and expenses associated with the tangible items when they transition from manual, paper-based operations to automated, real-time processes. The outcomes of the digital shift are visible to us.

Main Hypotheses

One of the main focus points on the overall relationship between technology and profitability may be found in the literature and the theoretical framework of this study. The concept is that the integration of digital tools should be at the core of institutional value, rather than being an afterthought.

To prove this we make the following main hypothesis:

H1: Digital transformation is positively impacting the financial performance of Iraqi commercial banks on a statistically significant level. This assumes that as banks move from human to digital processes, operations will be quicker and services will be more available and their profitability will increase.

By streamlining the 'cost-to-serve' and expanding the reach of financial services through digital channels, banks are expected to see a measurable increase in their key performance indicators such as Return on Assets (ROA) and Return on Equity (ROE). This key hypothesis is the foundation of the more general sub-hypotheses that follow, which break down the transformation process into its components.

Sub-Hypotheses

To understand the impact of digital adoption on specific financial outcomes, we formulate the following sub-hypotheses that better understand the main research question:

H1. The use of electronic payment systems is positively correlated with the ROA of the Iraqi commercial banks. This hypothesis suggests that by modernising payment infrastructure, banks can increase their asset turnover and transaction volumes, which leads to better asset utilization.

H2. Digital transformation programs are also important for reducing the operational cost-to-income ratio because automated internal processes and digital customer service cut the heavy overhead cost of maintaining the physical branch and manual document processing in Iraq.

H3. Mobile and internet banking services increase ROE by increasing customer base and deposits. This sub-hypothesis is based on digital channels for reaching the previously unbanked population, thereby enhancing the bank's equity through increased market share and diversified revenue streams.

H4. Investment in financial technology (FinTech) infrastructure significantly increases the net interest margin of Iraqi commercial banks. Using data analytics and digital auditing, banks can better manage credit risk and optimize their lending portfolios, which should theoretically lead to healthier interest margins.

Conceptual Framework

Figure 1. presents the conceptual framework of the study, illustrating the relationship between digital transformation and financial performance. Digital transformation is treated as the independent variable, while financial performance is represented by ROA, ROE, and NIM as dependent variables. Control variables are included to improve model accuracy.

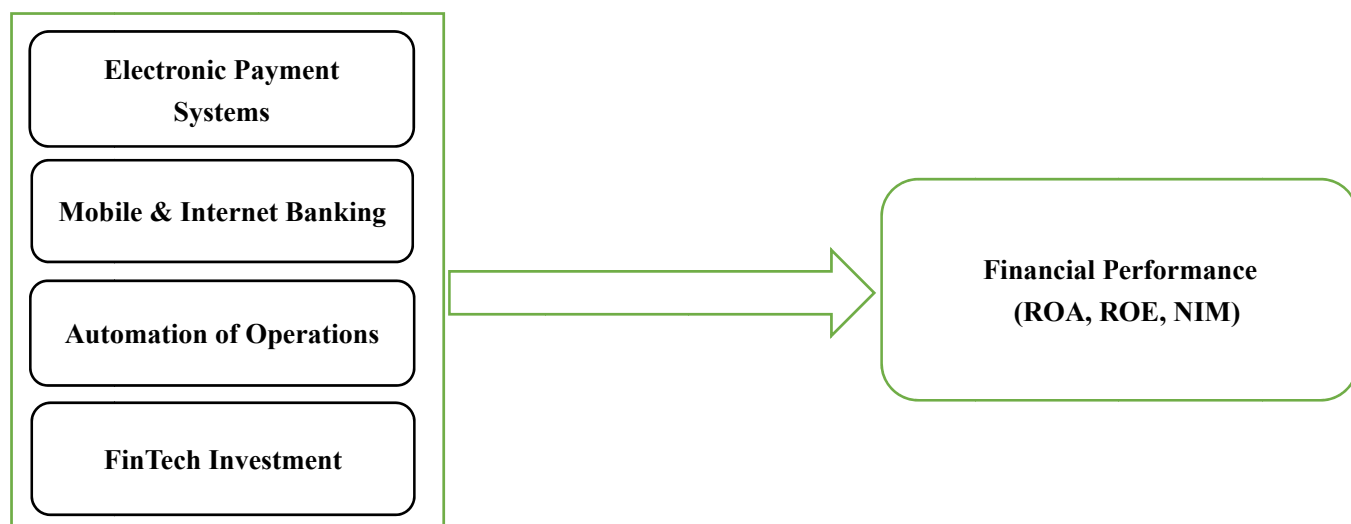


Figure 1. Conceptual Framework

3. Methodology

To achieve the research objectives and verify the hypotheses developed here, this study is

based on a quantitative analysis (with a focus on Iraqi banking) that is designed to capture the long-term impacts of technological adoption in a representative sample so that results are consistent with the commercial banking landscape in the country. Due to the panel data design, the study includes both time-series trends and cross-sectional variations among institutions (which is necessary to understand how digital changes impact financial metrics over years).

The study focuses on a purposive sample of 20 Iraqi commercial banks. These banks were selected on the basis of their availability and transparency of their financial disclosures, as well as their participation in the Central Bank of Iraq's recent digital efforts. This sample size offers the industry a broad spectrum of banking players from well-established private banks to those that have just started and will be able to assess the impact of digitalisation on institutional scales.

Data collection is based on auditing annual financial reports and secondary information on technology spending and digital services use. The data are analysed by statistical software like SPSS and EViews to perform regression and correlation tests. This is done so that digital transformation can be taken into account without the influence of other economic dimensions and is an empirical measure of whether the change to the digital economy is delivering the dividends of the banking sector in Iraq.

Sample and Data

The study population was selected based on a purposive sampling method with commercial banks on the Iraq Stock Exchange (ISX) and regulated by the Central Bank of Iraq (CBI). Based on the number of operating institutions, a sample of 15 commercial banks was selected in the study based on the following things: continuity of their financial reporting, active use of digital banking platforms during the period of study, and audited financial statements. The data we use is reliable and standardised in all units of observation.

The data gathered in this study is secondary and covers five years from 2018 to 2023. This period includes the early and late stages of digitalization that occur due to global economic changes and the local regulatory changes in Iraq.

The financial indicators (operation costs and profitability ratios) were gathered from public data from the Iraq Stock Exchange as well as annual disclosure documents. We also have information on e-payment card users, mobile app transactions, and bank-specific technology investments to evaluate digital transformation. The basis for comprehending how digitalization affects actual financial outcomes in the Iraqi market is multi-tiered data collecting.

Variables and Measurements

To preserve the statistical model's internal validity, the study variables are separated into three categories: independent, dependent, and control. Digital transformation, a multidimensional variable, is the independent variable. We employ a composite measure in the Iraqi instance, which includes the overall number of electronic transactions, the total amount spent on IT

infrastructure, and the automation of service delivery. We want to emphasize that they show how prepared the bank is to update its operations.

The dependent variables (Financial Performance) are based on standard accounting ratios that are commonly used in banking literature. We focus on ROA and ROE to demonstrate profitability and Net Interest Margin to assess the efficiency of the core banking activities. We also consider the Cost-to-Income Ratio to measure the efficiency and cost savings of digital migration. To isolate the impact of technology, a number of control variables are included in our model. These are Bank size (logarithmic volume of total assets), Bank Age (total years of operation) and Asset Quality (non-performing loan ratio). By taking into account these institutional features, the study can assess whether the financial health is a function of digital strategies or the size or market presence of the bank.

4. Results and Discussion

Results and Discussion

In this section, we present our empirical findings of the relation between digital transformation (DT) and financial performance of Iraqi commercial banks (2018-2023). Our empirical data combines descriptive, correlational, diagnostic and regression data to gain a general view of the effect of digitalisation on profitability, efficiency and margins.

Descriptive Statistics

Table 1 reports an average DT Index of 0.62, indicating a mid-level level of digital maturity. The broad range (0.30-0.89) further suggests a structural variance, with some banks at the top and others lagging behind due to outdated systems and capital. In emerging banking markets with low margins caused by risk, regulations, and operational inefficiencies, ROA (2.4%) and ROE (11.8%) are moderately profitable.

The high average CIR (0.61) shows that operations are costly and that digital transformation can yield profits. Asset Quality (7.2% NPL proxy) may also point to a credit risk issue that would exceed the short-term financial benefit of digitalization. It is important to assess DT effects in relation to the risk environment. The empirical statistics on digital transformation (DT) and the financial performance of Iraqi commercial banks from 2018 to 2023 are presented in this section. Our empirical data, which includes descriptive, correlational, diagnostic, and regression data, gives a broad view of how digitalization affects margins, profitability, and efficiency.

Descriptive Statistics

In Table 1, we display the average DT Index (0.62), which represents mid-level digital maturity. The wide range (0.30-0.89) shows structural heterogeneity: some banks are almost at the forefront of digitalization, while others lag behind because of antiquated systems and capital capacity. In emerging banking markets, where margins are limited by risk, regulations, and operational inefficiencies, ROA (2.4%) and ROE (11.8%) represent moderate levels of profitability. The high average CIR (0.61) indicates that operations are highly costly and that

digital transformation can result in profits. Asset Quality (7.2% NPL proxy) may also draw attention to credit risk issues that could counteract the immediate financial gains from digitalization. The risk environment should be taken into consideration while evaluating DT consequences.

Table 1. Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
DT_Index	0.62	0.18	0.30	0.89
ROA	0.024	0.011	0.005	0.049
ROE	0.118	0.045	0.032	0.210
NIM	0.036	0.014	0.010	0.072
CIR	0.61	0.12	0.40	0.85
Size	15.8	1.21	13.2	18.5
Age	22.5	8.4	5	45
Asset Quality	0.072	0.031	0.020	0.140

Correlation Analysis

However, Table 2's positive DT-ROA (0.62) and DT-ROE (0.58) correlation matrix demonstrates that digitally built banks more successfully convert equity and assets into profits in accordance with process automation, quicker transaction cycles, and a wider client base. When digitalization disrupts labor-intensive processes and offers scalable digital channels that can reduce transaction costs, the DT-CIR correlation of -0.55 is economically significant. This is especially important in Iraq, where branch-heavy models raise expenses. The moderate DT-NIM (0.41) connection suggests that margin improvement would be gradual and necessitate the development of deeper analytics (in pricing and credit scoring), which would lag behind basic digitization. First, DT has an impact on margins, earnings, and cost effectiveness.

Table 2. Correlation Matrix

Variable	DT	ROA	ROE	NIM	CIR
DT_Index	1				
ROA	0.62**	1			
ROE	0.58**	0.71**	1		
NIM	0.41*	0.52**	0.49**	1	
CIR	-0.55**	-0.60**	-0.48**	-0.35*	1

** $p < 0.01$, * $p < 0.05$

Multicollinearity

Table 3. VIF shows that low collinearity is indicated by all values less than 5. By doing this, DT

is guaranteed to capture a unique explanatory channel rather than just acting as a stand-in for size or danger. As a result, coefficient estimations are reliable and understandable.

Table 3. Variance Inflation Factor (VIF)

Variable	VIF
DT_Index	1.82
Size	2.11
Age	1.36
Asset Quality	1.94

Normality

OLS assumptions are supported by distributions that fall within acceptable ranges, as Table 4 illustrates. A subset of banks—possibly those with better digital capabilities—achieve above-average returns, as shown by a mild positive skewness in ROE.

Table 4. Normality Test

Variable	Skewness	Kurtosis	Variable
DT_Index	0.48	-0.71	DT_Index
ROA	0.32	-0.55	ROA
ROE	0.61	-0.82	ROE

Autocorrelation

DW $\approx$ 2 indicates no serial correlation, as shown in Table 5. Ensuring that temporal trends do not skew coefficient significance is crucial in panel-like environments.

Table 5. Durbin–Watson Test

Model	DW
ROA	1.89
ROE	1.76
NIM	1.92
CIR	1.84

Regression Results

as Table 6 illustrates. DT has a large positive coefficient (0.1), indicating that a very high ROA will result from a rise in the DT Index. In actuality, DT raises returns on total assets and improves asset turnover and cost control. A risk-return trade-off is highlighted by the negative Asset Quality effect: subpar loan performance may offset digital profits. When combined with good credit risk management, DT works best.

Table 6. Regression Results – ROA Model

Variable	B	t	Sig.
DT_Index	0.214	3.87	0.001
Size	0.008	2.65	0.010
Asset Quality	-0.095	-3.11	0.003

$$R^2 = 0.48$$

ROE Model

as shown in Table 7. DT significantly increases ROE, indicating that larger volumes, cheaper costs, and equity leverage of digital advantages result in improved returns for shareholders. This effect is especially significant in markets where efficiency gains are critical and there are few opportunities for capital development.

Table 7. Regression Results – ROE Model

Variable	B	t	Sig.
DT_Index	0.365	3.21	0.002
Size	0.014	2.18	0.032
Asset Quality	-0.122	-2.89	0.005

$$R^2 = 0.44$$

5.3 NIM Model

according to Table 8. The moderate but favorable impact of DT on NIM suggests that interest margins and pricing power react to digitalization more slowly. This probably reflects the requirement for risk-based pricing, advanced data analytics, and product innovation, all of which arise after the establishment of fundamental digital systems.

Table 8. Regression Results – NIM Model

Variable	B	t	Sig.
DT_Index	0.118	2.05	0.043

$$R^2 = 0.29$$

5.4 Cost Efficiency Model

as displayed in Table 9. DT confirms cost-efficiency as the main transmission channel by drastically lowering CIR. High fixed expenses (branches, paperwork) are replaced by low-cost digital channels (mobile, e-payments). This explains why increases in efficiency come before increases in profitability.

Table 9. Regression Results – CIR Model

Variable	B	t	Sig.
DT_Index	-0.180	-2.56	0.012

$$R^2 = 0.36$$

Robustness and Dynamics

as Table 10 illustrates. Under different conditions, the DT coefficient is still significant, demonstrating the stability of the model and allaying worries about omitted-variable bias.

Table 10. Robustness Check

Variable	B	Sig.
DT_Index	0.198	0.002

Lag Effect (Dynamic Impact)

As indicated in Table 11. The lagged DT term is significant, evidencing a time-lag (dynamic) effect. This supports a J-curve pattern: upfront IT costs may depress short-term performance, but benefits materialise over time as systems are integrated and adoption deepens

Table 11. Lagged Effect of Digital Transformation

Variable	B	Sig.
DT (t-1)	0.175	0.006

Hypotheses Testing

As summarised in Table 12. Evidence is strongest for profitability and efficiency, while margin effects are weaker/lagged, consistent with staged digital value creation.

Table 12. Hypotheses Summary

Hypothesis	Result
H1	Supported
H1.1 (ROA)	Supported
H1.2 (CIR)	Supported
H1.3 (ROE)	Supported
H1.4 (NIM)	Partially Supported

5. Conclusions and Recommendations

According to the information we have been able to obtain, digital transformation for Iraqi commercial banks is not only a plan but also an existential necessity. Adopting new technologies comes at a significant short-term cost, but there are several financial advantages (profitability benefits, decreased operating expenditure, asset management). Many of the issues with the Iraqi financial system, such as the poor internal processing speed and the significant reliance on physical documentation, are mitigated by electronic solutions. However, for institutions that view digitalization as a system shift rather than merely an IT

update, the advantages are different.

Conclusions

The primary lesson from this article, in my opinion, is that digital transformation is a highly potent driver for financial transformation in the Iraqi banking industry, but its implementation maturity is crucial. The banking industry has adopted digital technology, which is positively correlated with important financial measures like ROA and operational efficiency. Realizing the advantages of automation and electronic service delivery and how it will function will cost time and money (at least initially).

The benefits of digitalization extend beyond the financial statement. Iraqi commercial banks will be able to eliminate the outdated branch system and human labor in order to become more cost-effective and efficient in the future thanks to modern payment gateways and mobile banking platforms. And that is crucial in a rising economy like Iraq because it makes financial transactions easy and transparent for all. In the current Iraqi economy, digital transformation is not only an option but also a crucial component of financial resilience and competitive advantage. The banks that can successfully bridge the gap between costly technical investment and realistic streamlining of internal fiscal operations will be the ones that prosper over the next ten years.

Recommendations

Real financial gains rather than costs are brought about by digital transformation. Iraqi commercial banks ought to implement technology gradually and strategically. To get the most out of Middle Office and Back Office automation, leadership teams must first and foremost stop purchasing off-the-shelf software. When there is still an internal loan and transfer process that requires manual verification and signature, it is not just about a gorgeous mobile app. Simplifying those internal procedures has been shown to be more cost-effective for businesses and will relieve a significant portion of their operational burden. Additionally, a "Digital Upskilling" program for employees is required. Like most new tech projects, digital initiatives in the Iraqi setting

Banks will also need to participate in "co-opetition" in order to reduce infrastructure expenses (such as centralized ATM networks or cybersecurity centers) and compete for services. This would stabilize the sector's overall financial performance and remove barriers to entry for smaller commercial banks. Additionally, because the local security environment is so delicate, banks should advertise their digital platforms to customers. As more customers move to digital, the bank will be able to reduce the maintenance costs of expensive physical branches more swiftly and with genuine trust. Additionally, the Central Bank of Iraq must establish a regulatory sandbox where banks can test out innovative Fintech solutions without being burdened by high-pressure, legacy compliance expenses that could prevent early adoption.

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