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The Impact of Digital Transformation of Information Systems on the Financial Profitability of Institutions

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Abstract

The purpose of the study is to highlight the effects of the digital transformation of information on a purposive sample of private banks listed on the Iraq Stock Exchange (ISX) in the period (2023-2025). The research problem is to evaluate the feasibility of large scale technological investments with tangible financial returns in the banking industry. The study uses descriptive and quantitative analytical methods to analyze the relationship between digital transformation and financial performance indicators, aiming to meet its goals. Digital transformation of information systems is the independent variable, while the dependent variables of the study are financial indicators of profitability: net profit and Return on Assets (ROA).

The results show that digital maturity has a very strong positive association with net profit, which is also statistically significant (R = 0.83). The result indicated that banks with comprehensive digital transformation strategies (such as Al-Mansour bank) had a very high profit growth rate of 411%, whereas traditional banks had a profit growth rate of 15%.

A lower CIR with a higher ROA are two other indicators of enhanced operational efficiency that the data show. Banks are recommended to adopt digital banking models in the cloud to improve financial performance and reduce expenses.

Keywords: *Digital Transformation; Financial Profitability; Banking Sector; ROA; Operational Efficiency.*

1. Introduction

1.1. Background of Study

Today's accounting and management fields are undergoing a paradigm shift in the way they are being used, as new business models come into being. Information systems are not just an instrument for recording data, but they have an effect on the financial performance and competitive position of modern institutions [1], [2]. As the competition in the world is growing, the demands of the digital economy are growing too, and re-engineering financial processes, as well as building information systems to ensure their sustainability has become a must [3]. This position will help the study to dispel some of the myths about digital system adoption and profit maximization. It does this by offering a proof of the monetary gains that can be achieved from technological investments [4].

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One new way to measure the digital divide between institutions is by looking at how well they can integrate smart information technologies into their decision-making processes [5]. The research aims to broaden the view of digital transformations beyond its current role as a cost center by considering it as a strategic instrument for creating money [6]. Digitally transforming information systems is beneficial to institutions in several ways, including better control of liquidity, operational efficiency, as well as lower transaction costs caused by manual processes with human errors. As a direct consequence of these kinds of advancements, financial performance indicators like ROA improve [7], [8]. Crucially, this study provides an empirical as well as theoretical framework that links fourth industrial revolution technologies like cloud computing and artificial intelligence to the reliability of financial reports and the openness of information within institutions [9],[10]. In addition, the study delves into how the real-time flow of data helps level the playing field in terms of information asymmetry, which in turn boosts investor trust and the institution's market worth[11],[12].

The analytical approach provided by this study will be useful for financial decision-makers in understanding the digital transformation's impact on financial performance and its economic implications. By providing empirical data from a growing banking sector, this research contributes to the existing literature on digital transformation. Examining the correlation between financial profitability indicators and the digital transformation for information systems, this research takes a quantitative analytical method. This study's findings should help financial institutions enhance their digital transformation initiatives' bottom lines. Conclude that digital transformation aids in obtaining financial supremacy and a lasting competitive advantage by analyzing the processes by which it affects the structure of costs and revenues. With the introduction of a model that shows how digital information systems may stimulate profit expansion with institutional sustainability in a fast changing business environment, this study hopes to enrich Arab academic literature[3].

1.2. Research Problem

The current disparity among the amount of money invested in digital information systems by institutions and the results they actually receive is the root of the research problem. Despite the fact that digitization is becoming more prevalent, many companies are still confused about how it will influence their bottom line and overall financial health.

This study's major problem is defined by the following questions:

- In order to maximize profits, how might digital transformation be used to restructure operating costs?
- When it comes to important financial performance indicators like net profit with ROA, how does digitalization factor in?
- How much more profitable are banks that fully embrace digital transformation compared to those that stick with the tried-and-true methods of the past?

1.3. Importance for Research

- **Importance of the work:** The present research contributes to the current literature by establishing a contemporary theoretical framework that unites Information technology and the financial sciences, thus challenging the conventional wisdom that views IT as a cost center.

- **Practical Significance:** The present research outlines a practical strategy for decision-makers and bank executives to follow when determining the viability of digital investments financially and utilizing AI to increase efficiency with shareholder value.

1.4. Deficiency of Research

The efficacy of organizations, much research has concentrated on developed countries and large banks with advanced technological infrastructure. Consequently, there is a dearth of data from developing banking systems, especially when it comes to the banking industry in Iraq. Furthermore, previous research has paid scant attention to the correlation between information system digital transformation along with financial profitability metrics like ROA and net profit.

1.5. Research Contribution

The present research creates an integrated framework for analysis to examine the effect of digital maturity on financial profitability, with a focus on Iraqi private banks listed on ISX. By analyzing quantitative data and current financial records, this study sheds light on how digital transformation may boost financial performance in developing banking markets. This study adds to what is already known about the connection among digital transformation with financial performance via some crucial new insights in this area:

- It provides evidence from a developing economy, namely in Iraq's banking industry, on how digital transformation in information systems affects financial performance. While most studies on digital transformation have focused on industrialized nations, this one broadens the scope by looking at private banks listed on ISX.

- A comprehensive analytical framework was presented by this research that connects digital maturity indicators to important financial performance metrics such as net profit and ROA, and operational efficiency indicators such as the CIR. This approach clarifies how monetary advantages can be measured in relation to technological investments.

- This study makes significant contributions in the methodology field through quantitative analysis to calculate the financial impact of digital transformation in financial institutions. This research delves into the latest financial data and digital adoption trends in order to gain insights into how cloud computing and cutting-edge information systems could enhance operational efficiency and financial performance. It provides financial decision makers and banking executives with a valuable perspective on the strategic significance of digital transformation as a catalyst for profitability, cost effectiveness, and future sustainability of institutions in the constantly evolving financial markets.

1.6. The Purposes of the Research

The research project aims to accomplish the following:

- To lay the groundwork for digital transformations within the framework of financial and administrative information systems.
- Look into the ways that digitalization cuts down on wasteful asset use and costs.
- Analyze how the transformation of information systems has affected profitability metrics in the banking sector.
- To lay out a method for analyzing the correlation between digital transformation and ROI and other important financial metrics for banks.

1.7. Research Questions

The following research questions are developed for tackling the research and accomplish the study's objectives:

- What impact does digital transformation have on commercial banks' financial profitability?
- To what extent does digital transformation help banks increase their net profit?

- How will operational effectiveness with ROA be affected by the digital transformation of information systems?

1.8. Structure of the Paper

The rest of the article is structured like this: Theoretical underpinnings and a literature analysis on digital transformation and financial viability are presented in Section 2. Section 3 develops the study's conceptual framework and hypothesis. In Section 4, we detail the procedures and sources of data used in the study. In Section 5, we offer the findings and statistical analysis of the empirical investigation. The main findings of the study are discussed in Section 6. Section 7 concludes the paper with recommendations for further research and financial institutions.

2. Literature Review and Theoretical Background

2.1. Digital Transformation and Information Systems

Previous studies

In recent academic discussions, strategic significance for digital transformations in deciding organizational efficiency with financial performance has been increasingly highlighted. There is a lot of evidence that institutions can benefit from information systems in terms of increased competitiveness and value creation thanks to the shift toward technologically enabled business models. Digital transformation, according to [3], entails more than simply implementing new technologies; it also necessitates reevaluating organizational processes and discovering new revenue streams.

Noted [2] that when advanced digital technologies are properly integrated into information systems, they substantially contribute in improving operation effectiveness and enabling managers to make better informed decisions. Institutional performance is positively affected by digital capabilities, according to empirical studies in the banking with financial sectors.

Building digital capabilities into corporate information systems helps improve operational agility and make the most of institutional resources, according to research by [7], is likely to increase innovation, efficiency, and long term profitability, as shown by [6], and these factors significantly impact financial performance. Accompanying these developments, data-driven technologies have lately garnered a lot of scholarly interest as a crucial component of modern financial institutions. With the introduction of more advanced analytical techniques, like big data analytics and cloud-based information systems, financial forecasts in strategic financial planning have become more precise and reliable. Organizations that are able to incorporate digital technologies into their core operational and strategic activities outperform those that depend on traditional operational models in terms of organizational performance and sustainable competitive advantage [5].

2.2. Concept and Philosophy of Digital Transformation

Reviewing the literature in the fields of finance and administration reveals that the concept of digital transformation is fundamental to the fourth industrial revolution. It is more than just a passing technical term; it represents a movement toward a new way of thinking about organizations and their operations. In this section, the concept is examined by way of four main aspects:

- The main concept (Digitalization): Literary works distinguish among three related concepts that are often conflated in academic discussions: Data digitization refers to the technical process of moving information from an analog to a digital format, which enables electronic storage, processing, and transfer [13].
- Improvements in administrative workflows, payroll automation systems, as well as other operational procedures with operations can be achieved by digitalization [2]

- Because it encompasses the dramatic change that happens when digital technologies are integrated into current organizational structures and business models, digital transformation is the most comprehensive word. Making technology the principal driver of the business model is an important part of business process reengineering, it also includes process improvement. The result is the introduction of novel approaches to increasing profits for businesses and their clients [2], [14].

- The Strategic Philosophy of Digital Transformation: The analysis indicates that digital transformation is centered on building a data-driven culture. An institution that has undergone digital transformation does not rely on intuition in financial decision-making; instead, the transformation relies on advanced information systems that can analyze market behavior and cost patterns in real time. Additionally, it requires a shift in organizational thinking, where flexibility and the ability to adapt to technological changes become core aspects of the institution's culture [15]

- Financial Drivers and Motives for Digital Transformation: Digital transformation is driven by various motives that compel institutions to undertake this shift, with financial motives being one of the strongest drivers. Through digitization, institutions aim to enhance their efficiency and effectiveness through:

- Bridging the information gap to mitigate the risk of poor financial decisions that could lead to high costs.

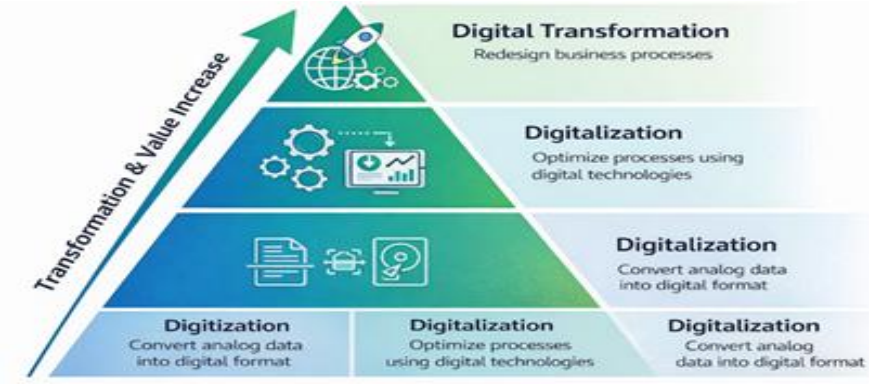
- Enhancing responsiveness by adjusting pricing or production strategies based on real-time data, ensuring profitability during crises.

- innovate revenue streams by developing new digital sales channels with minimal costs [16]

2.3. Structural Impact on the Institution

The analysis indicates that digital transformation alters the organizational structure of institutions by eliminating intermediate administrative levels. This change is facilitated by the capability of information systems to self-monitor and evaluate performance. As a result, there is a reduction in general and administrative expenses, leading to an overall increase in financial efficiency (Sui & Yao, 2023). Figure 1 illustrates the digital transformation pyramid.

Figure 1 Digital Transformation Pyramid



Source: Developed by the researcher based on Westerman et al. (2014), Vial (2019), and Verhoef et al. (2021).

2.4. Objectives of digital transformation in banking institutions

- Implementing digital information systems in banks aims to achieve various financial and operational objectives, most notably [17]:
- Revenue Innovation: Developing new digital sales channels that come with minimal costs, which helps boost non-interest income sources.
- Saving money: One of the main tenets of digital transformation is the elimination of wasteful spending by revealing previously unknown expenses and reducing the likelihood of human mistake via the use of automation.
- Assisting decision making: Financial forecasting becomes more accurate when tactics based on data are used instead of intuition.

2.5. The Importance of Digital Transformation for Banks

The research highlights the importance of information systems from a strategic standpoint within the framework of digital transformation. In addition to conveying data, these systems now act as a central nervous system connecting operational inputs with financial outputs. The following tenets define this function:

- Structural Linking and Information Integration: The capacity of systems to accomplish integration is the digital age's greatest asset for institutions. With the help of modern ERP and information management systems, information can now flow seamlessly and instantaneously from sales to finance management, thereby removing previously existing informational obstacles. Saving time and making sure financial reports are more accurate reflections of operational realities are both made possible by this integration [18].

- Research shows that digital information systems have changed financial management by making predictive analysis possible and keeping operational history safe. This encourages data-based financial decisions. Financial decision-makers can utilize dashboards to monitor cash flows and cost variations in real time, which helps to preserve profitability margins in target ranges and costs from deviating off course [19].

- The introduction of digital systems of information's has improved the reliability, timeliness, and verifiability of accounting information. As a result, the openness and accuracy of financial data are enhanced. As per [20], by reducing the need for human intervention, expert systems can significantly lessen the likelihood of mistakes and misstatements in the processing of financial data. As a result, net profitability increases and company success is enhanced, as investor confidence rises and the cost of capital falls.

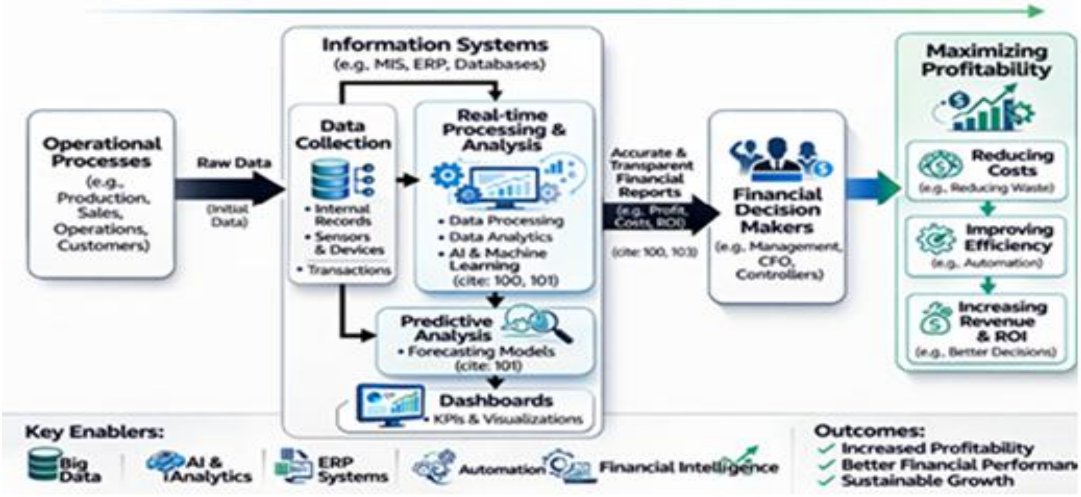
- Digital systems provide exact and rigorous internal control mechanisms; this makes information systems a useful tool for hedging and control. Automated auditing algorithms allow the system to spot inconsistencies, financial infractions, or operational cost gaps before they become major problems. Digital information systems, thus, act as a barrier, keeping institutional assets safe while making the most of them [15]. With the help of digital transformation, banks can turn their information systems into strategic assets that improve financial performance, transparency, and decision-making. The following points demonstrate this significance:

- Bridging the information gap: The rapid flow of data contributes to reducing information asymmetry between management and investors, thereby enhancing trust in financial reports [16].

- Flexibility in cost structure: Digital transformation empowers banks to convert substantial capital expenditures (CapEx) into more flexible operating expenditures (OpEx), particularly through the adoption of cloud computing solutions, the benefits of this adaptability not only boot and enhance efficiency but also drives innovations in the financial sector [15],

- Superior market response: Digital transformation enables banks dynamically adjust interest rates and customize and tailor financial services based on real-time data analytics, thereby enhancing market responsiveness and maintaining profitability stability during financial crises [2]; [5], [21]; [10].

Figure: 2 Digital Transformation of Information Systems and its impact on Financial Profitability in Banks



Source: Developed by researchers based on earlier literature on digital transformation and financial performance, including Vial (2019), Verhoef et al. (2021), and Kane et al. (2019); Brynjolfsson & McAfee (2014).

Figure: 2 illustrates the flow of data from operational processes to financial decision-making in the context of digital transformation. It highlights the relationship between digital transformation of information systems and financial profitability within the banking sector. The figure shows how raw data generated from banking operations is collected and processed through information systems such as ERP (Enterprise Resources Planning) and MIS (Management Information Systems). Advanced analytics, artificial intelligence, and predictive models convert this data into actionable insights, which financial decision-makers then utilize these insights to enhance profitability. This process leads to improvements in key financial indicators such as net profit, return on assets (ROA), and the cost-to-income ratio. Additionally, the image highlights how real-time data processing enhances financial performance, revenue creation, and cost efficiency, which in turn supports sustainable growth.

2.6. Dimensions of Digital Transformation

There are three essential factors technological, organizational, and human that propel digital change in financial institutions. A description of each dimension follows:

- The technology dimensional is all about digital infrastructure, that includes things like cloud computing, analytics of big data, and AI applications. These things help banks make better decisions [22], [23].

- The element of organization places an emphasis on the role of the institutional framework that enables and supports digital transformation. It calls attention to the necessity of a creative and flexible organizational culture that can effectively respond to ever-changing circumstances and fast paced technological as well as market developments [24],[22].

- People Dimension highlights how crucial it is for workers to have the right digital abilities, knowledge, and preparedness to undergo digital transformation in order for it to be a success [25], [26].

2.7. Technological Enablers of Digital Transformation

Modern financial institutions rely on technological instruments as the backbone of their digital transformation infrastructure. A number of steps allow these technologies to immediately improve efficiency in operations and financial performance:

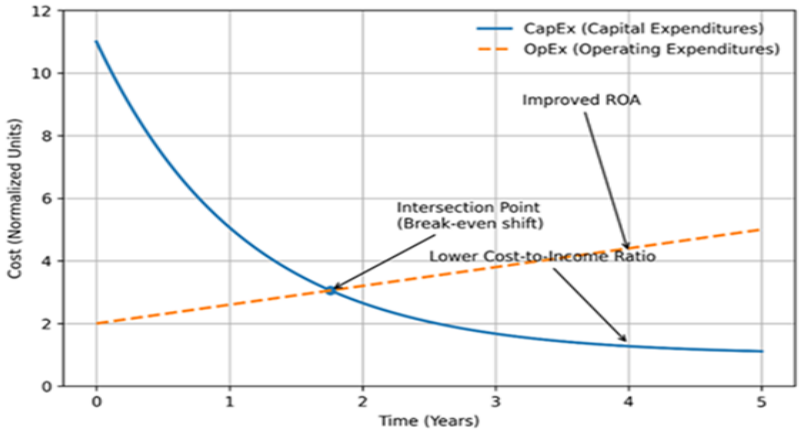
Cost flexibility with Cloud computing: Banks may now more easily scale their technical resources while cutting infrastructure costs thanks to cloud computing, which allows them to move away from expensive, capital-intensive infrastructure and toward flexible operating solutions. According to [27].

Financial institutions may process massive volumes of data to get predictive insights with the use of big data analytics, which in turn helps them maximize revenues. Financial institutions can better meet market demands by developing financial products that use dynamic pricing techniques informed by real-time analysis of consumer behavior and market trends. Found [16] that this method increased asset turnover, decreased stagnant inventory, and improved profitability.

Artificial Intelligence (AI) and Smart Automation of Operations: AI plays a crucial role in the automating of complex operational processes within banking institutions. By integrating AI algorithms into accounting and information systems, the likelihood of human error in financial forecasting is reduced and decrease the reliance on labor-intensive supervisory tasks. This leads to improved operational efficiency and increased profit margins [15].

Internet of Things (IoT) and Instantaneous Control over Assets: The Internet of Things enables financial institutions to monitor physical assets and operational processes using connected digital sensors. This technology helps reduce maintenance costs, prevent operational disruptions, and improve the efficiency of use of institutional resources. [20].

Figure: 3 Cost Transformation via Cloud Computing: From CapEx to OpEX



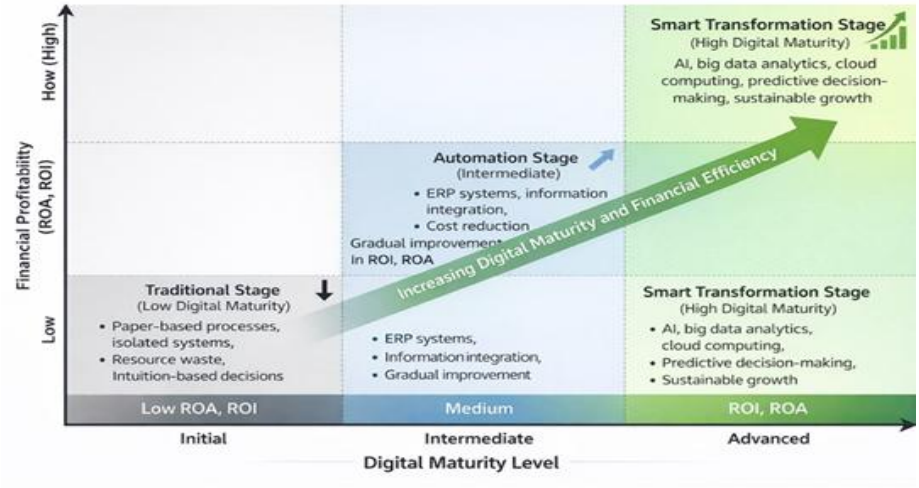
Source: Developed by researchers based on Armbrust et al. (2010) and Marston et al. (2011), and Verhoef et al. (2021).

The intersection points between capital expenditures CapEx and operating expenditures OpEx indicate the stage at which digital transformation begins to yield financial efficiency gains, particularly by reduced cost-to-income ratios in banking institutions. The preceding graphic shows how firms' cost structures are changed when they use cloud computing. CapEx go down and OpEx go up progressively. When operational costs start to outweigh original capital investments, we are at the junction point. By reducing expenses for increasing ROA, this transfer improves financial performance and helps ensure both sustainability with profitability in the long run [28];[29];[3]. It also shows how cloud computing helps businesses shift their spending focus from capital to operational expenses. Results in better financial effectiveness and becoming more durable expense management accredited [29], [28], and [3], are the result of this shift, which lowers investment costs up front and provides more leeway in managing costs over time.

2.8. Digital Maturity and Financial Efficiency in Banking Institutions

By examining the correlation among digital maturity with financial efficiency, the stages for development of banks may be seen in Fig 4. It depicts the three stages of digital transformation for banking institutions, beginning with the first stage of traditional digital transformation, followed by the second stage of intermediate digital transformation, and the third stage, represented by advanced digital transformation. In the first, traditional stage, there is a heavy reliance on manual processes and the performance of specific financial tasks. In the intermediate stage, partial digital integration is contributed through the application of institutional systems and automation strategies to gradually improve operational efficiency. In the advanced stage, financial institutions adopt modern technologies such as artificial intelligence applications, big data analytics, and cloud computing, enabling predictive to decision-making, reduce costs, improve performance of financial tasks, and thus achieve sustainable profitability gains [2],[3],[5]. Accordingly, progressing to higher levels of digital maturity is typically linked to improved financial performance, as measured by return on assets (ROA) and overall profitability [30], [31]. This framework provides the theoretical basis for developing research hypotheses, which examine the direct impact of digital transformation on financial performance, particularly net profit and Return on Assets (ROA).

Figure: 4 Digital Maturity vs. Financial Efficiency Matrix in Banking Institutions



Source: Developed by researchers based on Vial (2019), Verhoef et al. (2021), and Kane et al. (2019).

3. Financial Profitability

3.1. Concept of Financial Profitability

Profitability is reflected in one of the most important indicators for assessing the financial performance of banking institutions. Identifying profit from profitability is critical. The term profit refers to the total amount of money that remains after deducting all costs from income, whereas profitability is a relative metric that shows how well a bank can make money with its current resources over a given time frame. In light of this, financial profitability might be described as an indicator of operational efficiency that shows how well management has used assets, deposits, as well as equity to generate a surplus that ensures the institution's continued existence and expansion [32]

3.2. Importance of Financial Profitability

For financial stability with long-term institutional viability, it is essential that banks turn a profit. A bank's profitability is a measure of its viability and growth potential because it is the principal means by which the capital base is fortified, the capacity to endure financial risks is enhanced, and economic swings are dampened. Capital sufficiency, risk absorption capability, and general financial stability are all directly impacted by a bank's profitability, making it an essential performance and sustainability indicator, especially in challenging economic times. All [30]; [31]; [33]; [34]; [35] agree that banks can't fund lending activities, have enough capital buffers, and maintain long-term operational success without strong profitability.

3.3. Aims for financial profitability

In order to maintain the bank's financial viability, encourage its expansion, and increase the wealth of its shareholders, the management team works hard to achieve predetermined profitability goals. Raising EPS as well as improving the overall value of shareholders is how this goal of strategic financial management is attained and pursued. For banks to be able to weather economic storms and keep their finances stable when markets are volatile, they must have sufficient capital reserves, which they can only achieve by increasing capital adequacy. In addition, banks can better compete in the ever-changing financial markets when they have a healthy profit margin since they can afford to invest in digital banking services and innovation [36].

3.4. Financial viability metrics

In order to measure the profitability of the banking sector, financial research investigations frequently use a set of financial ratios. One of the most utilized metrics is the net profit margin (NPM), showing how much money is left over after paying all the bills and taxes. By cutting operational expenses, digital transformation can enhance the NPM [37], [3]. Another important metric for operational effectiveness is the ROA, which assesses how well management turns assets into profit [33], [34].

The ability of a bank to produce returns for its shareholders is reflected in its ROE, which is a popular metric for evaluating its financial results from an investment standpoint. In addition, by contrasting operational expenditures with operational income, the CIR evaluates the efficacy of cost management. Lower CIR values are indicative of more efficient operations and stronger financial results [31], [30].

4. Development of the Conceptual Framework with Hypotheses

4.1. Conceptual Framework

This study presents a conceptual framework for examining the relationship between the digital transformation of information systems and financial profitability in banking institutions. Digital transformation is considered as the

independent variable, reflecting the adoption of advanced digital technologies, automating operational processes, and supporting decision-making [2],[3]. Financial profitability acts as the dependent variable, evaluating the financial outcomes resulting from improved operational efficiency and the optimal utilization of technological capabilities. It is measured using key financial indicators, including net profit, return on assets ROA, and the cost-to-income ratio (CIR) as an indicator of cost efficiency [33],[31]. The conceptual framework assumes that the effective implementation of digital transformation enhances financial performance by improving efficiency, reducing operating costs, and empowering and simplifying data-driven financial decision-making. Digital transformation also enhances the ability and flexibility of financial institutions to adapt to changing business environments and market conditions and supports innovation and data-driven decision-making [5], and emphasizes that there is a direct positive relationship between digital transformation and financial profitability in banking institutions [5],[10].

4.2. Research Hypotheses

The study was built upon the following scientific hypotheses:

- Main Hypothesis (H1): "Digital transformation of information systems has a statistically significant effect on the financial profitability in banking institutions."

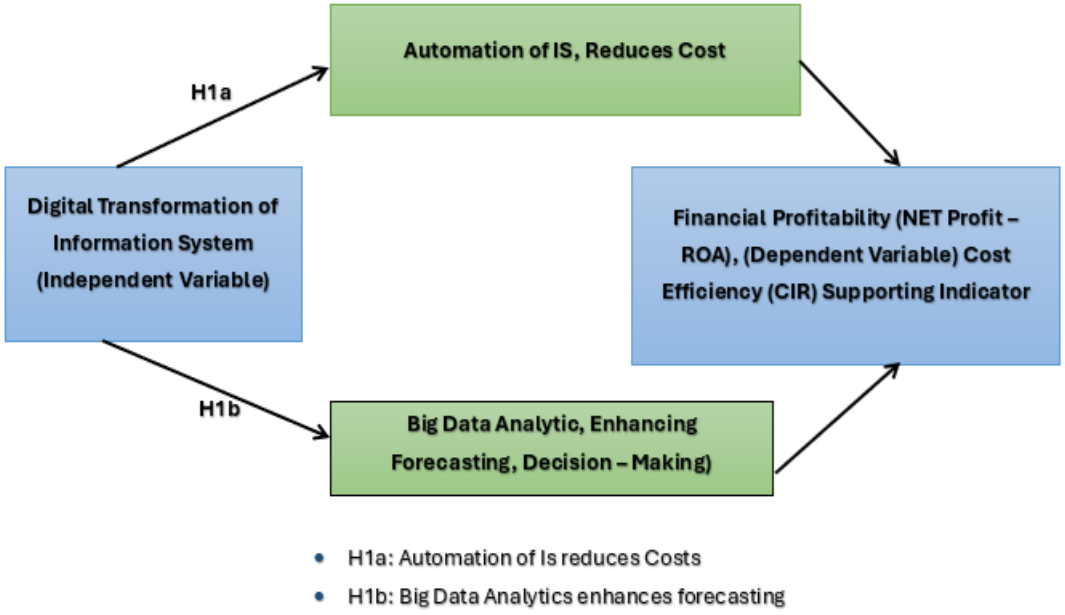
- First Sub-Hypothesis (H1a): “Digital transformation of information systems has a statistically significant effect on net profit in banking institutions."

- Second Sub-Hypothesis (H1b): “Digital transformation of information systems has a statistically significant effect on Return on Assets (ROA) in banking institutions."

4.3. Research Model

- Financial institutions' profitability is directly related to the digital transformation of their information systems, as shown in the conceptual model... This relationship is measured by net profit and return on assets (ROA), with cost efficiency considered as a supporting indicator. Digital transformation reflects the level of adoption of advanced technologies that enhance operational processes and facilitate data-driven decision-making [2], [3]. The model posits that higher levels of digital transformation led to improved financial performance through increased profitability and cost optimization, as evidenced by improved return on assets (ROA) and lower cost-to-income ratios [31],[30]). Accordingly, the model indicates that greater digital maturity enables banks to achieve greater operational efficiency and sustainable financial performance [5], [10], and there is a positive relationship between digital transformation and financial profitability within banking institutions. Figure 5 illustrates the relationship between conceptual model variables.

Figure: 5 Conceptual model of digital transformation and financial profitability



Source: Developed by researchers based on Vial (2019), Verhoef et al. (2021), and Ozili (2021).

4.4. Linking the Conceptual Model to Research Hypotheses

The research suggestion hypotheses are directly related to the conceptual framework which is shown in Fig 5. The approach includes three ways in which digital transformation can benefit the financial efficiency: cost planning, convergence in operations, and decision making based on data. The null hypothesis (H1) shows the overall link between digital transformation and financial profitability, whereas the alternative hypotheses (H1a and H1b) reflect the effects of digital transformations on net profit and return on assets (ROA), respectively. This alignment provides both a formal justification for investigating the purported relationships and consistency between the theoretical framework and a real study. This unified paradigm has the potential to bring together the domains of theories of digital transformation and financial performance evaluation, laying the groundwork for empirical validation in novel banking situations.

5. Research Methology

5.1. Research Approach

The present research examines the impact of digital transformation on banks' bottom lines using descriptive and analytical methodologies. Theoretically, we employ a descriptive method to establish a framework for digital transformations and financial performance. Then, we use an analytical tack to learn how digital transformation techniques impact banks' financial operations and what factors influence the relationship between digital transformation practices and financial performance indicators.

5.2. Demographics and samples

The demographic of this study encompassed private banks operating in Iraq's banking sector that were listed on ISX from 2023 to 2025. The five selected banks were chosen for the study due to the availability and abundance of financial data relevant to the topic and time period. These banks are perfect for studying the effects of digitizing information systems on financial performance because of the wide range of digital transformations they have undergone. This

allowed us to compare the sample banks in the study, some of which use innovative digital techniques and others that adhere to more traditional business practices.

5.3. Sources of Data

The research's main as well as secondary sources of data come from the publicly available financial reports of specific banks. These reports provide crucial financial indicators such net profit, ROA, and price efficiency metrics. With this amount of data, we can draw some important conclusions about how digital transformation affects financial performance, the dependent variable. The empirical study relies heavily on secondary data formats, which include

• Detailed yearly financial reports of ISX listed banks

• Central bank of Iraqi official financial statistics

• What the ISX has to declare

• Secondary sources, such as research papers and books written by experts in the field on topics like digital transformation and business results

5.4. Measurement of Variables

The variables of the study are measured as follows:

Digital transformations for information systems: the independent variable. Several variables were used to evaluate digital transformation in the present research. Based on the financial data from the selected banks' annual reports, these indicators show how much digital technology the banks have adopted. They include how much digital banking services have expanded, how much technological infrastructure has developed, and how much digitalization of operations has occurred.

Net profit, ROA, metric of operational efficiency, and CIR are financial metrics that assess financial profitability. These indicators are considered dependent variables.

5.5. Statistical Methods

The present research tests its hypotheses and analyzes data from selected banks within the study sample using multiple methods of statistical as well as financial analysis. Descriptive statistics, compatriot finance, growth rate, financial ratio, correlations, and basic regression analysis are all part of these methodologies. Microsoft Excel was utilized for processing data as well as graphical analysis, while SPSS version 26 was utilized for statistical analysis.

5.6. Research Scope and Limitations

The subsequent parameters distinctly delineate the study's scope:

- In terms of geographical coverage, this research is limited to private banks in Iraq that are members of the banking sector and are listed on the ISX.
- In terms of time frame, the empirical analysis is applicable from 2023 all the way through 2025.
- Financial profitability metrics, including net profit, return on assets (ROA), and the cost-to-income ratio as a measure of operational efficiency, are the primary focus of this study.

6. Results and Analysis

6.1. Profit Growth Analysis

Using information gathered from the banks' the period between 2023 to 2025 annual reports, we present the key conclusions for statistical as well as financial analyses that were carried out. We contrasted the financial results of institutions using advanced digital transformation methods to those using more traditional operating models. The findings are further supported by statistical hypothesis testing to examine and inspect the impact of the independent variable, the digital transformation of information systems on the dependent variable, the financial profitability of the selected banks for the study sample. Net profit indicates the ultimate financial outcome of banking activities, while management efficiency reflects how well a bank an adaptation to technological changes. Table 1 illustrates the variations of net profit growth rates among the banks in the study sample according to their level of digital maturity.

Table - 1 Net Profit Growth of Sample Banks (2023-2025) (Amounts in billions of Iraqi Dinars)

No.	Bank	Digital Level	Net Profit 2023 (IQD bn)	Net Profit 2025 (IQD bn)	Growth (%)
1	Al-Mansour Bank	Advanced	4.50	23.00	411%
2	Bank of Baghdad	Advanced	42.00	120.30	186%
3	Credit Bank of Iraq	Average	10.20	20.30	99%
4	Ashur Intl Bank	Average	12.50	24.10	93%
5	National Bank (Al-Ahli)	Traditional	-	-	15%

Source: Prepared by the researchers based on financial data from the Iraq Stock Exchange (ISX).

Note: As shown in Table 1, advanced digital banks recorded significantly higher growth rates in net profits compared to traditional banks and financial ratios reflect the average values of digitally advanced banks.

Figure: 6 Graphical representation of the gap in net profit growth (2023-2025)

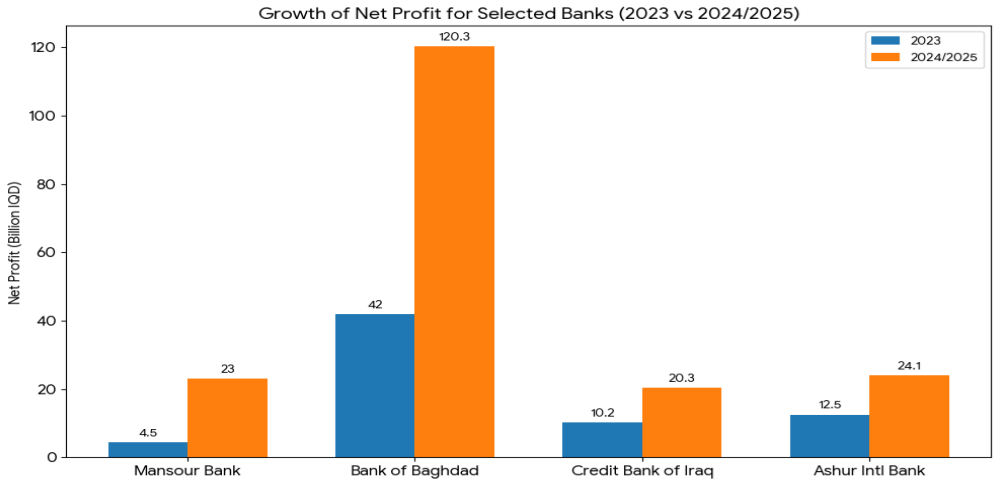


Figure 6 provides a graphical representation with a clear visual image of the widening gap in net profit growth between 2023 and 2025, highlighting the strong impact of "digital leverage" in boosting the profits of technologically advanced banks that adopt technological developments. The data in Table 1 shows a significant disparity in financial performance between digitally advanced banks and traditional banks, as clearly illustrated by the graph. Banks that have adopted comprehensive digital transformation strategies experienced considerably achieved significantly higher growth rates in net profits. This reflects the positive effect of digital technologies on customer base expansion and improving operational efficiency. Several key observations can be highlighted:

Exponential Growth Effect: Al Mansour Bank achieved a remarkable growth rate of 411%, significantly exceeding the usual banking growth rates. This growth and exceptional performance are due to the bank's adoption of digital platforms that enabled it to achieve its goals of expanding banking services to include new market segments and new customer categories residing in remote geographical areas, as well as new young customer categories, without the need for large investments in the infrastructure of traditional branches.

Economics of scaling in digital operations: As the volume of electronic transactions increased, banks with exceptional digital capabilities, including Al Mansour Bank with Bank of Baghdad, were able to save money. Marginal costs decreased as a result of the rise in electronic transactions. Unlike traditional banks, whose expansion is impeded by high operational expenses, these banks were able to increase their customer base and relatively stable operating costs, leading to higher percentages of profit margins. Rather than being explained by a typical development of the economy, Al Mansour Bank's astounding growth rate of 411 percent over the research period is best understood as a result of the fast transition to online banking. This expansion is a result of the bank's use of digital banking services, that increased operating efficiency with broadened the range of revenue-generating activities without substantially raising the expenses of traditional infrastructure. The bank's digital platforms with mobile banking apps allowed it to expand its customer base, process more transactions per day, boost its operational flexibility, and grow its revenue. Its operating expenses remained relatively stable. This is in line with the idea of digital economies of scale, in which banks and other financial organizations may provide services to more people using the same digital infrastructure at lower marginal costs.

5.2. Evaluation of operations efficiency metrics

From 2023 to 2025, digitally advanced banks' efficiency indices will change, as shown in Tab 2.. Several financial ratios were calculated to study the impact of digital transformation on cost structures and profitability indicators. These ratios are presented below:

- In-depth Financial Analysis: The findings shown in Table 2 indicate a significant transformation in the financial structure of banks implementing digital transformation strategies.
- Reduction in Operating Costs: The efficiency of digital automation technologies is strongly demonstrated by the reduction in the cost-to-income ratio from 65% to 52%. Digital transformation has significantly reduced reliance on manual procedures and paperwork, thereby lowering operating costs and increasing cost-effectiveness.
- Improvement in Return on Assets (ROA): Improvement in Return on Assets (ROA): The growth in ROA to 3.4% indicates banks implementing digital transformation strategies can generate higher profits using the same asset base. Based on the findings to this research, investments in digital technology are more profitable compared to those invested in traditional tangible assets.

Table: 2 Development of Efficiency and Profitability Indicators Before and After Digital Transformation - Arithmetic Mean for Advanced Banks

Financial Indicator	Formula Used	Ratio in 2023	Ratio in 2025	Change	Financial Interpretation
Return on Assets (ROA)	**Net Profit / Total Assets**	**1.2%**	**3.4%**	**+183%**	**Increase in the productivity of digital assets.**
Cost-to-Income Ratio (CIR)	**Operating Expenses / Revenues**	**65%**	**52%**	**(-13%)**	**Decrease in waste and fixed costs.**
Net Profit Margin (NPM)	**Net Profit / Total Revenue**	**18%**	**28%**	**+55%**	**Improvement of operational efficiency and control over expenses.**

Source: Financial analysis output of the Excel program based on financial data

Table 2 shows the average measured financial indicators based on the advanced digital banks selected as selected from the study sample during 2023 to 2025. Operating expenses are divided by total operating income to calculate the cost-to-income ratio, or CIR. In accordance with this finding, investing in technology may boost efficiency more than investment in some traditional assets.

5.3. Hypothesis Testing and Statistical Analysis

The present research utilized standard correlation and regression analysis to evaluate the strength with direction of the association among the research variables in order to analyze the causal connection among digital transformation with financial success. Tab 3 shows that there is a highly favorable relationship ($R = 0.83$) among financial profitability measures and the degree of digital transformation. The coefficient of determination ($R^2 = 0.69$) indicates that approximately 69% of the variance in financial profitability can be explained by differences in digital transformation practices among the banks selected in the study sample. The results indicate a strong positive correlation between the digital transformation of information systems and financial profitability, according to the analysis of the results within the framework of the study methodology, which emphasizes statistical correlation rather than absolute causation. The results provide strong empirical support for the main hypothesis (H1), confirming that digital transformation has a statistically significant impact on banking institutions' financial profitability considering the statistical significance level ($Sig = 0.000$) is below the acceptable threshold ($\alpha = 0.05$). Furthermore, the findings confirm the two sub-

hypotheses (H1a and H1b), indicating the significant impact of digital transformation to rising net profit and return on assets (ROA), which indicates increased financial performance and improved financial profitability.

Table 3 Summary of Statistical Analysis Results (SPSS Output)

Independent Variable	Dependent Variable	Correlation Coefficient (R)	Coefficient of Determination (R2)	Probability Value (Sig)	Significance Level (α)	Statistical Decision
Digital Transformation	Financial Profitability	0.83	0.69	0.000	0.05	Statistically Supported, Accepted at α ≤ 0.05

Source: Outputs of the statistical program (SPSS V.26)

The result presents empirical proof that digital transformation is key to enhancing financial performance for emerging banking markets. A very strong positive relationship and strong correlation are demonstrated by the correlation coefficient (R=0.83). This can be explained economically by the fact that profitability measurement metrics often rise in tandem with increased investment spending on infrastructure and digital transformation. The coefficient of determination (0.69) indicates that digital transformation, as an independent variable, contributes 69% of the variance and increase in bank profits in the study sample, while other market and regulatory factors explain the remaining 31%. Finally, the results indicate that digital transformation is the decisive driver of financial profitability through its impact on operational efficiency and resource utilization.

6. Discussion

6.1. Consistence of the Findings with Previous Studies

The results of this study are consistent with previous empirical research, such as Vial's 2019 study, which indicated a relationship between digital transformation and financial profitability and confirmed that digital transformation improves operational efficiency by reducing several unnecessary processes and lowering transaction costs. Similarly, [3] suggested that organizations might optimize cost structures and accomplish increased levels of efficiency by utilizing flexible digital technologies, particularly cloud-based systems. The significant decrease in the cost-to-income ratio in the results of this study reinforces the idea that digital transformation facilitates the transition from rigid cost structures to more flexible and efficient operating models, and the results of this are reflected in improved overall financial performance, thus increasing financial profitability. In other words, adopting digital technologies increases the efficiency and profitability of financial institutions, as confirmed by studies such as [6] and [7]. The study's findings also demonstrate that the digital transformation of information systems significantly improves financial performance metrics for financial institutions. In the same manner, these findings support the theory that digital technologies are now an essential element and are key to improving operational efficiency and financial performance in modern financial institutions.

6.2. The Impact of Digital Transformation on Cost Efficiency and Profit Margins

Digital transformation is fundamentally changing the cost structure of financial institutions by increasing cost-effectiveness and maintaining profit margins. Automating information systems also improves the quality and sustainability of financial results by reducing transaction costs, agency costs [18], also smart automation reduces the cost of human error, which enhances the quality of financial outputs [38]. Additionally, the shift from investments in fixed technology to the more flexible operating costs of cloud computing contributes to improved financial management and cost control for bank institutions. These findings are consistent with other studies confirming that digital technologies, particularly cloud computing, help reduce IT maintenance costs by up to 30% which directly raises the efficiency of financial performance [27], this leads to better financial control over profit margins.

6.3. Digital transformations with net profit growth

The findings from the experiment show that digitally advanced banks have far higher net profits than traditional banks. The capacity for digital transformations to increase income sources while decreasing operational expenses is demonstrated by this. The study conducted by [6] found that investments in Information lead to higher financial profitability by increasing productivity and inventiveness. Argued [5] that institutions with higher levels of digital maturity are better able to engage customers and make data driven decisions, which in turn leads to better financial results. The high growth rates seen in this study provide support for this argument.

6.4. Digital Transformation and the Improvement of ROA

Technological change improves key profitability measures in a number of ways, including resource optimization and asset utilization (particularly ROA). State [15] that institutions can boost asset turnover by incorporating data analytics and AI into their information systems. They can track asset lifecycles in real-time and cut down on capital sitting idle thanks to this. This has a knock-on effect of improving banks' bottom lines. The research showed that digital transformation boosts investor trusts by making data more accessible and transparent, which in turn improves financial performance and makes decisions more efficient for banking organizations. As a result, both market value and ROA are enhanced [39]

6.5. Digital Transformation, Competitive Advantage, and Sustainable Profitability

According to the work conducted by [19], the institution has the potential to provide individualized products and services at reduced costs as a result of digital transformation. This might lead to the creation of new revenue prospects. Financial institutions can gain a sustainable competitive advantage via digital transformation by cutting down the costs of service delivery, boosting service efficiency and delivering high-quality service. With a highly sophisticated digital platform and ingrained information systems, banks can provide customized financial products at lower marginal cost, which can generate economies of scope as the number of products increases and income streams grow, while keeping costs down. [2],[3] Moreover, through regular implementation of digital strategies, banks can improve their competitive edge and safeguard their profit margins and ensure long-term profitability. This is done by enhancing the agility of the institution and its ability to adapt to market changes. Based on [5], [10] and [30] digital transformations are sustainable ways to generate profit because they generate profit through continuous technological advancement and not solely on cost reduction. The last step in digital transformation was for successful institutions to create "competition moats" that keep new competitors out and maintain their profit margins [16]. According to [3] the study found that digitalization leads to sustainable profitability rather than just traditional expense compression because it depends on constant technical innovation

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6.6. Challenges of Digital Transformation (Digital Investment Risks)

Despite the benefits and advantages that are achieved through digital transformation, there are several challenges that may affect the stability of the financial profitability of financial institutions. The most significant of these challenges is the high initial investments required to develop the digital infrastructure, which may put temporary pressure on the stability of cash flow and short-term profitability. The study concludes that the massive capital investments (High Initial Capex) required to develop the digital infrastructure may lead to the erosion of cash flows and profitability in the short term [27]. Furthermore, resistance to organizational change can reduce the effectiveness of digital transformation initiatives. Inadequate digital skills among employees can also limit the optimal use of digital systems, thus reducing expected financial returns the most dangerous organizational obstacle lies in "resistance to change" by traditional cadres; where weak digital skills lead to not exploiting the systems to their full capacity, which raises the "opportunity cost" [18]. The poor financial planning for the transformation process may end in what is known as the "digital paradox", where technical costs increase without a corresponding increase in productivity, causing severe pressure on profit margins [3]. Cyber security risks also pose a significant challenge, as the increasing reliance on digital systems exposes financial institutions to potential cyber threats that could affect business continuity and the institution's reputation. This means that cyber security risks may lead to operational disruptions, financial losses, and damage to the financial institution's reputation. Therefore, this type of institution must allocate sufficient resources to the digital systems infrastructure to protect digital assets and ensure stable financial performance. Information security is therefore a crucial factor in protecting profits. The analysis indicates that total reliance on "digital information systems" makes the institution vulnerable and target for ransom ware attacks and data sabotage, potentially leading to a complete halt of production operations [39].

According to the findings, the market value of the institution might plummet in record time due to the direct expenses of breaches (like legal fines and data loss) and indirect costs (like commercial brand harm). Therefore, this study emphasizes that allocating a budget for cyber security is not an additional cost, but rather an insurance policy that ensures profitability stability and protects shareholders' rights from sudden technical risks [40].

6.7 Strategies for a Sustainable Digital Transformation

A strategy for resolving these issues and turning them into opportunities is detailed in the study's last section. The report suggests implementing a lean digital transformations methodology to reduce funding concerns. This model uses incremental development instead of a rapid, full-scale investment [20]. Investment in data management, the report shows through analysis, also guarantees accurate data inputs, which in turn leads to high-quality financial judgments. According to [15], in order to succeed in the digital market, which is known for its instability, firms must ensure that their financial and technology strategies are well-aligned in order to achieve steady and sustainable profitability.

7. Conclusion and Recommendations

7.1 Conclusions

- **Theoretical Implications**

Theoretical investigations on digital transformation benefit from this study's addition of practical data from a growing financial system. The present research shows that digital transformations for information systems can greatly increase financial profitability even in growing banking environments, like the banking sector in Iraq. Nearly all prior research efforts have focused on mature financial sectors.

7.2. Practical Effects

Financial decision makers and bank management can benefit greatly from the study's conclusions. The research shows that digital transformation is more than just a tech expense; it's a strategic investment that can boost profits and streamline operations. Consequently, financial institutions should put a premium on investing in data-driven

technologies and state-of-the-art digital infrastructure. This includes increasing digital banking services and bolstering data analytics skills to aid in strategic financial decision-making. The long-term viability of online banking depends on robust cyber security measures; this can only be achieved if regulatory organizations like Iraq's Central Bank back digital transformation initiatives by encouraging new technologies and creating consistent rules to help the industry expand.

7.3. Research Limitations and Future Research

It is important to note that there are limits to this study, despite the fact that it offers helpful information regarding the connection among digital transformation with financial viability. The study's results may not be applicable to other financial contexts because the empirical analysis is based on a small sample of private banks serving Iraq and listed on the ISX from 2023 to 2025. In addition, additional performance dimensions like market capitalization as well as customer satisfaction were left out of the study, which mainly looks at financial profitability indicators based on available financial data. Additional financial institutions and a longer time period should be considered for future research to increase the study's breadth. The potential mediating effect of technical advancement or online banking on the connection among digital transformation with financial outcomes is an area that could be investigated in future research. Although the study found a strong correlation among digital transformation with financial profitability, it should be mentioned that other economic and regulatory factors may also influence banking institutions' financial performance and would not have been covered in the current research.

7.4. Digital Transformation as a Strategic Necessity

- Findings show that digital transformations is no longer an option for modern banks; it is a strategic need. The study drew numerous conclusions, supported by statistical and financial analyses of bank data from the research sample for the years 2023–2025:

- How technological advancements are improving financial institutions' viability by digitizing their information systems, financial institutions can substantially increase their viability. Based on the data, it appears that digital proficiency is strongly correlated with net profit.

- Digital transformations is clearly a strategic profit center, not merely an operational expense, according to real-world results. The strong positive correlation (R=0.83) between digital competence and net profit provides strong statistical support for this.

- Functionality in a digital setting the disparity between the growth rates of "digitally transformed" and traditional banks 411% and less than 15%, respectively, suggests that digital transformation has become the decisive component in the financial sector's competitiveness.

- The outcomes demonstrate that operational efficiency was enhanced as a consequence of digital transformations utilizing digital apps. The cost-to-income ratio dropped from 66% to 53% as a result of these improvements. By capitalizing on digital economies of scale, banks were able to provide a broader range of services at reduced costs. Digital assets are more productively efficient, according to the data. With a ROA of 3.5% upon full digital transformation, it became clear that digital assets (platforms and software) are more productively efficient than physical assets.

- Banks can obtain larger financial returns while maintaining relatively stable operating costs thanks to digital technology, which contribute to sustainable financial performance.

8. Recommendations

Based on the results of the study, the following recommendations are suggested:

- Adopting the "Comprehensive Bank" strategy: The necessity for traditional banks to leave the business model based on "concrete branches" and move towards investing in "cloud infrastructure" to reduce fixed capital costs.

- Promoting the integration of digital adaptation indicators in the evaluation of banking performance by regulators, especially the Central Bank of Iraq, and establishing standard digital maturity indicators to measure Iraqi banks' rate of digital transformation.

- Investing in Data Analytics: The research recommends that banks establish specialized units for "Big Data Analytics" to understand customer behavior and provide customized services that raise commission revenues and more invest in a robust cyber security system to keep online banking platforms secure.

- Impelling banks to establish fully integrated digital financial strategies supported by cloud-based computing technologies and establishing specialized data analytics divisions in banks to improve financial decision-making and consumer insights.

- Human Resources: The necessity of transferring the surplus of employees resulting from automation from "manual data entry" jobs to "digital marketing" and "customer service" jobs, to ensure that labor is not laid off while raising productivity efficiency, and providing opportunities for financial institution employees to improve their digital skills to be able to ensure the efficient implementation of digital transformation operations.

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