

The Impact of FinTech Adoption on Financial Performance: Evidence from Saudi Banking Sector

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Abstract

This research aimed to examine the impact of adopting financial technology (FinTech) on financial performance, specifically Return on Assets (ROA), Return on Equity (ROE), and Earnings Per Share (EPS) within the Saudi banking sector. To achieve these objectives, a descriptive-analytical approach was employed. The study population consisted of the banking sector, comprising ten banks listed on the Tadawul stock exchange. The study sample included these listed banks over the period from 2020 to 2025; a comprehensive survey strategy was used, resulting in a sample size of 60 observations. Data analysis was conducted using E-Views software. The key finding was a statistically significant impact of FinTech adoption on financial performance (ROA, ROE, and EPS) in the Saudi banking sector. The research recommended that Saudi banks expand their adoption of FinTech, given its role in improving financial performance and enhancing operational efficiency. It also emphasized the need to increase investment in modern financial technologies aligned with the banks' needs and strategic goals while prioritizing technologies that offer high economic returns.

Keywords: Financial Technology (FinTech), Financial Performance, Return on Assets (ROA), Return on Equity (ROE), Earnings Per Share (EPS), Saudi Banks.

1-1 Introduction

Financial technology (FinTech) has emerged as a key driver of fundamental transformation in the banking sector, with banks increasingly prioritizing the adoption of FinTech applications due to their vital role in enhancing competitive advantage and maintaining market share (Nis, 2022). This focus arises amidst rapid developments in the banking and financial landscape and the resulting challenges which compel banks to keep pace with modern financial innovations characterized by lower costs and higher operational efficiency; such innovations positively impact their ability to improve profitability and

enhance financial performance (Touat, 2021). Furthermore, the adoption of FinTech contributes to the development of digital banking services, improves service quality for customers, and accelerates banking processes, thereby supporting banks in achieving superior levels of financial efficiency and performance sustainability (Al-Naimi et al., 2023).

Financial performance assessment is a fundamental process upon which banks rely to measure their financial efficiency and effectiveness, utilizing a set of indicators that help evaluate a bank's ability to generate profits and maximize shareholder value (Ghalem, 2022). Key indicators include the Return on Assets (ROA), which reflects the bank's ability to efficiently utilize its assets to generate profits; the Return on Equity (ROE), which demonstrates management's efficiency in investing shareholders' funds; and Earnings Per Share (EPS), a crucial metric for measuring the share of the bank's profits attributable to each share (Al-Own et al., 2023). Against this backdrop, this study aims to examine the impact of adopting financial technology (FinTech) on financial performance within the Saudi banking sector by analyzing how the use of modern financial technologies influences ROA, ROE, and EPS indicators.

1-2 Research Problem

Despite the rapid developments within the Saudi banking sector regarding financial technology and the substantial investments banks are making in digital transformation and the adoption of modern financial technologies there is a clear disparity in their ability to translate these technologies into positive financial outcomes. While some banks have successfully leveraged financial technology to improve operational efficiency and boost profitability, others continue to face challenges related to high technology investment costs and a limited ability to convert these investments into tangible financial results (Qasaimeh et al., 2025).

Furthermore, rapid developments in financial technology and increasing competition from fintech firms have exerted additional pressure on Saudi banks to maintain adequate levels of return on assets, return on equity, and earnings per share. This has created an urgent need to rigorously examine the impact of fintech adoption on the financial performance of Saudi banks. Consequently, fintech has emerged as a key factor in enhancing bank competitiveness and financial efficiency; however, its effects vary depending on the level of adoption and the technical and managerial readiness within the banks (Al-Matari et al., 2023).

The problem addressed in this paper is highlighted by a knowledge gap in Arab and Saudi studies regarding the relationship between the adoption of financial technology (FinTech) and bank financial performance—specifically concerning the measurement of FinTech's impact on financial performance indicators such as Return on Assets (ROA), Return on Equity (ROE), and Earnings Per Share (EPS). While numerous studies have addressed

digital transformation and electronic banking services, few have directly focused on measuring the financial impact of FinTech adoption within the Saudi banking sector. Furthermore, the Saudi banking environment is undergoing rapid changes driven by Saudi Vision 2030, which has fostered a shift toward a digital economy and financial innovation; this underscores the importance of examining this topic in light of recent developments. A study by the Saudi Central Bank (2024) confirmed that the expansion of FinTech is a key driver in the development of the Saudi financial sector; however, measuring the impact of these technologies on bank financial performance requires further empirical research to clarify the nature of the relationship between them. The research problem can be defined through the following questions:

Main Question: What is the impact of FinTech adoption on financial performance in the Saudi banking sector?

This question gives rise to the following sub-questions:

- 1- What is the impact of FinTech adoption on Return on Assets (ROA) in the Saudi banking sector?
- 2- What is the impact of FinTech adoption on Return on Equity (ROE) in the Saudi banking sector?
- 3- What is the impact of FinTech adoption on Earnings Per Share (EPS) in the Saudi banking sector?

1-3 Research Objectives

Based on the research problem and questions, the objectives of this research are as follows:

Primary Objective: To determine the impact of adopting financial technology (FinTech) on financial performance in the Saudi banking sector.

Stemming from this primary objective are the following sub-objectives:

- 1- To clarify the impact of adopting financial technology on Return on Assets (ROA) in the Saudi banking sector.
- 2- To clarify the impact of adopting financial technology on Return on Equity (ROE) in the Saudi banking sector.
- 3- To clarify the impact of adopting financial technology on Earnings Per Share (EPS) in the Saudi banking sector.

1-4 Significance of the Research

The significance of this research stems from the growing importance of financial technology (FinTech) in the development of the Saudi banking sector, particularly amidst

rapid digital transformation and the drive to foster financial innovation in line with the objectives of Saudi Vision 2030. Saudi banks are actively adopting modern financial technologies to enhance service quality, boost operational efficiency, and strengthen competitiveness; consequently, the impact of FinTech adoption on financial performance represents a topic of both academic and practical importance within the Saudi banking landscape.

The research also derives significance from its focus on key financial performance indicators (specifically Return on Assets (ROA), Return on Equity (ROE), and Earnings Per Share (EPS)) which are critical metrics for assessing a bank's efficiency in resource utilization, profitability, and shareholder value maximization. The findings are expected to provide bank management and decision-makers with empirical insights to evaluate the effectiveness of FinTech investments and their impact on financial performance. Furthermore, the study aims to establish a knowledge base that supports researchers and professionals in the fields of FinTech and banking, while paving the way for future studies addressing other dimensions of the relationship between financial technology and banking performance.

1-5 Research Hypotheses

Based on the research questions and objectives, the research hypotheses are as follows:

H01: There is no statistically significant Impact ($\alpha \leq 0.05$) of financial technology adoption on financial performance in terms of its dimensions (Return on Assets, Return on Equity, and Earnings Per Share) within the Saudi banking sector.

H01.1: There is no statistically significant Impact ($\alpha \leq 0.05$) of financial technology adoption on Return on Assets in the Saudi banking sector.

H01.2: There is no statistically significant Impact ($\alpha \leq 0.05$) of financial technology adoption on Return on Equity in the Saudi banking sector.

H01.3: There is no statistically significant Impact ($\alpha \leq 0.05$) of financial technology adoption on Earnings Per Share in the Saudi banking sector.

Theoretical Framework and Previous Studies

2-1 Financial Technology (FinTech)

2-1-1 The Concept of Financial Technology (FinTech)

The concept of financial technology (FinTech) emerged in the early 1990s, when Patrick Schueffel presented a set of proposals to bankers aimed at developing banking services and enhancing their efficiency through the use of modern technological tools (Khotinskay, 2019). Since then, FinTech has undergone rapid evolution, becoming a primary driver of change within the financial and banking sectors. It is defined as a modern financial industry

that leverages advanced technologies to develop financial activities and services as well as to improve their efficiency and effectiveness thereby facilitating the delivery of financial services that are faster, more accurate, and more flexible (Schueffel, 2016).

Financial technology refers to various technologies and technological innovations aimed at reducing or eliminating financial intermediation costs by enhancing financial processes and services making them more efficient, faster, and more flexible thereby contributing to improved access to financial services and greater effectiveness in financial transactions (Das, 2019).

2-1-2 Stages of FinTech Evolution and Their Characteristics

2-1-2-1 Stages of FinTech Evolution

While financial technology (FinTech) is often viewed as a modern product of the convergence between financial services and information and communication technologies, the relationship between the financial sector and technology is not new; its roots trace back to the early stages of global economic development. The laying of the transatlantic telegraph cable in 1866 established an infrastructure that paved the way for a period of financial globalization lasting until 1913 which fostered greater financial interconnectedness among nations (Buckley et al., 2016). In light of this historical context, the evolution of financial technology can be categorized into the following stages:

First: The Initial Phase (1866–1967)

This phase was characterized by a close link between finance and technology from the inception of modern financial systems. Financial activities emerged within government administrative frameworks, contributing to the development of supporting tools and techniques such as the calculator and the double-entry accounting system. Furthermore, the 19th-century European financial revolution fostered the rise of joint-stock companies, insurance firms, and banking services, which in turn supported the launch of the Industrial Revolution. These developments facilitated the spread of contemporary technologies such as the telegraph, railways, and steamships leading to the expansion of cross-border financial relations. Subsequently, the development of the global Telex network following World War I helped create an environment conducive to a more advanced stage of integration between finance and technology, paving the way for the next phase (Buckley et al., 2016).

Second: The Second Phase (1967–2008)

This phase began with the transition from analog to digital systems in 1967 and witnessed pivotal developments in financial services, marked by several key milestones, most notably (Louiza and Chouaib, 2021):

1. The introduction of the first Automated Teller Machine (ATM) by Barclays Bank, which facilitated customer access to funds and the execution of banking transactions.
2. The establishment of NASDAQ as the first fully electronic stock exchange, bringing about a radical transformation in financial markets.
3. The creation of the SWIFT system in 1973 as a global network for the exchange of financial information between banks, thereby enhancing the efficiency of cross-border payments.
4. The widespread adoption of computers during the 1980s and 1990s, which led to the emergence of online banking and the growth of e-commerce, fundamentally altering the nature of the relationship between customers and financial institutions. This phase concluded with the outbreak of the global financial crisis in 2008.

Third: The Third Phase (2008–Present)

This phase began in the wake of the global financial crisis, as fintech startups emerged as key players in the delivery of financial services. It was characterized by the provision of innovative, direct financial solutions for individuals and businesses, with a clear focus on enhancing user experience and offering specialized services. A defining feature of this phase was the shift in competition from traditional banks to fintech companies, which reshaped financial service delivery through digital platforms and modern technologies. Major technology firms such as Amazon and Uber also entered the sector, alongside Apple with its digital wallet, Apple Pay. This reflects a trend toward greater integration between technology and financial services, with expectations that these developments will comprehensively reshape banking interfaces and increase their flexibility (Consumer International, 2017).

2-1-2-2 Characteristics of Financial Technology

Fintech is characterized by a set of features that distinguish it from traditional financial service delivery models, most notably the following (Matay, 2013):

1. It represents a system of financial and banking knowledge, skills, and methods that enable institutions to meet customer needs and requirements with greater precision and flexibility (Al-Gasaymeh et al., 2024).
2. Technology serves as a supporting tool rather than an end in itself; financial institutions utilize it to improve operational efficiency and enhance service quality (Al-Jaghbeer et al., 2024).
3. Banking and financial services are among the most significant and widespread areas of fintech application (Saber, 2023).

4. The impact of fintech is not limited to banking services alone but extends to administrative and organizational aspects within financial institutions (Sonia and Maryam, 2021).

Literature also identifies a set of criteria that a financial innovation must meet to be classified as financial technology (FinTech), including (Authority, 2022):

1. Introducing or supporting new financial products or processes, whether directly or through the enhancement of existing ones.
2. Relying wholly or partially on modern or emerging technologies as a core component of the solution.
3. Being novel, unique, or transformative, rather than merely digitizing traditional processes.
4. Delivering measurable added value by addressing an existing problem or offering clear benefits to users or the financial sector as a whole.

2-1-3 Objectives and Importance of Financial Technology

Fintech seeks to achieve a range of objectives that contribute to the development and enhanced efficiency of the financial sector. Foremost among these is cost reduction; the sector aims to lower the cost of delivering financial services compared to traditional methods, thereby fostering broader financial inclusion and enabling a larger segment of individuals and businesses particularly the underserved to access financial services (Abdul-Redha et al., 2020). This objective stands as a key driver for the adoption of digital financial solutions across various markets.

Fintech also seeks to achieve a higher degree of personalization in financial services, where products and services are tailored to the diverse needs of customers whether individuals or institutions and delivered through various, more flexible digital channels. This approach contributes to enhancing customer satisfaction and improving the quality of banking services provided to them (Jaziyah & Muhammad, 2019).

Another fundamental objective is achieving speed and ease of use; fintech services largely rely on modern technologies that enable financial transactions and procedures to be completed more quickly, accurately, and efficiently, thereby reducing the time and effort required to execute financial operations (Almulla et al., 2021). Furthermore, fintech seeks to expand the reach of financial services beyond geographical boundaries, allowing services to be provided to customers worldwide regardless of their location (Jaziyah & Muhammad, 2019).

Fintech also offers a significant advantage by enabling customers to compare various financial products and services in terms of price and quality, thereby enhancing transparency and improving the efficiency of consumers' financial decision-making (Al-Gasaymeh et al., 2024).

Regarding the importance of financial technology (FinTech), it serves as a key channel for delivering modern financial services by providing advanced technological solutions that support banks in various areas such as capital markets, corporate finance, data analysis, and payment systems, while enabling customers to manage their financial resources more efficiently and contributing to cost reductions and enhanced speed and efficiency in financial operations (Iskandar, 2020).

The importance of financial technology is also evident in that it poses regulatory challenges to regulatory authorities and market participants, which is the need to achieve a careful balance between benefiting from modern financial innovations and managing the potential risks associated with them (Arner et al., 2015). Financial technology also contributes to supporting economic growth by increasing the volume of financial transactions and facilitating individuals and companies' access to a variety of financial services and products more easily and efficiently (Ozili, 2018).

2-1-4 Fintech Technologies

The financial services sector has witnessed significant evolution driven by digital transformation and advancements in modern technologies; financial technology now relies on a suite of sophisticated tools and techniques that have reshaped the delivery of financial services. Key technologies driving this shift include artificial intelligence, machine learning, big data, cloud computing, blockchain, the Internet of Things (IoT), and the metaverse innovations that have brought about a paradigm shift in the banking sector.

First: Artificial Intelligence

Artificial intelligence is considered one of the key pillars of financial technology, as it aims to simulate human cognitive abilities through computer systems capable of reasoning, analysis, and decision-making. This encompasses various functions such as perception, prediction, planning, and data processing (Bodton, 2017). It is also characterized by its ability to process vast amounts of data with speed and high accuracy, thereby enhancing decision-making efficiency (Qasaimeh & Jaradeh, 2022).

The importance of artificial intelligence lies in its ability to automate processes, analyze big data, improve information quality, and support decision-making (bad-Segura, 2020). In the banking sector, it is used to analyze financial transaction patterns and detect anomalies such as credit card fraud by tracking purchasing patterns, locations, and times, thereby enhancing the security of financial operations (Al-Dhab, 2023).

Banks also rely on artificial intelligence to reduce costs, increase competitiveness, develop services, and expand their customer base, in addition to utilizing it for chatbots and compliance services (Ben Azza, Hisham, and Al-Abidi, 2022). Accordingly, artificial intelligence serves as a strategic tool for improving operational efficiency and enhancing competitiveness within the banking sector (Diab, 2022).

Second: Big Data

Big data is defined as massive, complex datasets that cannot be processed using traditional tools (Gupta & Tham, 2019); it is characterized by volume, velocity, variety, veracity, and value (Youssef et al., 2023).

Data is categorized into structured, unstructured, and hybrid types. Unstructured data—which includes images, videos, and social media content—is the most complex to analyze (Youssef et al., 2023). Furthermore, such data originates from internal sources, such as banking systems and customer data, as well as external sources, such as markets and social media (Ahmed, Saeed, and Al-Najjar, 2021).

The importance of big data in the banking sector lies in improving risk management, increasing returns, reducing operational costs, enhancing decision quality, and fostering innovation in financial services; it also enables banks to understand customer behavior and develop tailored products, thereby strengthening their competitiveness (Adhat, 2023).

Third: Cloud Computing

Cloud computing is defined as the provision of computing resources such as storage, databases, and infrastructure over the Internet in a flexible and on-demand manner. Its primary models include Software as a Service (SaaS), Platform as a Service (PaaS), Infrastructure as a Service (IaaS), and Business as a Service (Alfozan & Aoude, 2021).

Cloud computing offers advantages such as cost savings, easy data access, improved control, increased flexibility, and reduced operational risks. It also enables banks to store and manage data highly efficiently without requiring massive infrastructure investments; however, it faces challenges related to security, data privacy, and connectivity continuity (Rana & Zhen, 2023).

Fourth: Blockchain

Blockchain technology is a secure, distributed database that records transactions in a decentralized manner without the need for an intermediary (Nicoletti, 2017). It is characterized by features such as decentralization, programmability, data persistence, auditability, transaction speed, and cost reduction (Viriyasitavat & Hoonson, 2018).

Blockchain is utilized in smart contracts which execute automatically based on pre-defined conditions thereby reducing costs and enhancing efficiency (Boudkhil, 2021).

Cryptocurrencies, such as Bitcoin and Ethereum, serve as prominent examples of blockchain applications, despite the volatility and regulatory risks they face (Arab Monetary Fund, 2019).

Fifth: The Internet of Things (IoT)

The Internet of Things refers to a network of connected devices including smart devices, vehicles, sensors, and various systems that exchange data over the Internet; it aims to enable continuous communication between devices as well as data collection and analysis (Aznag & Tahanout, 2022).

The importance of IoT in the banking sector is evident in its ability to enhance customer experience, reduce costs, develop marketing strategies, and increase operational efficiency; it relies on key characteristics such as interconnectivity, heterogeneity, and connectivity (Patel & Patel, 2016).

Sixth: The Metaverse

The metaverse is an interconnected virtual environment reliant on virtual and augmented reality that enables users to interact with integrated digital spaces; it is underpinned by technologies such as blockchain, artificial intelligence, and big data (Amin, 2023).

It offers significant benefits to the financial technology sector, including cost reduction, enhanced security, and improved customer experiences through the provision of more personalized digital financial services (Yathiraju & Dash, 2023). However, it faces challenges related to cybersecurity, technological dominance, and social implications (Saudi Authority for Data and Artificial Intelligence, 2023).

Seventh: Machine Learning

Machine learning is a branch of artificial intelligence that involves developing models capable of learning from data and improving their performance without explicit programming; it comprises two stages: training and application (Qasaimeh et al., 2024).

In the banking sector, it is utilized for fraud detection, risk management, personalized service delivery, and process automation, thereby contributing to improved efficiency, risk reduction, and enhanced customer satisfaction (Muhammad & Ness, 2024).

2-2 Financial Performance

2-2-1 Concept of Financial Performance

In general, performance reflects the extent to which banks are able to utilize their human and financial resources efficiently and effectively to achieve their objectives. The concept of performance is based on two key elements: efficiency, which refers to achieving planned goals and aligning with expected outcomes; and effectiveness, which entails accomplishing

tasks in the best possible manner while minimizing the use of resources, time, and effort. Thus, performance is defined as the process of comparing actual performance against targeted performance to identify strengths and weaknesses and to enhance performance levels (Gaoual & Geryville, 2021).

Financial performance reflects a bank's ability to efficiently utilize its available resources to achieve satisfactory profit levels, serving as a fundamental pillar that mirrors the institution's development and continuity. In this context, Al-Da'mi and Al-Marsoumi (2017) view financial performance as an outcome measured by specific indicators used to compare actual achievements against pre-planned objectives.

Furthermore, Nwala et al. (2020) explained that financial performance serves as a metric reflecting an institution's financial position, aiding in the assessment of improvements in performance and profitability resulting from its services and operational activities.

Toumi and Al-Masoud (2021) noted that financial performance describes an organization's current status while illustrating the paths and trends taken to reach that position—insights gained through the analysis of sales, revenues, assets, and liabilities. Furthermore, financial performance demonstrates the impact of the financing structure on the organization's profitability and fundamentally reflects its adopted financing policy.

2-2-2 Importance of Financial Performance

The importance of financial performance lies in its role as a key tool for enhancing the performance of financial institutions across multiple dimensions. It provides vital information and data to stakeholders with financial interests, enabling them to identify the institution's strengths and weaknesses and make informed financial decisions. Furthermore, financial performance serves to monitor the institution's operations, oversee its status, and analyze its behavior; it also facilitates performance assessment and the identification of obstacles and their underlying causes. This process contributes to the formulation of appropriate solutions and corrective measures aligned with the institution's objectives, thereby supporting sound financial decision-making that ensures the institution's continuity and survival (Elbraiki & Abdullah, 2022).

Shahboub (2022) highlighted that the importance of financial performance lies in several key aspects, most notably understanding the nature of the organization's activities and continuously monitoring their evolution, as well as comprehending and tracking the surrounding economic and financial conditions that may impact organizational performance. Furthermore, financial performance facilitates necessary financial analysis through the evaluation and comparison of financial data, and enhances the understanding of financial information, thereby supporting decision-making processes and the improvement of organizational performance.

2-2-3 Dimensions of Financial Performance

2-2-3-1 Return on Assets

It represents the ratio of net income to the bank's total assets and is widely used as a key performance indicator for banks (Singh et al., 2024).

This indicator is distinguished by its ability to capture a bank's overall financial performance; it facilitates comparisons between banks to assess efficiency and provides data on the revenue generated by the bank's funds (Najdawi, 2023).

It is calculated using the following equation:

$$\text{Return on assets ratio} = \frac{\text{profit after Tax}}{\text{Total assets}} * 100\%$$

2-2-3-2 Return on Equity

This metric measures the rate of return on shareholders' or owners' equity in banks; a high ratio indicates the bank's ability to generate profits for its owners and demonstrates that management is utilizing shareholders' funds efficiently and effectively (Masjat, 2021).

This indicator can be calculated using the following formula (Schweser, 2018):

$$\text{Return on Equity} = (\text{Net Profit After Tax} / \text{Equity}) \times 100\%$$

This ratio is interpreted based on the numerator representing net profit (or income after tax) and the denominator representing equity—which reflects the funds of the bank's shareholders and owners. The indicator measures the bank's efficiency in utilizing shareholder funds; a high ratio signals the bank's ability to optimally invest equity and generate higher returns. It also facilitates comparisons between the realized return and returns on alternative opportunities, while allowing for an assessment of management's success in delivering a satisfactory return to shareholders. Furthermore, this indicator may be directly influenced by the bank's level of financial leverage (Othman, 2013).

2-2-3-3 Earnings Per Share

Earnings Per Share (EPS) is considered one of the most important financial performance indicators used to measure the portion of a company's or bank's net profit attributable to each share; it reflects the institution's ability to generate profits that benefit shareholders. EPS also serves as a key metric for evaluating an institution's financial performance and making investment decisions, as it enables investors to compare per-share profitability across different institutions and assess their investment appeal. A higher EPS indicates a greater capacity to generate profits and distribute them effectively to shareholders (Brealey et al., 2020). EPS is calculated by dividing net profit after tax by the number of outstanding common shares during the financial period, according to the following formula:

$$\text{Earnings per share} = (\text{Net profit after tax} \div \text{Number of subscribed shares}) * 100\%.$$

This indicator reflects the profit generated per share, making it a key metric upon which investors rely to evaluate financial performance and make investment decisions; it is also used to compare different financial institutions in terms of profitability efficiency (Brigha & Ehrhardt, 2017).

The study by Touati (2022) aimed to evaluate the performance of private Libyan commercial banks using the international CAMELS framework adopted from the US banking assessment system and to assess the framework's suitability for the Libyan banking environment. This framework evaluates bank performance based on six indicators: capital adequacy, asset quality, management quality, profitability, liquidity, and sensitivity to market risk. The study focused on these indicators and their applicability to assessing the performance of private Libyan commercial banks. An analytical approach was employed to examine specific financial statement items relevant to the framework's indicators and compare them against standard benchmarks to derive results. The study sample comprised the United Bank for Commerce and Investment and Al-Waha Bank during the 2014–2017 period. Key findings indicated that applying the full CAMELS framework was not feasible for private Libyan commercial banks, primarily because the "sensitivity to market risk" component could not be assessed due to a lack of required data; consequently, the "CAMEL" variant (excluding the "S" component) was applied. Nevertheless, the framework's indicators proved useful in evaluating the performance of these banks regarding the remaining components. The study recommended that banks finalize their balance sheets and publish financial data in a timely manner to benefit from CAMELS-based assessments, enabling them to make informed decisions that reinforce strengths and address weaknesses identified through the evaluation.

The study by Aql et al. (2023) aimed to measure the impact of financial technology (FinTech) on the financial performance of banks operating in Egypt. To achieve this objective, the researchers conducted an empirical study covering a sample of 20 banks in Egypt over the period from 2016 to 2020, resulting in a total of 100 observations. The study relied on secondary data—including bank financial reports and statements, World Bank databases, and panel time-series data—and employed Pearson correlation analysis using the STATA software package. The results revealed a positive impact of credit card balances on both the Return on Assets (ROA) and the Return on Equity (ROE); however, no significant impact was found regarding the value of technological assets on these two metrics. Based on these findings, the study recommended prioritizing financial technology, encouraging banks to focus on FinTech innovations, improving information technology infrastructure, and conducting customer awareness campaigns regarding the importance of financial technology.

The study by Aliwa (2023) aimed to measure the impact of financial technology on the operational efficiency of commercial banks in Egypt. Data Envelopment Analysis (DEA) was employed to achieve this objective, with a sample comprising 20 banks: seven state-

owned banks, three Islamic banks, and ten mixed banks (Arab and foreign). The study relied on financial data and reports issued by these banks between 2017 and 2022. The findings revealed that commercial banks exhibited the highest efficiency, followed by Islamic banks, and then mixed banks. The study recommends that less efficient banks learn from the experiences of the more efficient ones and calls for further research in this field.

Siska's (2022) study aimed to examine the impact of financial technology services on the financial performance of Islamic banking, using Bank Syariah Indonesia as a case study. Financial ratios specifically capital adequacy, return on assets (ROA), return on equity (ROE), the operating expense-to-operating income ratio, and the financing to deposit ratio, were utilized as dependent variables. The independent variables consisted of financial technology services, namely mobile banking, internet banking, SMS banking, and phone banking. The study concluded that financial technology has an impact on the performance of Bank Syariah Indonesia.

The study by Sajid et al. (2023) examined the impact of fintech products on bank risk exposure, considering the mediating role of operational efficiency. The study utilized a sample of 50 banks from India, China, Pakistan, and Bangladesh, covering the period from 2014 to 2021. It found that fintech products reduce banking risks by enhancing operational efficiency; path analysis results indicated that operational efficiency acts as a mediator between fintech products and banking risks. A key recommendation of the study is to leverage fintech to mitigate risk and boost operational efficiency within banks.

The study by Bashayreh and Abu Wadi (2021) aimed to examine the impact of financial technology on the performance of thirteen Jordanian commercial banks between 2012 and 2018 using panel data models. Return on Equity (ROE) was employed as the dependent variable to measure financial performance, while financial technology factors specifically online banking, ATM services, and telephone banking services were analyzed (coded as 1 if the service was available and 0 if not). The study concluded that financial technology has a positive impact on the performance of Jordanian commercial banks.

3- Study Methodology (Method and Procedures)

3-1 Study Methodology

Methodology constitutes a fundamental aspect of scientific practice. The term "study methodology" refers to the set of procedures and techniques employed to collect, classify, analyze, and present data in order to achieve the study's objectives and reach the desired findings. This study adopts a descriptive-analytical approach, analyzing the relationship between financial technology adoption variables and financial performance. This analysis is based on data derived from the financial statements and annual reports of banks within the Saudi financial sector for the period 2020–2025, aiming to achieve the study's objectives, test its hypotheses, and interpret the results.

3-2 Study Population and Sample

The study population consists of the market financial sector, and this sector includes (10) banks whose shares are listed on the Tadawul Stock Exchange. The study sample included banks listed on the Tadawul Stock Exchange, which have all the necessary data to measure the dimensions and variables of the current study during the period extending from the year (2020) to the year (2025). Therefore, the study sample included all the banks listed on the Tadawul Stock Exchange and representative of the study population using the comprehensive survey strategy. The sample size was (60) observations (number of banks (10) x number of years (6) = (60) observations).

3-3 Data collection sources

The selection of data sources is based on the nature of the study and the variables to be measured. For the current study, secondary sources were deemed most appropriate for achieving the research objectives. These sources included books, scientific studies, and academic research, which were utilized to derive theoretical insights regarding the study topics and to explore all aspects and dimensions related to its variables. Additionally, the study utilized financial statements, annual reports, and accompanying notes from banks within the Saudi financial sector to gather the data necessary for measuring the study's variables.

3-4 Methods for measuring study variables

The study aimed to identify the impact of adopting financial technology (FinTech) on financial performance within the Saudi banking sector during the period (2020–2025). Accordingly, the study variables consisted of the following:

First: The dependent variable (financial performance). Financial performance was measured using three financial indicators:

1- Return on Assets (ROA); which represents the percentage of net profit after tax to total assets for bank (i) times year (t), calculated using the following formula:

$$\text{Return on assets ratio} = \frac{\text{profit after Tax}}{\text{Total assets}} * 100\%$$

2- Return on Equity (ROE); which represents the percentage of net profit after tax to total shareholders' equity for bank (i) times year (t), and is calculated using the following formula:

$$\text{Return on Equity} = (\text{Net Profit After Tax} / \text{Equity}) \times 100\%$$

3- Earnings Per Share (EPS); which represents the ratio of net profit after tax to the number of subscribed shares for bank (i) times year (t), and is calculated using the following formula:

Earnings per share = (Net profit after tax ÷ Number of subscribed shares)*100%.

Secondly: The Independent Variable (Fintech Adoption)

Fintech adoption was measured based on the amounts invested in purchasing ATMs, software, and systems, as well as the revenue generated from credit card operations comprising total commissions and financing volumes as disclosed in the annual reports of Saudi banking sector banks during the study period.

Control Variable (Leverage Ratio)

The leverage ratio was measured as the percentage of total liabilities to total assets for bank (i) times year (t), and is calculated using the following formula:

$$\text{Leverage Ratio} = (\text{Total Liabilities} / \text{Total Assets}) \times 100\%$$

3-5 Statistical Procedures Employed

Appropriate statistical methods were used to answer the study questions and test its hypotheses, utilizing the E-VIEWS software:

First: Descriptive statistical methods. The researcher employed several descriptive statistical measures to characterize the study variables. This stage involved describing the variables to determine the extent of similarities and differences among banks in the Saudi banking sector by applying the mean, standard deviation, minimum value, and maximum value which are among the most commonly used methods.

Secondly: Inferential statistical methods. The researcher employed inferential statistical techniques using EViews software to apply the statistical methods and indicators associated with the multiple regression model. Specifically, the following were applied:

- 1- Pearson correlation test to measure correlation coefficients between independent dimensions.
- 2- Variance Inflation Factor (VIF) test to check for the absence of multicollinearity among independent dimensions.
- 3- Unit root test to verify the stationarity of the variable data.
- 4- Durbin-Watson (D-W) test to check for the absence of autocorrelation among random errors in the study variables.
- 5- Jarque-Bera test to verify whether the data follows a normal distribution.
- 6- Lagrange Multiplier (LM) test and Hausman test to estimate study models by selecting the most appropriate model among the Pooled Regression Model (PRM), Fixed Effect Model (FEM), and Random Effect Model (REM).

7- Multiple linear regression analysis to test the study hypotheses.

3-6 Data Analysis and Hypothesis Testing

3-6-1 Descriptive Statistics for Study Variables

In this section of the study, we present the key findings of the descriptive statistical analysis regarding the study variables included in the econometric models: the dependent variable financial performance (Return on Assets, Return on Equity, and Earnings Per Share); the independent variable FinTech adoption; and the control variable leverage ratio.

Descriptive statistical methods specifically the arithmetic mean, minimum and maximum values, and standard deviation were employed to describe these variables. These statistics provide valuable insights into the nature of the study sample (the Saudi banking sector) over the study period spanning from 2020 to 2025.

Description of the study's dependent variable (financial performance)

The study's dependent variable was financial performance, measured by Return on Assets (ROA), Return on Equity (ROE), and Earnings Per Share (EPS) within the Saudi banking sector. The following table presents the descriptive statistics for these financial performance indicators for the study sample within the Saudi banking sector over the study period.

Table 1: Descriptive statistical results for financial performance indicators in the Saudi banking sector during the study period.

The Scale	ROA	ROE	EPS
Arithmetic mean	1.673	11.433	0.266
Standard deviation	0.392	3.372	0.122
Highest value	2.379	21.917	0.638
Lowest value	0.787	6.037	0.118

Table (1) presents the descriptive statistical results for financial performance indicators in the Saudi banking sector, specifically Return on Assets (ROA), Return on Equity (ROE), and Earnings Per Share (EPS) during the 2020–2025 period. The table shows that the arithmetic mean for Return on Assets was 1.673%, with a standard deviation of 0.392%, reflecting the quality of assets and the stable regulatory environment of the Saudi banking sector. Conversely, the variation between the minimum value (0.787%) and the maximum value (2.379%) indicates significant disparities in operational efficiency among banks; this can be attributed to differences in the management of operating costs, the quality of credit portfolios, and the composition of revenue streams.

The table shows that the arithmetic mean of the return on equity stood at 11.433%. This indicates that shareholders of Saudi banks are able to achieve average annual returns of 11.433% on their investments, reflecting the Saudi banking sector's capacity to generate

value for shareholders. Conversely, the variation between the minimum value (6.037%) and the maximum value (21.917%) coupled with a high standard deviation of 3.372% points to significant disparities among banks in generating this value. These differences can be attributed to variations in financing strategies, risk management capabilities, dividend distribution policies, and bank size.

The table also shows that the arithmetic mean of the return per share stood at 0.266 Riyals; this indicates that a single share in the Saudi banking sector generates, on average, an annual net profit of 0.266 Riyals. Conversely, the variation between the minimum value (0.118 Riyals) and the maximum value (0.638 Riyals) along with a standard deviation of 0.122 Riyals points to significant disparities among banks regarding share profitability. These differences can be attributed to variations in capital size and the number of issued shares across Saudi banks, as well as differences in their respective capacities and efficiencies in generating profits.

Description of the study's independent variable (Fintech adoption)

The independent variable in the study was the adoption of financial technology, measured by the volume of expenditure by the banking sector on investments in financial technology (ATMs, credit cards, software, and systems). The following table presents the descriptive statistical results regarding the adoption of financial technology within the Saudi banking sector the study's sample during the study period.

Table 2: Descriptive statistical results for FinTech adoption in the Saudi banking sector during the study period.

The Scale	Adoption of financial technology	The natural logarithm of fintech adoption
Arithmetic mean	2,594,377,245.583	21.043
Standard deviation	2,961,912,221.867	1.250
Highest value	15,210,362,000	23.445
Lowest value	61,413,000	17.933

Table (2) shows the statistical results of financial technology adoption in the Saudi banking sector during the period (2020-2025). The table shows that the arithmetic average for adopting financial technology reached (2,549.4) million riyals, and this indicates a high level of banking sector investment in financial technology, which reflects the huge size of the sector and its commitment to achieving digital transformation. On the other hand, the discrepancy between the lowest value (61.4) million riyals and the highest value (15,210.4) million riyals, with a high standard deviation of (2,961.9) million riyals, indicates that there is a large difference between banks in adopting financial technology, which can be attributed to the difference in the size of the banks and their investment strategies in financial technology applications, their marketing and promotional policies and their needs for it, and the difference in the size of demand for their financial services. In order to reduce

the variance in values, the natural logarithm of the investment amounts in financial technology was taken.

Description of the study's control variable (leverage ratio)

The control variable in the study was the indebtedness ratio. The following table presents the descriptive statistical results for the indebtedness ratio within the Saudi banking sector the study's sample during the study period.

Table 3: Descriptive statistical results for the indebtedness ratio in the Saudi banking sector during the study period.

The Scale	leverage ratio
Arithmetic mean	85.017
Standard deviation	2.371
Highest value	89.657
Lowest value	80.533

Table (3) presents the statistical results regarding the indebtedness ratio in the Saudi banking sector during the period 2020–2025. The table shows that the arithmetic mean of the indebtedness ratio was 85.017; this indicates that, on average, the Saudi banking sector finances 85.0% of its assets through debt and 15.0% through shareholders' equity. This aligns with the nature of banking operations which rely on customer deposits (classified as liabilities) as a primary source of funding and reflects adherence to Basel III requirements, which mandate that banks maintain a capital adequacy ratio of at least 10.5–12% of risk-weighted assets. The data also highlights the sector's significant investment in financial technology (FinTech), reflecting the sector's substantial scale and its commitment to digital transformation. The variation between the minimum value (80.533) and the maximum value (89.657) coupled with a low standard deviation of 2.371 indicates a high degree of convergence in indebtedness ratios across banks. This convergence can be attributed to the stability of the Saudi banking sector, the application of unified regulatory policies regarding capital requirements and maximum leverage limits, and the similarity of business models among banks, which naturally results in comparable financing structures.

3-6-2 Correlation analysis

To examine the relationship between variables and determine the strength of their association, the Pearson correlation test was employed; correlation coefficients on this scale range from 0 to (± 1). A value of 0 indicates the absence of any relationship between the variables, whereas a value of (± 1) signifies a perfect relationship either positive or negative. The Pearson correlation matrix serves as a preliminary method for detecting multicollinearity, particularly among explanatory variables; high correlation between these variables complicates the assessment of their impact on the dependent variable and inflates the coefficient of determination (R^2), thereby leading to inaccurate estimation of regression

parameters. The standard criterion for identifying this issue is that the correlation coefficient between explanatory variables should not exceed (± 0.80) (Gujarati, 2004).

In the current study, the correlation between the variables of fintech adoption and the debt ratio was measured, and the results were as follows:

Table 4: Pearson correlation test

variable	Adoption of financial technology	leverage ratio
Adoption of financial technology	1.000	
leverage ratio	0.405-	1.000

Table (4) indicates the absence of collinearity (the problem of multicollinearity) between the variables of fintech adoption and the debt ratio, as the correlation coefficient between them was below the ($\pm 80\%$) threshold, standing at 0.405.

To make a definitive assessment regarding the presence of this issue, the Variance Inflation Factor (VIF) test was conducted to ensure the absence of high linear correlations among the independent variables. The standard criterion for this test is that VIF values should not exceed 10 (Gujarati, 2004). The following table presents the results of this test, which are as follows:

Table 5: Variance Inflation Factor Test

variable	VIF
Adoption of financial technology	1.197
leverage ratio	1.197

An examination of the values in Table (5) reveals that the Variance Inflation Factor (VIF) for the two variables FinTech adoption and the debt ratio is (1.197). Since this value is below (10), it confirms the absence of a multicollinearity problem between these two variables.

3-6-3 Test of data stability for study variables

Stationarity in a time series implies that the variance between two time periods depends solely on the time interval, rather than the specific moment the variance is recorded; this entails stability in both the mean and the variance of the series values over time. To assess the stationarity of the study variables, the presence of a unit root is examined; the existence of a unit root indicates non-stationarity, necessitating the use of data differencing to ensure stationarity. To determine the presence of a unit root and ensure the suitability of the panel data, the Levin-Lin-Chu (LLC) test is applied; this test indicates the absence of a unit root (i.e., time series stationarity) when the p-value is less than 0.05 (Greene, 2003).

Table 6: Results of the stationarity test for the study variables' data

variable	Value calculated at the level	P-value	The Result
Adoption of financial technology	-3.343	0.017	Stationary at the level
ROA	-8.071	0.000	Stationary at the level
ROE	-7.406	0.000	Stationary at the level
EPS	-3.194	0.025	Stationary at the level
leverage ratio	-7.650	0.000	Stationary at the level

Table (6) demonstrates the stationarity of the time series and the stability of the variables over the period (2020–2025), based on the results of the LLC test; the test revealed that the p-values for all study variables did not exceed 0.05, indicating that the data are suitable for analysis.

3-6-4 Autocorrelation test

The autocorrelation test is a statistical procedure that measures the relationship between the value of a specific time-series variable and its previous values within the series. It aims to determine the degree of correlation between successive values specifically, to verify the independence of estimated residuals in a regression model and their random distribution around the regression line, as a random error distribution ensures unbiased residual estimates. This is assessed using the Durbin-Watson (D-W) test, which yields values ranging from 0 to 4; D-W coefficients between 1.5 and 2.5 indicate the absence of autocorrelation, thereby confirming the data's suitability for statistical analysis (Gujarati, 2004). The following table presents the D-W coefficient values used to check for autocorrelation, with the results as follows:

Table 7: D-W coefficient values for the study hypotheses

Hypothesis	Value of the D-W coefficient	The Result
H01	1.742	There is no autocorrelation.
H02	1.913	There is no autocorrelation.
H03	1.633	There is no autocorrelation.

Based on the results presented in Table (7), the data are free from the problem of autocorrelation; the Durbin-Watson (D-W) coefficient values ranged from (1.633 to 1.913) falling within the (1.5–2.5) range, which indicates the suitability of the data for statistical analysis.

6-3-5 Test for normal distribution

One of the fundamental assumptions for the validity of the General Linear Model (GLM) is that the data follow a normal distribution. If this assumption is not met, the data undergo various statistical transformations, such as applying the natural logarithm or the square root. Given that the study comprises 60 observations, it is reasonable to assume that the data are normally distributed regardless of the distribution of the underlying population

based on the Central Limit Theorem, which posits that large samples ($n > 30$) are effectively normally distributed. This is verified using the Jarque-Bera test; data are considered normally distributed if the resulting probability values exceed 0.05 (Ryan, 2013).

Table 8: Jarque-Bera test for normal distribution

variable	Jarque-Bera	p-value
Adoption of financial technology	1.856	0.395
ROA	2.533	0.282
ROE	5.042	0.080
EPS	20.499	0.000
leverage ratio	3.361	0.186

Table (8) reveals that the probability values for the study variables with the exception of earnings per share exceeded 0.05, indicating a normal distribution. Conversely, the probability value for earnings per share was below 0.05, indicating a non-normal distribution; however, given that the study comprises 60 observations a large sample size ($n > 30$) the issue of non-normality does not compromise the validity of the study models.

6-3-6 Estimation of study models

The study data is classified as panel data, which combines the characteristics of time-series and cross-sectional data. Panel data is distinguished by its ability to account for individual differences and provide data that is more diverse and valuable, exhibits lower collinearity, and offers greater degrees of freedom; it also excels at identifying and measuring unobserved effects that are otherwise difficult to capture in standard time-series or descriptive analyses. The panel data methodology relies on three analytical models to measure the effects between variables: the Pooled Regression Model (PRM), the Fixed Effects Model (FEM), and the Random Effects Model (REM).

To select the most appropriate model for the study and use it in the analysis, two analytical tests were conducted: the Lagrange Multiplier (LM) test and the Hausman test. The LM test is used to determine the most suitable model choosing between the Pooled Regression Model (PRM) and the Random Effects Model (REM) based on the premise that the PRM performs more consistently than the REM at a significance level greater than 0.05. Meanwhile, the Hausman test is used to select the most appropriate model between the Fixed Effects Model (FEM) and the Random Effects Model (REM), operating on the assumption that the REM performs more consistently than the FEM at a significance level greater than 0.05.

In the current study, both tests were conducted to determine the appropriate model for testing the study hypotheses, and the results were as follows:

Table 9: Results of the study model estimations

Hypotheses	Lagrange Multiplier		Hausman		The most accurate and consistent model
	Ch ²	Sig	Ch ²	Sig	
H01	72.596	0.006	3.585	0.167	Random-effects model
H02	76.096	0.003	3.867	0.145	Random-effects model
H03	94.837	0.000	13.094	0.001	Fixed-effects model

The results of the LM and Hausman tests presented in Table (9) indicate that the random effects model is more appropriate for estimating the models related to hypotheses (H01) and (H02); the LM test showed a significance level below 0.05, while the Hausman test showed a significance level above 0.05. In contrast, the fixed effects model was more appropriate for estimating the model related to hypothesis (H03), as both the LM and Hausman tests yielded significance levels below 0.05.

6-3-7 Results of the study hypothesis testing

The study sample comprises the Saudi banking sector for the period 2020–2025. Data regarding the banks in this sector were collected from their annual reports, financial statements, and accompanying notes; consequently, the data constitute a cross-sectional time series, and appropriate models were estimated to test each hypothesis. Following the verification of data suitability for the study models and the prior description of the study variables, this section presents the results of the hypothesis testing, conducted using multiple regression analysis.

Results of the main hypothesis test

The primary hypothesis aims to examine the impact of adopting financial technology (FinTech) on financial performance within the Saudi banking sector. It posits that there is no statistically significant impact at a significance level of ($\alpha \leq 0.05$) of FinTech adoption on financial performance, as measured by its dimensions: Return on Assets (ROA), Return on Equity (ROE), and Earnings Per Share (EPS). This hypothesis was tested through its sub-hypotheses, as follows:

Results of the test of the first sub-hypothesis

The first sub-hypothesis aims to examine the impact of adopting financial technology (FinTech) on the return on assets (ROA) within the Saudi banking sector. It states that: "There is no statistically significant impact at a significance level of ($\alpha \leq 0.05$) of FinTech adoption on the return on assets in the Saudi banking sector." The results of testing this hypothesis are as follows:

Table 10: Model Summary and ANOVA for the First Sub-hypothesis

Dependent variable	Model Summary			ANOVA	
	R ²	Adjusted R ²	Standard error of the model	F-test value	Test significance level F

ROA	0.474	0.456	0.309	25.731	0.000
The effect is statistically significant at Sig $\leq$ 0.05.					

Table (10) demonstrates the significance of the model; the F-test value was 25.731 with a significance level of 0.000 (below 0.05). Furthermore, the coefficient of determination (R^2) value of 0.474 indicates that 47.4% of the variance in "FinTech adoption" can be explained by the variance in the model's variables, assuming other factors remain constant.

Table 11: Regression coefficients for the first sub-hypothesis

Variables	Coefficient value	Standard error	T-test value	T-test significance level
Adoption of financial technology	0.221	0.031	7.165	0.000
leverage ratio	0.046-	0.017	2.716-	0.009
Regression intercept	6.886	1.811	3.802	0.000
The effect is statistically significant at Sig $\leq$ 0.05.				

Table (11) presents the regression coefficient values for the study model and their impact on Return on Assets (ROA). The regression coefficient for the financial technology adoption variable (0.221) indicates a positive relationship with ROA; specifically, a one-unit increase in financial technology adoption leads to a (0.221) unit increase in ROA. The t-statistic value was (7.165), with a significance level of (0.000) (below 0.05), demonstrating a positive impact of financial technology adoption on ROA within the Saudi banking sector.

The regression coefficient for the debt ratio (-0.046) indicated an inverse relationship between the debt ratio and the return on assets; specifically, a one-unit increase in the debt ratio leads to a 0.046-unit decrease in the return on assets. The t-statistic (-2.716) showed a significance level of (0.009) below the (0.05) threshold demonstrating a negative impact of the debt ratio on the return on assets within the Saudi banking sector.

Based on the two preceding tables, the first sub-null hypothesis is rejected, and the alternative hypothesis is accepted, stating that: "There is a statistically significant impact at a significance level of ($\alpha \leq 0.05$) of FinTech adoption on the return on assets in the Saudi banking sector."

Results of the second sub-hypothesis test

The second sub-hypothesis aims to examine the impact of FinTech adoption on the Return on Equity (ROE) within the Saudi banking sector. It states that: "There is no statistically significant impact at a significance level of ($\alpha \leq 0.05$) of FinTech adoption on the Return on Equity in the Saudi banking sector." The results of testing this hypothesis are as follows:

Table 12: Model Summary and ANOVA for the Second Sub-Hypothesis

Dependent variable	Model Summary			ANOVA	
	R ²	Adjusted R ²	Standard error of the model	T-test value	T-test significance level
ROE	0.516	0.499	0.239	30.434	0.000

The effect is statistically significant at Sig $\leq$ 0.05.

Table (12) demonstrates the significance of the model; the F-statistic was 30.434 with a significance level of 0.000 (below 0.05). Furthermore, the coefficient of determination (R²) of 0.516 indicates that 51.6% of the variance in "FinTech adoption" can be explained by the variance in the model's variables, assuming other factors remain constant.

Table 13: Regression coefficients for the second sub-hypothesis

Variables	Coefficient value	Standard error	T-test value	T-test significance level
Adoption of financial technology	0.152	0.027	5.583	0.000
leverage ratio	0.104-	0.014	7.245-	0.000
Regression intercept	10.877	1.542	7.054	0.000

The effect is statistically significant at Sig $\leq$ 0.05

Table (13) presents the regression coefficient values for the study model and their impact on Return on Equity (ROE). The regression coefficient for the financial technology adoption variable (0.152) indicates a positive relationship with ROE; specifically, a one unit increase in financial technology adoption leads to a (0.152) unit increase in ROE. The t-statistic (5.583), with a significance level of 0.000 (below 0.05), demonstrates a positive impact of financial technology adoption on ROE within the Saudi banking sector.

The regression coefficient for the debt ratio (-0.104) indicated an inverse relationship between the debt ratio and return on equity; specifically, a one-unit increase in the debt ratio leads to a 0.104-unit decrease in return on equity. The t-statistic (-7.245) showed a significance level of 0.000 (below 0.05), demonstrating a negative impact of the debt ratio on return on equity within the Saudi banking sector.

Based on the two preceding tables, the second sub-null hypothesis is rejected, and the alternative hypothesis is accepted, stating that: "There is a statistically significant impact at a significance level of ($\alpha \leq 0.05$) of FinTech adoption on Return on Equity (ROE) in the Saudi banking sector."

Results of the third sub-hypothesis test

The third sub-hypothesis aims to examine the impact of FinTech adoption on earnings per share in the Saudi banking sector. It states: " There is no statistically significant Impact ($\alpha \leq 0.05$) of financial technology adoption on Earnings Per Share in the Saudi banking sector." The results of testing this hypothesis are as follows:

Table 14: Model Summary and ANOVA for the Third Sub-hypothesis

Dependent variable	Model Summary			ANOVA	
	R ²	Adjusted R ²	Standard error of the model	T-test value	T-test significance level
EPS	0.567	0.552	0.082	37.283	0.000

The effect is statistically significant at Sig ≤ 0.05 .

Table (14) demonstrates the significance of the model; the F-test value was 37.283 with a significance level of 0.000 (below 0.05). Additionally, the coefficient of determination (R²) value of 0.567 indicates that 56.7% of the variance in "FinTech adoption" can be explained by the variance in the model's variables, assuming other factors remain constant.

Table 15: Regression coefficients for the third sub-hypothesis

Variables	Coefficient value	Standard error	T-test value	T-test significance level
Adoption of financial technology	0.080	0.009	8.635	0.000
leverage ratio	0.017-	0.005	3.550-	0.001
Regression intercept	2.899	0.527	5.504	0.000

The effect is statistically significant at Sig ≤ 0.05

Table (15) presents the regression coefficient values for the study model and their impact on earnings per share. The regression coefficient for the financial technology adoption variable (0.080) indicates a positive relationship between financial technology adoption and earnings per share; specifically, a one-unit increase in financial technology adoption leads to a 0.080-unit increase in earnings per share. The t-statistic was 8.635, with a significance level of 0.000 (below 0.05), demonstrating a positive impact of financial technology adoption on earnings per share within the Saudi banking sector.

The regression coefficient for the debt ratio (-0.017) indicated an inverse relationship between the debt ratio and earnings per share; specifically, a one-unit increase in the debt ratio leads to a 0.017-unit decrease in earnings per share. The t-statistic (-3.550), with a significance level of 0.000 (below 0.05), demonstrates a negative impact of the debt ratio on earnings per share within the Saudi banking sector.

Based on the two preceding tables, the third sub-null hypothesis is rejected, and the alternative hypothesis is accepted, stating that: "There is a statistically significant impact at a significance level ($\alpha \leq 0.05$) of FinTech adoption on earnings per share in the Saudi banking sector."

Based on the results of the sub-hypothesis testing, the main null hypothesis is rejected and the alternative hypothesis is accepted, stating that: "There is a statistically significant impact at a significance level ($\alpha \leq 0.05$) of financial technology adoption on financial performance (in terms of return on assets, return on equity, and earnings per share) within the Saudi banking sector."

4- Results and Recommendations

4-1 Results

Based on the statistical analysis, the results are as follows:

- 1- The results indicated that Saudi banks demonstrate a good level of efficiency in deploying assets and generating returns from them; however, there are disparities among the banks attributable to differences in operational efficiency, cost management, and credit portfolio quality.
- 2- The results demonstrated the Saudi banks' strong ability to generate returns and create added value for shareholders, with variations observed among the banks due to differences in their financing strategies, risk management, and dividend distribution policies.
- 3- The results showed that Saudi banks are capable of generating profits for shareholders, though there are variations in earnings per share (EPS) levels; these differences are attributed to variations in capital size, the number of shares, and the banks' profit-generation efficiency.
- 4- The results revealed a high level of financial technology (FinTech) adoption among Saudi banks, with disparities attributed to differences in bank size, investment strategies, and technological needs; the natural logarithm of FinTech investment values was used to minimize data variance.
- 5- The results indicated high leverage ratios among Saudi banks consistent with the nature of banking operations and the reliance on customer deposits as a primary funding source along with a clear convergence among the banks resulting from sector stability and the implementation of uniform regulatory requirements regarding capital and financial leverage.
- 6- The results demonstrated a statistically significant impact of fintech adoption on the various dimensions of financial performance in Saudi banks, indicating that expanding the

use of fintech contributes to improving banks' financial outcomes and enhancing their efficiency and ability to generate returns.

7- The results revealed a statistically significant impact of fintech adoption on Return on Assets (ROA); this can be attributed to the ability of financial technologies to improve banking operational efficiency and reduce costs, thereby enhancing banks' capacity to generate better returns from their assets.

8- The results showed a statistically significant impact of fintech adoption on Return on Equity (ROE); this is attributed to fintech's contribution to boosting operational efficiency and increasing revenues, which supports banks' ability to generate higher returns for shareholders.

9- The results indicated a statistically significant impact of fintech adoption on Earnings Per Share (EPS); this can be explained by the fact that the improvements in efficiency and profitability resulting from fintech adoption positively influence the earnings generated per share.

4-2 Recommendations

Based on the findings, the research recommends the following:

- 1- Expanding the adoption of financial technology (FinTech) by Saudi banks, given its role in improving financial performance and enhancing operational efficiency.
- 2- Increasing investments in modern financial technologies aligned with the banks' needs and strategic objectives, while focusing on technologies that offer high economic returns.
- 3- Developing the banks' digital infrastructure to ensure the efficiency, speed, and continuity of digital financial services.
- 4- Leveraging financial technology to reduce operational costs by automating banking processes and minimizing manual procedures, thereby contributing to an improved return on assets.
- 5- Enhancing the use of financial technology in developing banking products and services, which contributes to revenue growth and improves the banks' ability to generate returns for shareholders.
- 6- Link fintech investment decisions to financial performance indicators—specifically Return on Assets (ROA), Return on Equity (ROE), and Earnings Per Share (EPS)—to ensure the realization of tangible value from these investments.
- 7- Develop the skills of fintech personnel through continuous training to ensure the effective use of technologies and maximize the benefits derived from them.

8- Foster digital innovation and partnerships with fintech companies to leverage modern technological solutions and continuously enhance banking services.

9- Periodically evaluate the economic return on fintech investments to ensure the efficiency of technology-related spending and direct investments toward areas with the greatest impact on financial performance.

10- Strengthen regulatory and supervisory frameworks related to fintech to ensure its safe and sustainable expansion while maintaining financial and banking stability.

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