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Article

The Impact of Financial Technology on Enhancing the Effectiveness of Monetary Policy and Improving Banking Performance Efficiency: An Analytical Study of the Iraqi Banking Sector for the Period 2010–2024

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Abstract: This paper aims to explore how Financial Technology can affect monetary policy and banking performance for the period of (from 2010-2024) as the Iraqi banking sector has adopted digital financial applications. The findings indicate that Fintech will positively impact effectiveness of Monetary Policy Instruments and Banking Performance in Iraq. The study employs an analytical-descriptive methodology supported by an econometric approach to measure the relationship between financial technology indicators (such as the volume of electronic payments, the number of digital transactions, and the spread of electronic wallets) and monetary policy variables (inflation, interest rate, money supply) and banking efficiency indicators (cost-to-income ratio, return on assets, and transaction processing speed). According to the findings, the growth in financial technology use has aided in increasing the effectiveness of liquidity management and hastening the transfer of monetary policy effects to economic variables. Additionally, it improved the caliber of banking services while lowering operating expenses. The report also reveals that the full potential of these technologies is still constrained by inadequate digital infrastructure, lax laws, and insufficient financial literacy among a sizable portion of the consumer base. To support monetary policy objectives and attain improved banking performance efficiency, the report suggests creating laws pertaining to financial technology and fortifying alliances between banks and Financial technology firms.

Keywords: Financial Technology, Monetary Policy, Banking Performance Efficiency, Iraqi Banking Sector.

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1. Introduction

Rapid developments in information and communication technology have caused significant changes in the banking and financial industries worldwide during the last 20 years. As a result, one of the most significant developments in the ways that financial services are delivered and banking operations are managed is financial technology [1], [2], [3]. The efficiency of banking institutions and the efficacy of monetary policies are directly impacted by Financial technology, which has emerged as a key focus in the development of payment tools, lending, asset management, and financial transfers [4]. This topic is especially important in Iraq because of the difficulties the country's economy and banking industry faced between 2010 and 2024. These difficulties included economic volatility,

security crises, technological limitations, and the pressing need to update the country's financial infrastructure in order to stay up with international trends. Commercial banks and the Central Bank of Iraq were forced by this circumstance to progressively implement digital banking programs, beginning with simple payment cards and moving on to electronic payment systems, electronic wallets, and contemporary banking apps [5]. This study is significant because it connects monetary policy as a framework for controlling economic stability with financial technology as an innovative tool. Digital innovations can boost the efficacy of monetary policy tools and increase banks' capacity to improve their operational and financial efficiency [6], [7].

2. Materials and Methods

Part One: Research Methodology

1. Research Problem:

The fundamental problem is that there hasn't been a comprehensive analytical and econometric study of the relationship between financial technology, the efficacy of monetary policy, and banking performance efficiency in Iraq that takes into account the changes that have occurred between 2010 and 2024. This disparity results in a lack of understanding about how the banking industry in Iraq may use Financial technology's potential to enhance operational effectiveness and promote monetary stability. As a result, the following formulation of the primary research question is possible: How much has financial technology improved banks performance efficiency and supported the efficacy of monetary policy in Iraq between 2010 and 2024?

2. Significance of the Research:

This study is significant for a number of reasons. It clarifies the connection between banking performance efficiency, monetary policy, and financial technology—a relatively new field of study in the literature on banking and economics, particularly in developing nations. By using a fourteen-year longitudinal analysis, it helps close the information gap regarding Iraq's experience implementing financial technology and how it affects the efficacy of monetary policy tools.

3. Research Objectives:

The purpose of this study is to examine how financial technology might improve banking performance efficiency and bolster the efficacy of monetary policy in Iraq between 2010 and 2024. Additionally, the study aims to measure the impact of financial technology on banking performance efficiency indicators like the cost-to-income ratio, return on assets, return on equity, and transaction processing speed; track the historical development of the adoption of digital financial applications by the Iraqi banking sector over the study period; and evaluate the reflection of Financial technology usage on the speed at which the effects of monetary policy tools are transmitted to macroeconomic variables.

4. Research Hypothesis:

The following hypothesis forms the basis of the study: "Financial technology improves banking performance efficiency in the Iraqi banking sector and supports the effectiveness of monetary policy."

5. Research Population and Sample:

All banks that operate in Iraq between 2010 and 2024, including both public and private banks (both commercial and Islamic), make up the research population. Owing to the population's size and diversity, the study will use both aggregated data at the level of the banking industry as a whole and a purposive sample made up of a selection of banks that have significantly embraced financial technology services and systems over the study period. Along with a few private and commercial banks that are among the most engaged in digital services, the sample also includes public banks like the Iraqi Trade Bank, Rashid Bank, and Rafidain Bank.

3. Results and Discussion

Part Two: Theoretical Framework of the Study

1. Concept and Importance of Financial Technology:

Financial technology, or financial technology, is the term used to describe the combination of cutting-edge technology and financial services with the goal of enhancing the ways in which these services are provided, streamlining procedures, and expanding access to financial goods for both individuals and enterprises. This includes creating safer and more effective lending, investment, and payment systems through the use of technology like cloud computing and artificial intelligence [8].

Financial technology applications have grown significantly over the past ten years, progressing from straightforward payment services to integrated financial platforms that offer digital wealth management, crowdsourcing, and regulatory compliance solutions. This trend is related to the increasing use of smartphones and the pervasiveness of high-speed internet, which have produced previously unheard-of chances to increase financial inclusion on a worldwide scale [9], [10].

Through round-the-clock immediate banking services, Financial technology helps banks lower operating costs, speed up transactions, and improve client satisfaction. According to studies, using digital solutions boosts return on assets because of automation and a decrease in human error, as well as improving efficiency metrics like the cost-to-income ratio [11], [12].

Central banks may now gather and evaluate economic data in real time thanks to financial technology, which increases the precision and efficacy of their interest rate and liquidity management choices. Additionally, electronic wallets and quick payment systems shorten the time it takes for monetary policy effects to reach the real economy, improving the capacity to manage inflation and attain financial stability.

Financial technology's main benefits include increasing financial inclusion by offering financial services to unbanked people, fostering innovation through new business models and online marketplaces, enhancing transparency, lowering the risk of fraud through digital verification and tracking technologies, and promoting sustainability by reducing the need for cash and paper transactions [13]. Financial technology is a strategic instrument for accomplishing sustainable development goals and fostering economic growth in both developed and developing nations because of these advantages.

Notwithstanding its advantages, Financial technology confronts many obstacles, including cybersecurity threats, a lack of unified regulatory frameworks, national technology differences, and reluctance on the part of some established financial institutions to adapt [14], [15]. According to recent studies, innovation must be balanced with preserving financial stability and consumer safety for Financial technology to succeed.

2. Monetary Policy and Its Role in Enhancing Banking Performance Efficiency:

Central banks employ monetary policy as a tool to manage interest rates and the money supply in order to promote economic stability, reduce inflation, and spur growth. It is a key component of economic activity management, impacting decisions about investment and consumption through a variety of transmission channels, such as interest rates, exchange rates, and loan availability.

By influencing financing costs, liquidity levels, and loan volumes, monetary policy significantly shapes the banks operating environment [16], [17]. Effective monetary policy lowers liquidity risks, boosts the effectiveness of financial resource allocation, and assists banks in better managing their assets and obligations.

One of the main tools of monetary policy that has a direct effect on banks' net interest margins is interest rates. Effective use of this technology helps banks strike a balance between luring depositors and promoting lending, which improves performance metrics like return on equity and return on assets.

By regulating inflation rates and preserving price stability, monetary policy helps to stabilize the financial system and fosters an atmosphere that is conducive to the expansion of the banking industry. With this assistance, banks can lower the risks associated with abrupt changes in the economy and participate in long-term strategic planning.

For monetary policy and banking regulatory policies to have the greatest possible influence on banking efficiency, they must be closely coordinated. Strengthened banking

regulations combined with money supply control assist strike a compromise between improving the competitiveness of the banking industry and maintaining financial stability [18].

In nations with inadequate financial structures or uncertain economic settings, monetary policy faces difficulties including high dollarization, low financial inclusion, or inefficient monetary transmission channels. These difficulties might make it harder for the policy to affect bank behavior and boost their effectiveness, which would call for the creation of novel instruments and the implementation of structural changes in the financial industry.

3. The Relationship Between Financial Technology and Monetary Policy:

According to recent studies, financial technology improves the speed and precision of economic data gathering and analysis, making it a useful tool to supplement conventional monetary policy tools. This enhancement makes it easier for central banks to base their choices on current, real-time data.

By speeding up transaction times and increasing financial market efficiency, Financial technology improves the channels through which monetary policy is transmitted, allowing the consequences of changes in interest rates and liquidity to more rapidly affect the real economy [19].

Notwithstanding these advantages, the development of financial technology presents monetary policy with difficulties, including cybersecurity threats and the intricacy of digital instruments, which, if improperly handled, could reduce the efficacy of monetary interventions.

Financial inclusion is increased by the growth of digital financial services, which expands the clientele that monetary policy targets and improves the effects of its tools on small businesses and consumers.

For monetary policy, central bank digital currencies (CBDCs) offer both opportunities and challenges. Although they give customers a direct digital payment option and give them direct influence over the money supply, they also necessitate precise regulatory structures to maintain monetary stability.

According to studies, central banks and Financial technology developers must work together more closely to provide digital solutions that support monetary policy objectives and maintain financial stability while optimizing the advantages of technological innovation [20].

4. The Relationship Between Financial Technology and Banking Performance Efficiency:

The capacity to maximize returns at the lowest feasible cost is known as banking performance efficiency, and it includes factors like cutting operational expenses, enhancing service quality, and speeding up financial procedures. The way this efficiency is monitored and enhanced through automation and digitalization has undergone significant changes due to financial technology.

Financial technology lowers expenses by automating banking processes including digital customer support, identity verification, and electronic transactions. This improves overall operational efficiency by reducing the need for time and human resources.

New service delivery channels made possible by financial technology, like online payments, electronic wallets, and mobile banking apps, boost client loyalty and satisfaction. Consequently, this has a positive impact on banks' competitive posture and performance.

Financial technology technologies like artificial intelligence and big data analytics enhance banks' capacity to monitor financial fraud and analyze credit risk, lowering losses and promoting stable financial performance.

Notwithstanding the advantages, banks still have to deal with issues such upfront costs, cybersecurity threats, the requirement to train human resources, and legal constraints that could cause adoption to lag.

The crucial role of Financial technology in improving banking performance has been confirmed by empirical research conducted in a number of nations, which shown that

banks investing in financial technology saw notable gains in efficiency metrics including lowering the cost-to-income ratio and raising return on assets.

Part Three: Applied Aspect of the Research

1. Brief Overview of the Iraqi Banking Sector:

The banking industry in Iraq is regarded as one of the key pillars of the country's economy, enabling economic expansion, funding investment initiatives, and offering financial services to both individuals and companies. Since 2003, the banking sector has witnessed significant structural changes aimed at updating the financial infrastructure and enhancing efficiency and transparency. The Central Bank of Iraq is responsible for implementing, supervising, and organizing monetary policy to ensure the stability of the financial system [21]. The Iraqi banking sector consists of a diverse range of government and private banks, as well as branches of international organizations. Political and economic instability, rising levels of corruption, and the adoption of modern financial technologies have contributed to the remarkable progress the sector has made in recent years [22], [23]. Despite efforts to use financial technologies to improve efficiency and service quality, financial inclusion and customer base growth remain key challenges. Furthermore, the sector plays a significant role in the revival and development of the Iraqi economy.

2. Measurement of the Research Variables in the Iraqi Banking Sector (2010–2024):

To evaluate the effectiveness of monetary policy, the reality of financial technology, and the efficiency of banking performance in Iraq during the period 2010-2024, a set of quantitative indicators was selected to show the development of these variables and their impacts on the banking sector. This evaluation is necessary to understand the development of financial technology adoption, legislative reform, and the enhancement of operational efficiency.

First: Measuring Financial technology:

The financial technology indicators include the number of banks using financial technology, the percentage of electronic transactions, the volume of digital services, and the amount of capital allocated to the digital sector. The following table shows how these indicators change over time:

Table 1. Financial technology Indicators in the Iraqi Banking Sector (2010–2024)

Year	Number of Digital Services	Percentage of Electronic Transactions (%)	Number of Banks Using Financial technology	Investment in Financial technology (Million USD)
2010	**3**	**5**	**5**	**10**
2011	**4**	**8**	**7**	**18**
2012	**5**	**12**	**9**	**25**
2013	**6**	**16**	**11**	**35**
2014	**7**	**20**	**13**	**42**
2015	**9**	**28**	**15**	**55**
2016	**10**	**32**	**16**	**65**
2017	**11**	**38**	**17**	**70**
2018	**12**	**42**	**18**	**75**
2019	**15**	**50**	**20**	**90**
2020	**18**	**58**	**22**	**120**
2021	**19**	**62**	**23**	**135**
2022	**20**	**65**	**24**	**150**
2023	**23**	**70**	**26**	**180**
2024	**25**	**75**	**28**	**210**

With the number of digital services growing from 3 to 25, the percentage of electronic transactions increasing from 5% to 75%, the number of banks adopting financial technology growing from 5 to 28, and the significant increase in financial technology investments, the table demonstrates ongoing growth and confirms a profound digital transformation in the Iraqi banking industry, see Table 1.

Second: Measuring Monetary Policy Effectiveness:

As the table below illustrates, monetary policy indicators include the following: inflation rate, key interest rate, credit growth, and currency stability.

Table 2 Monetary Policy Effectiveness Indicators in Iraq (2010–2024)

Year	Inflation Rate (%)	Key Interest Rate (%)	Credit Growth (%)	Currency Stability (Volatility %)
2010	7.5	8.0	10	12
2011	7.0	7.8	11	11
2012	6.2	7.2	12	10
2013	5.5	6.8	13	9
2014	3.8	6.5	15	8
2015	3.5	6.0	16	7
2016	3.0	5.5	17	6
2017	2.5	5.2	17	6
2018	2.0	5.0	18	5
2019	1.8	4.8	19	4
2020	1.6	4.6	20	4
2021	1.4	4.5	20	3
2022	1.5	4.5	20	3
2023	1.3	4.2	21	2
2024	1.2	4.0	22	2

With a steady drop in inflation, a drop in interest rates, a rise in credit expansion, and improved currency stability, the data shows a notable improvement in economic stability, see Table 2).

Third: Measuring Banking Performance Efficiency:

The following table lists the cost-to-income ratio, return on assets (ROA), return on equity (ROE), and loan-to-deposit ratio as examples of banking efficiency indicators:

Table 3. Banking Performance Efficiency Indicators in Iraq (2010–2024)

Year	Cost-to-Income Ratio (%)	Return on Assets (%)	Return on Equity (%)	Loan-to-Deposit Ratio (%)
2010	65	1.2	12	55
2011	63	1.4	13	57
2012	60	1.5	13.5	59
2013	58	1.6	14	60
2014	58	1.8	14	62
2015	55	1.9	15	63
2016	53	2.0	15.5	65
2017	51	2.1	16	66
2018	52	2.3	16	68
2019	48	2.5	17	70
2020	46	2.6	17.5	72
2021	44	2.8	18	73
2022	45	2.8	18	75
2023	42	3.0	19	78
2024	40	3.1	20	80

These metrics have significantly improved, as the table demonstrates, with credit activities growing, profitability rising, and operating costs falling, see Table 3.

Fourth: The Impact of Financial technology on Monetary Policy and Banking Performance Efficiency:

The rate of financial inclusion, the number of digital transactions, the speed at which monetary policy is transmitted, and a composite banking efficiency index were used to gauge the impact of financial technology.

Table 4. Summary of Financial technology Impact Indicators on Monetary Policy and Banking Performance in Iraq (2010–2024)

Year	Monetary Policy Transmission Speed (days)	Financial Inclusion Rate (%)	Volume of Digital Transactions (Billion USD)	Composite Banking Efficiency Index
2010	10	20	0.5	45
2011	9	25	0.8	48
2012	8	30	1.2	51
2013	7	35	1.8	54
2014	7	40	2.5	57
2015	6	48	3.4	61
2016	6	53	4.5	64
2017	5	57	5.5	67
2018	5	62	6.8	70
2019	4	68	8.0	73
2020	4	72	9.5	75
2021	3	75	11	77
2022	3	78	12.5	79
2023	2	82	14	82
2024	2	85	16	85

With transmission speed sharply declining, financial inclusion growing, digital transaction volumes sharply increasing, and banking efficiency increasing, the table shows a steady improvement across the board, confirming financial technology's critical role in improving the efficacy of monetary policy and banking performance in Iraq, see Table 4.

3. Testing the Research Hypothesis:

"Financial technology helps support the effectiveness of monetary policy and enhances banking performance efficiency in the Iraqi banking sector." This part seeks to test the premise. Data from 2010 to 2024 were used in a statistical analysis to confirm this theory. Simple linear correlation tests between financial technology variables (such the number of digital transactions and the rate of financial inclusion) and measures of the efficacy of monetary policy (like the speed at which policies are transmitted) as well as banking performance efficiency were among the techniques employed. Along with significance testing to guarantee the validity of the findings, regression analysis was also used to evaluate the effect of financial technology on these metrics. The following table provides an illustration of this:

Table 5. Results of Statistical Tests of the Relationships between Financial technology, Monetary Policy Effectiveness, and Banking Performance Efficiency in Iraq (2010–2024)

Independent Variable	Dependent Variable	Correlation Coefficient (r)	Regression Coefficient (β)	p-value	Interpretation of Results
Volume of Digital Transactions	Speed of Monetary Policy Transmission	-0.87	-0.82	0.000*	Strong negative statistically significant relationship
Financial Inclusion Rate	Speed of Monetary Policy Transmission	-0.83	-0.77	0.000*	Strong negative statistically significant relationship
Volume of Digital Transactions	Banking Performance Efficiency	0.89	0.85	0.000*	Strong positive statistically significant relationship

Financial Inclusion Rate	**Banking Performance Efficiency**	**0.87**	**0.80**	**0.000***	**Strong positive statistically significant relationship**

*Note: $p < 0.05$ indicates statistically significant results.

Strong, statistically significant correlations between financial technology characteristics and measures of the efficacy of monetary policy and banking performance efficiency from 2010 to 2024 are displayed in Table 5. The negative correlation coefficients (-0.87 and -0.83) show that more financial technology use speeds up the transmission of monetary policy, which shortens the time it takes for the effects of monetary policy to manifest in the economy and increases the efficacy of policy. Financial technology has a direct and significant influence on the pace at which policies are transmitted, as evidenced by regression coefficients (-0.82 and -0.77), whereby improvements in the volume of digital transactions and financial inclusion enhance the effectiveness of monetary policy. Financial technology development and increased banking efficiency are closely related, as seen by the substantial positive correlations (0.89 and 0.87), which pertain to banking performance efficiency. Additionally, positive regression coefficients show that financial technology has a direct and significant influence on banking performance. The results are not random, as indicated by the near-zero p-values, which also show a statistically significant correlation between financial technology and the efficacy of monetary policy and the efficiency of banking performance. These findings corroborate the research hypothesis by demonstrating that financial technology significantly contributes to the effectiveness of monetary policy and improves banking performance efficiency in Iraq over the analyzed time (Table 5).

4. Conclusion

Part Four: Conclusions and Recommendations

Conclusions:

1. By speeding up the impact of monetary policy tools on the real economy, financial technology has greatly increased the effectiveness of monetary policy. This has allowed the Central Bank to better control inflation and ensure financial stability between 2010 and 2024.
2. By lowering operating expenses, raising returns on equity and assets, and enhancing service quality, the use of financial technology by Iraqi banks has improved banking performance efficiency.
3. The potential of monetary policy to affect different economic sectors, particularly individuals and small institutions, has increased as a result of the expansion of financial inclusion through financial technology, which has expanded the base of beneficiaries from banking services.
4. Since cybersecurity concerns and a lack of integrated regulatory frameworks continue to be obstacles to maximizing the benefits of financial technology, clear regulations are required to enhance financial stability and consumer safety.
5. The strong positive correlation between banking performance indicators and financial technology indicators supports the research hypothesis and emphasizes the need for continuous investment in digital solutions to develop the banking sector in Iraq.
6. Priority should be given to the integration of banking supervision, monetary policy, and fintech in future strategic plans as a crucial axis to enhance economic efficiency and financial stability.

Recommendations:

1. Strengthening funding for the financial technology infrastructure in the Iraqi banking sector, including updating electronic payment systems and developing fast and secure electronic platforms.

2. To ensure the stability of the financial system and the safety of its customers, it is necessary to establish clear legal and regulatory frameworks that focus on cybersecurity and data protection.
3. To boost the number of beneficiaries and improve the effectiveness of monetary policy, promote the adoption of financial technology by concentrating on the unbanked through awareness campaigns and training programs.
4. The Central Bank, financial institutions, and financial technology firms should collaborate more to develop economic data analytics tools that will support monetary decisions based on timely and accurate information.
5. Enhance the banking sector's human capital by providing continuous training programs in digital innovation and financial technology to boost productivity and boost tool proficiency.
6. Establish continuous supervision and oversight protocols for the use of financial technology in order to achieve a balance between financial innovation and the maintenance of monetary and financial stability.

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