The Impact of Mobile Banking as a FinTech on the ROA of Banks in the Banking Sector in Egypt

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Abstract

The research aimed to assess the impact of mobile banking, as a financial technology (FinTech), on the Return on Assets (ROA) of the banking sector in Egypt. With an applied study on the top 10 banks, the study found that while mobile banking initially had a minimal effect on ROA, incorporating control variables such as inflation and bank size significantly improved the explanatory power of the model. The research concluded that mobile banking, along with other factors, plays a significant role in enhancing ROA and contributing to financial inclusion in Egypt. Based on these findings, it recommended that banks focus on integrating mobile banking services, policymakers address emerging risks, and further studies explore the long-term effects on the banking sector's stability and growth.

Keywords: Mobile Banking, FinTech, Return on Assets (ROA), Financial Inclusion, Banking Sector of Egypt.

1. Framework of the Research

1.1. Introduction

Mobile banking, an emerging financial technology (FinTech), has revolutionized the way financial services are delivered across the globe. Initially introduced in the late 1990s with services such as Paybox in Germany and M-Pesa in Kenya in 2007 (Arabia, 2024), mobile banking has rapidly gained traction, becoming a critical component of banking operations, especially in developing countries like Egypt. The technology offers users the convenience of banking services anywhere and anytime, thus driving rapid acceptance worldwide (Bali, 2024). In Egypt, mobile banking is positioned as a key enabler of financial inclusion, a crucial component of Egypt's Vision 2030, which aims to foster economic stability and sustainable growth.

1.2. Problem Statement

The global banking sector has experienced a profound technological shift, with mobile banking being one of the most influential advancements. Mobile banking enables financial services to be delivered through mobile devices, improving accessibility and convenience. However, with the rise of mobile banking, there are also challenges, including the emergence of new risks and the need for constant technological adaptation. In the context of Egypt, mobile banking plays a crucial role in enhancing banking sector performance, particularly in terms of Return on Assets (ROA), while supporting the national goals of financial inclusion and sustainable economic growth.

The research focuses on understanding how mobile banking, as a significant component of FinTech, influences the banking sector's performance in Egypt, especially in terms of ROA, and its broader impact on sustainable development.

1.3. Research Questions

The main question of the research is: What is the impact of mobile banking as a FinTech on the ROA of the banking sector in Egypt?

1.4. Objectives of the Research

The research aims to achieve the following objectives:

- To understand the concept of financial technology and mobile banking.

- To assess the impact of mobile banking on the ROA of the banking sector in Egypt.

2. Literature Review and Theoretical Part

2.1. Mobile Banking as a FinTech

Mobile banking refers to the implementation of financial services using mobile communication technologies with mobile devices (ITU, 2011). Mobile banking allows customers to check account balances, transfer money, and access many other banking products and services from anywhere, at any time. Using mobile phones and mobile communications technology to provide banking services such as deposits, withdrawals, balance inquiries, etc.... (Shareef, Baabdullah, Dutta, Kumar, & Dwivedi, 2018).

According to (Hampshire, 2017), It is a financial system that includes access via mobile devices to a broader range of banking services that include account-based savings or transaction products offered by banks. Mobile banking services can be classified in the following figure. (Le et.al, 2021)
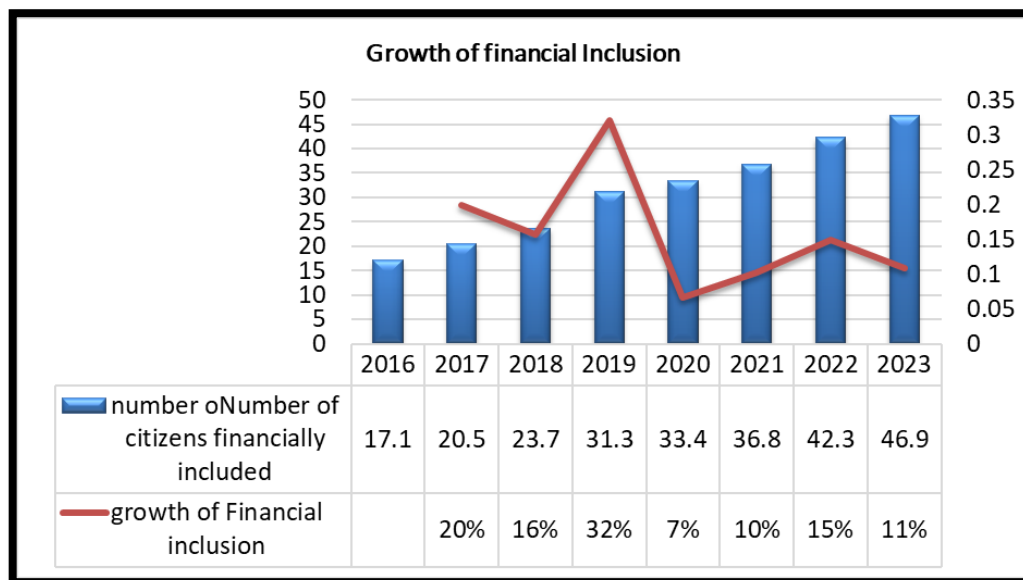
Figure no (1) - Mobile banking services

Source: (Sharma, Govindaluri, & Al Balushi, 2015)

As is clear from the previous figure, mobile banking services are diverse and cover most financial transactions (Adhitya & Sembel, 2020), and there is a wide spread of their fields, including transfers, payments, insurance services, and other financial services (Siska, 2022).

2.2. The Status of Mobile Banking in Egypt

There is a significant increase in users of mobile banking services in Egypt. This is due to a group of factors, the most important of which is the government's move towards financial inclusion to include all segments of Egyptian society. On the practical level in Egypt, financial inclusion is widespread with support from the government, as the Egyptian government seeks to include the largest possible number of citizens within the financial inclusion, and this can be monitored through the following figure:

Figure no (2) -Financial inclusion in Egypt

Growth of financial Inclusion	2016	2017	2018	2019	2020	2021	2022	2023
number oNumber of citizens financially included	17.1	20.5	23.7	31.3	33.4	36.8	42.3	46.9
growth of Financial inclusion		20%	16%	32%	7%	10%	15%	11%

Source: Prepared by the researcher based on the data available on the Central Bank of Egypt website

It is clear from the previous figure that there is a wide growth and spread of financial inclusion, but the annual increase is unstable, as the largest increase in growth in

inclusion was in May 2019, as it reached 32%. While the smallest increase was in 2020, as it reached 7%.

2.3. E- Wallets in Egypt and Their Development

Electronic wallets in Egypt have seen significant development in recent years, influenced by technological advancements and the shift towards a digital economy. The shift towards electronic transactions is one of the most critical aspects of this development, with government policies and central banks playing a major role in promoting financial inclusion and achieving sustainable development goals.

In 2016, the Central Bank of Egypt launched a financial inclusion strategy aimed at enhancing the use of banking services among different segments of society. By 2023, the use of electronic wallets had grown significantly, driven by the spread of smartphones and the increase in internet users. According to statistics from the Central Bank, the number of electronic wallets reached approximately 30 million by mid-2023, with a noticeable annual growth rate (Central Bank of Egypt, 2023).

Electronic wallets in Egypt include mobile applications linked to bank accounts or electronic payment accounts that allow users to make payments, transfer funds, pay bills, and even receive salaries. These wallets are an effective means of integrating unbanked populations into the formal financial system, contributing to economic growth and enhancing financial stability.

Electronic wallets are an essential part of Egyptian banks' strategies to improve financial performance and expand their customer base. One of the key indicators used to measure this impact is the return on assets (ROA) Reports from Egyptian banks during the period from 2017 to 2023 showed improvements in these indicators with the increased use of electronic wallets, indicating better operational efficiency and increased non-traditional revenues (Abdullah, 2022).

Moreover, electronic wallets have played a role in promoting the achievement of sustainable development goals by improving access to financial services for marginalized

groups (Nasri et.al., 2020). According to a study conducted by the Egyptian Association for Information and Financial Technology, 75% of e-wallet users were previously unbanked, helping to reduce the financial inclusion gap (Egyptian Association for Information and Financial Technology, 2023).

The rapid increase in the number of E-wallets reflects significant progress in the field of financial technology in Egypt. This growth is linked to the development of digital infrastructure specially in urban areas and increased consumer awareness of the importance of digital financial solutions, contributing to achieving financial inclusion and sustainable economic growth. This increase can be traced in the following figure:

Figure no (3) -increase in number of E-wallets in Egypt

No of E-wallets (million)

	2019	2020	2021	2022	2023
No of E-wallets	15.2	19.8	25.2	30.4	39.4
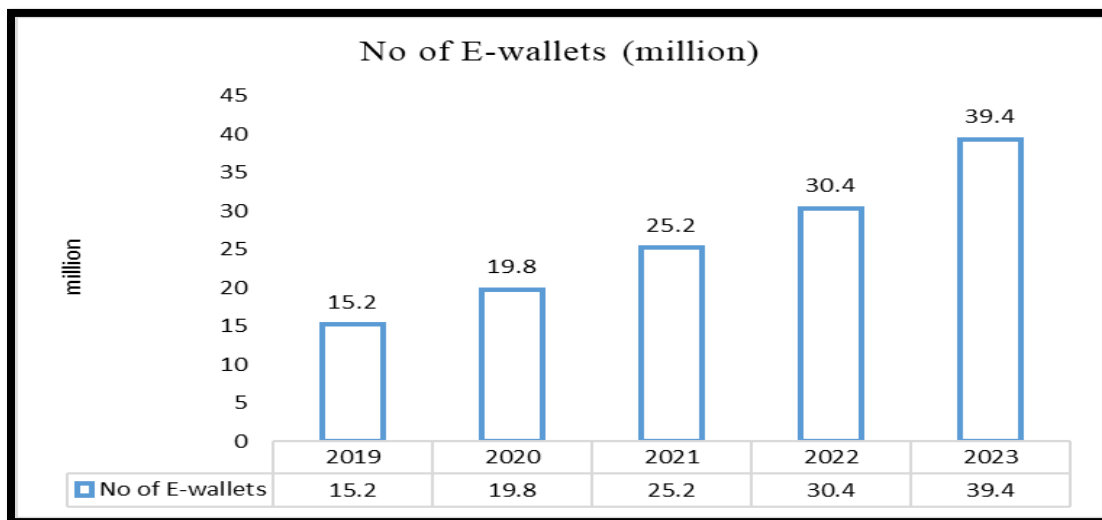
Source: by the researcher using the data of (Central Bank of Egypt, 2023).

The clear increase in the number of E-wallets from 15.2 million in 2019 to 39.4 million in 2023 reflects the enormous growth witnessed in the financial technology sector in Egypt. This growth can be attributed to several key factors:

- Government Policies to Promote Financial Inclusion and expand access to digital banking services, such as adopting electronic payments and developing digital

infrastructure. These policies have facilitated the adoption of E-wallets as an efficient payment tool across various groups.

• The widespread use of smartphones and increased internet access have significantly contributed to the growth of E-wallets. With the increasing number of smartphone users in Egypt, the opportunities for using E-wallets have expanded.

• The Pandemic (COVID-19) as a Catalyst pushed users toward greater adoption of digital solutions due to social distancing **a**nd precautionary measures Akhtar & Nosheen, 2022). This explains the significant increase in the number of E-wallets from 2019 to 2020 (4.6 million wallets).

• With the development of e-commerce and the growing reliance on electronic payments (Idfilandu & Saripudin, 2021), consumers in Egypt began to adopt E-wallets more as a convenient and secure way to pay and transfer money**.**

• The financial sector has witnessed multiple innovations in digital payment solutions, either through fintech companies or the banks themselves, contributing to the provision of various services via E-wallets, such as bill payments, money transfers, and even investments.

3. Applied Study on Banking Sector in Egypt

3.1. Study population

The study population is represented in banks operating within the borders of the Arab Republic of Egypt, from which the research sample will be drawn as follows:

The study population is represented by the following:

Top 10 Commercial banks operating within the borders of the Arab Republic of Egypt. They are chosen for the following reasons:

• The net profits of the 10 largest Egyptian commercial banks rose to more than EGP 212 billion by the end of 2023, according to data from the Central Bank.

- The top ten banks account for 74.9% of the total profits of the banking sector banks, which recorded EGP 283.4 billion by the end of 2023.
- The assets of the top 10 banks recorded about EGP 11.13 trillion by the end of 2023, accounting for 78.3% of the banking sector's assets amounting to EGP 14.2 trillion.
- The total deposit balances in these banks also recorded about EGP 7.885 trillion, while customer lending balances amounted to EGP 4.4 trillion by the end of 2023.
- The data showed an increase in the volume of investments of the 10 largest banks in treasury bills to reach EGP 4.051 trillion by the end of 2023.
- The total number of credit cards issued by the 10 largest banks in the banking sector also increased to reach 4.651 million cards by the end of 2023, compared to 4.33 million cards by the end of 2022, according to the Central Bank report.
- The number of ATMs in the 10 largest banks reached about 18,374 thousand machines by the end of December 2023, compared to 17,503 thousand machines by the end of December 2022.

The Study population is represented in the following banks:

table no (1) – Banks of Study population

No	Bank Name	Bank Abbreviation
1	National Bank of Egypt	NBE
2	Banque Misr	BM
3	Banque du Caire	BDC
4	Arab African International Bank	AAIB
5	Commercial International Bank	CIB
6	Qatar National Bank	QNB
7	Bank of Alexandria	AlexBank
8	Faisal Islamic Bank	FIB

9	United Bank	UB
10	Hongkong and Shanghai Banking Corporation	HSBC

Source: prepared by the researcher.

3.2. The study Sample

The study sample was selected based on a set of criteria as follows:

- The bank must be one of the ten major banks previously mentioned
- The bank must have an electronic wallet
- The bank must have published data for the electronic wallet
- The bank's financial data must be published

This is applied as follows:

Table no (2) – Study Sample Selection criteria

No	Bank	Is the financial data published?	Does the bank have a E-Wallet?	Is the E-wallet data published?	The Study Sample
1	NBE	√	√	√	√
2	BM	√	√	√	√
3	BDC	√	√	√	√
4	CIB	√	√	√	√
5	QNB	√	√	√	√
6	AlexBank	√	√	√	√
7	AAIB	√	√	x	x
8	FIB	√	√	x	x
9	UB	√	√	x	x

10	HSBC	√	x	x	x

Source: prepared by the researcher.

3.3. Variables of the Research

The study variables are divided into an independent variable, dependent variable and control variables as follows:

- The independent variable: Mobile Banking (No of E-Wallets).
- The dependent variable: the ROA of the banking sector.
- The Control Variables: (Total assets, bank's lifespan and inflation rate).

3.4. Research Hypothesis

The research is based on the following main hypothesis:

There is a significant impact of mobile banking as a FinTech on the ROA of banks in the banking sector in Egypt.

3.5. Testing the hypothesis of the Research

3.5.1. Encoding of study variables

The following table shows the codes used to express the study variables. Wherever this code is found, it refers to the intended variable. The researcher uses the codes to facilitate the formulation of the model and conduct appropriate statistical analyses.

Table no (3) - encoding of the study variable

The variable	Code of the variable	Variable type
E-Wallets	E-Wall	Independent
Return on Assets	ROA	Dependent
Size of Total Assets	Size	Control
Bank's Lifespan	Life	Control

Inflation Rate	Inf	Control

Source: prepared by the researcher

3.5.2. Testing the research hypothesis before adding the control variables

To test the correlation and regression between e-wallets and ROA, we do the following steps:

Identifying the variables Entered to statistical analysis

This is shown in the following table

Table no (4) – variables Entered to statistical analysis

Variables Entered/Removed[a]			
Model	Variables Entered	Variables Removed	Method
1	Wals[b]	.	Enter
a. Dependent Variable: ROA			
b. All requested variables entered.			

this table highlights that the analysis focuses solely on the effect of the "E-wallets" variable on ROA, providing a straightforward view of its direct relationship without incorporating additional variables or complex variable selection methods.

Measuring the correlation and regression between e-wallets and ROA

Table no (5) - Model Summary between e-wallets and ROA

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.105[a]	.011	-.014	.060454
a. Predictors: (Constant), Wals				

The above "Model Summary" table provides key statistics on the regression analysis involving the independent variable e-wallets "Wals" and the dependent variable "ROA.". The correlation coefficient (R) is 0.105, indicating a very weak positive linear relationship between "Wals" and "ROA." This low value suggests that "Wals" explains only a minimal portion of the variability in "ROA.". The R-Squared value is 0.011, which means that only 1.1% of the variance in "ROA" can be explained by the variable "Wals." This extremely low R-Squared value highlights that "Wals" has a negligible impact on explaining the variability in "ROA.

Measuring the significance of the regression

The significance of the regression is shown below

Table no (6) – ANOVA of e-wallets and ROA

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.002	1	.002	.449	.507[b]
	Residual	.146	40	.004		
	Total	.148	41			
a. Dependent Variable: ROA						
b. Predictors: (Constant), Wals						

The ANOVA table assesses the overall significance of the regression model predicting "ROA" using the predictor "Wals.". Concerning significance (Sig.): the p-value associated with the F-statistic is 0.507. This p-value is well above the common significance threshold of 0.05, suggesting that the model is not statistically significant. In other words, the predictor "Wals" does not have a meaningful impact on predicting "ROA."

3.5.3. Formulating the model

The model is formulated based on the following table:

Table no (7) – Coefficients between e-wallets and ROA

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.043	.014		2.977	.005
	Wals	-.009	.014	-.105	-.670	.507
a. Dependent Variable: ROA						

Based on the provided data, the linear regression equation can be formulated using the coefficients from the table.

The equation of the model is:

ROA=0.043−0.009×Wals

Explanation:

➢ The constant term is 0.043, which represents the intercept of the regression line.

➢ The coefficient for the variable "Wals" is −0.009 indicating that for each unit increase in "Wals," the ROA is expected to decrease by 0.009, assuming all other factors remain constant.

3.5.4. Testing the Research hypothesis after adding the control variables

Measuring the correlation and regression between e-wallets and ROA

The correlation and regression between e-wallets and ROA is indicated as following:

Table no (8) - Model Summary between e-wallets and ROA (control variable)

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.616[a]	.380	.313	.049776
a. Predictors: (Constant), Inf, Life, Wals, Size				

The table no (20) "Model Summary" provides information about the regression analysis involving the independent variables (Inf, Life, Wals, Size) and their relationship with the dependent variable ROA. The correlation coefficient (R) is 0.616, indicating a moderate to strong positive linear relationship between the set of predictors (independent) and the dependent variable, ROA. This suggests that the predictors collectively have a substantial impact on ROA. The R-Squared value is 0.380. This means that 38% of the variability in ROA can be explained by the combined effects of the independent variables (Inf, Life, Wals, Size). This is a relatively moderate proportion, indicating that the model has a fair amount of explanatory power, though a significant portion of the variability remains unexplained.

Measuring the significance of the regression

The significance of the regression is shown below

Table no (9) - ANOVA between e-wallets and ROA after adding control variable

ANOVA[a]						
	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.056	4	.014	5.666	.001[b]
	Residual	.092	37	.002		
	Total	.148	41			
a. Dependent Variable: ROA						
b. Predictors: (Constant), Inf, Life, Wals, Size						

The above table "ANOVA" no (21) evaluates the overall significance of the regression model with the predictors (Inf, Life, Wals, Size) in relation to the dependent variable, ROA. The p-value associated with the F-statistic is 0.001. This p-value is well below the common significance threshold of 0.05, suggesting that the regression model is statistically significant. In other words, the predictors collectively have a meaningful impact on the dependent variable, ROA.

Formulating the model

The model is formulated based on the following table:

Table no (10) - Coefficients between e-wallets and ROA after adding control variable

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.546	.132		4.148	.000
	Wals	.038	.017	.436	2.279	.029
	Size	-.104	.027	-.843	-3.788	.001
	Life	.000	.000	.112	.529	.600
	Inf	.002	.001	.335	2.551	.015
a. Dependent Variable: ROA						

Based on the provided coefficients from the regression analysis, the multiple regression model can be formulated as follows:

➢ **Constant (Intercept):** The constant term is 0.5460. This is the predicted value of ROA when all the predictor variables (Wals, Size, Life, Inf) are equal to zero.

➢ **Wals:** The coefficient for Wals is 0.038, indicating that for each one-unit increase in Wals, ROA is expected to increase by 0.038, holding all other variables constant. This coefficient is statistically significant with a p-value of 0.029, suggesting a meaningful positive effect on ROA.

➢ **Size:** The coefficient for Size is −0.104, meaning that for each one-unit increase in Size, ROA is expected to decrease by 0.104, holding all other variables constant. This coefficient is statistically significant with a p-value of .001, indicating a significant negative effect on ROA.

➢ **Life:** The coefficient for Life is .000, which is essentially zero, indicating that Life does not have a significant effect on ROA. The p-value of 0.600 supports that Life is not a significant predictor in this model.

> ➤ **Inf:** The coefficient for Inf is 0.002, meaning that for each one-unit increase in Inf, ROA is expected to increase by 0.002, holding all other variables constant. This coefficient is statistically significant with a p-value of 0.015, suggesting a meaningful positive effect on ROA.

Accordingly, the model can be formulated as follows:

$$ROA = 0.546 + 0.038 \times Wals - 0.104 \times Size + 0.000 \times Life + 0.002 \times Inf + E$$

In summary, the regression model indicates that E-Wallets, Total assets, and Inflation rate significantly affect ROA, while bank's lifespan does not have a significant impact.

4. Results

- The results show that the use of e-wallets (Wals) has a weak and statistically insignificant effect on Return on Assets (ROA) when considered alone. However, after adding control variables such as inflation, total assets size, and bank's lifespan, the model's explanatory power significantly increased and became statistically significant, indicating the combined effect of e-wallets and other factors on ROA. The bank's lifespan (Life) did not have a significant effect on ROA.

5. Recommendations

- **Encourage E-Wallet Adoption**: Since e-wallets show a positive and significant effect on ROA after including control variables, banks should focus on encouraging the use of e-wallets to enhance their profitability and financial performance.
- **Focus on Managing Total Assets**: Given the negative impact of asset size on ROA, banks should explore strategies to efficiently manage their assets to prevent a negative effect on profitability.
- **Monitor Inflation Trends**: The inflation rate has a positive and significant effect on ROA, suggesting that banks should closely monitor inflation trends and adjust their strategies to mitigate risks and optimize performance.

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