The Impact of IT Investments on the Performance of Largest Middle East Banks

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Abstract. IT investments lately have taken major role in Middle East banks. Hence, this study is adding to the discussion of impact of IT to the financial performance of ten largest Middle East banks, covering the period 2011-2021. The main source of the data is from annual reports of each bank. The study uses CAMELS model as dependent variable, whereas IT investments like Automated Teller Machine (ATM), Mobile Banking (MB), Internet Banking (IB), Point of Sale Terminals (POS) and Telephone Banking (TB) are the independent variables. The findings of the study show that the use of ATM, POS and TB has significant impact on financial performance of banks. Hence, the use of MB, IB does not have significant impact on financial performance of Middle East banks. The study concludes with recommendations for future studies.

Keywords: IT, Bank Performance, CAMELS, Middle East, FinTech

1. Introduction

With the development of information technology, financial institutions, particularly banks have innovated and improved their financial products and services. This improvement was as a result of automation in financial services that brought by financial technology, shortly Fintech. The progression of Fintech portrays a continuous cycle of same time development of finance and innovation that prompted various steady and unstoppable advancements, for example, online banking, crowdfunding, digital wallet, mobile pay, shared loaning, crypto payments, wire transfer, digital currencies and many more [1]. Banks and trading businesses were depended on utilization of technologies comprising physical significance such as paper and coins and was limiting the services to achievable territorial distances through methods of physical transportation. By advancements in data and technology empowered the physical portrayal to lose value and to communicate quicker in far distances [2]. In light of the advancement of financial technologies, as depicted over, it represents total technological applications in conveying financial solutions. FinTech includes a wide

assortment of inventive thoughts and novel business plans empowered through computerized innovations, where the solutions might be found for client communications, for payments through block chain, for crowdsourcing and for insuring [3]. The steady entrance of Tech giants in banking and financial sector is intensely affecting the business. Enormous Technological organizations can exploit a favored connection with customers, recently created during their business undertakings and take advantage of cutting-edge specialized arrangements - like information assortment - to offer financial assistance. Tech companies increase competition in financial service providers such as banks [4].

Various academic research shows clashing outcomes on the investment in financial technology. Organizations keep on investing enormous amount of money in information technology. The reason must be that these organizations feel they receive value since they take this venture, or else they wouldn't do it [5]. Do companies invest essentially in light of the fact that they see different organizations carrying out in investing in high technology? Is investing in financial technology delivering significant worth? There are numerous studies measuring performance on financial institutions from financial technology investments. In fact, [6] affirms that the development of FinTech companies adversely impacts performance of 41 banks in Indonesia. While the outcomes of [7] show that FinTech development diminishes Chinese banks' profitability and the quality of assets in total, it is seeing as more articulated for huge state-claimed business banks, it recovers adequacy of banks' capital and effectiveness of management, however less significantly for policy banks and state-possessed business banks. Actually, [8] demonstrate that technology-based strategies for example, the quantity of given bank cards, the quantity of automated teller machines (ATMs), and the quantity of point of sale (POS) terminals further developed profitability of banks in 23 countries. The study of [9] stresses that the IT influences on efficiency in Asia-Pacific banks considering the given profitability in their reports throughout the financial crisis in Asia. Overall, the banks in Asia-Pacific increased their productivity, as well as strategic and operational benefits as a result of investing in higher technology. In addition, [10] contends that Banks all over Asia accomplished improvement in productivity over usage of IT. Both retail and wholesale IT items impact in increase of productivity. Additional benefit of IT usage is in expanding yields and diminishing costs. A recent study of [11] showed huge proof of the effect of ICT investment on performance indicators in finance also reflecting positive significance. Moreover, [12] demonstrate that investments in FinTech are positive and significantly related with performance of banks, during the entire considered time frame. Considering the fact that Middle East banks have invested profoundly in information technology in the past few years with funding to reach 2 billion USD at the end of the year 2022 [13] and difficulty in obtaining FinTech investment banks data [14], increases the need for further analyzing the impact of investments in FinTech and banks profitability.

Additionally, there is an absence of literature for the impact of IT investments on the performance of Middle East banks. Thus, there is a requirement for additional investigations to add to the current discussion for the Middle East banks performance and

their relation with IT. Therefore, the main objective of this study is to fill this research gap by relying on annual reports of the top ten most performing banks in Middle East. Based on the proposed models, this paper pursues the most convenient dimension for analyzing the changes on profitability of Middle East banks as a result of IT investments. We respect the comprehension coming from this issue as an endeavor for additional examinations by academic world and results of this study to bring benefit to banking sector and by that its management.

The rest of the research is coordinated as follows: the second section assesses related literature to financial technology. The third section discusses the methodology. The fourth section specifies the research findings. Ultimately, the fifth section provides concluding remarks, limitations and recommending possible future research.

2. Literature Review

Even though the term FinTech is very popular lately, its notion dates with the initial Trans-Atlantic transmission link in 1958, by decreasing the correspondence interval from days to couple of hours, that likewise brought to improvement of worldwide financial services such as SWIFT, ATMs which was shortly considered as Fintech 1.0. Additionally, throughout FinTech 2.0 Internet was developed and during FinTech 3.0 information technology emerged [15]. [16] define FinTech as any creative thoughts that further develop financial service processes by recommending technology solutions as indicated by various business circumstances, while the thoughts could likewise prompt new business plans or also creation of new businesses.

The development of financial technology, resulted to apply diverse and choose most reliable measure by researchers in digital technology as of [17] have measured the impact of financial technology on the financial performance of banks by the number of Automated Teller Machine (ATM) transactions and internet and mobile banking, while bank profitability was measured by Return on Assets (ROA). Similarly, [18] for measuring investment in financial technology used CAMELS model and found that ATM and TB have negative impact whereas MB, IB, BC and POS have positive impact. Additionally, [19] tested the relationship among measures of financial technology like: ATM, Internet Banking, POS terminal, mobile banking and cash holding. They reveal that cash holding is negatively related to four other measures given above. [20] used mixed-method research, qualitative and quantitative approach to analyze the impact of FinTech. Qualitative approach included conducting four semi-structured interviews whereas quantitative approach was based on including annual reports of banks. The study of [21] discloses that Debit card on ATM had a positive significant relationship and significant with ROA, while Credit Cards on ATM and POS Machines were also positively related to ROA but not statistically significant while Prepaid Cards ATM was negatively related to ROA and non-significant.

Additionally, the studies that analyzed the impact of implementation of financial technology in banks resulted in varied conclusions. [22] didn't find a significant relation between FinTech enterprises and profitability of banking area due to impact of FinTech from inside and outside the environment. The study of [23] shows that e-banking impacted in increase of the profitability of banks, by which banks have met own costs and earned profits even in the short period of time. Moreover, [24] found that investment in ATMs impacted in increase of bank profitability. Furthermore, [25] prove the presence of profitability paradox in the Indian Banking sector. Additionally, [26] investigated the relation of improvement in advanced technology in profitability of banks in Saudi Arabia and Jordan. The author proves that as banks advance in investing in higher technology the income of banks increases. As well, [27] denote that Jordanian commercial banks realize higher return on assets, return on equity and earnings per share as a result of investing in financial technology. Also, [28] study the relation of investment in Information Technology and performance of European banks. The author finds small association between total Information Technology investment and improvement of bank profitability through indicates the presence of a profitability paradox. Besides, [29] indicated that e-banking improved the proficiency of client assistance, empowering clients to utilize the Web to direct business from their homes. Then again, it likewise lessens the administration staff, which diminishes Chinese bank expenses and further develops consumer satisfaction. Likewise, [30] found significant positive correlation between fintech and profitability of 38 European Banks for the period 2013-2015, whereas the number of physical branches and bank profitability show negative correlation. Whereas, [31] confirms that all the automated service quality factors (ATM, internet and telephone banking) had nonsignificant relationships with bank financial performance.

Thus, from the exhaustive and broad assessment of literature, and to affirm the above discoveries the accompanying hypothesis were created:
H1: There is no positive relation between investing in ATM and FP of Middle East banks.
H2: There is no positive relation between investing in MB and FP of Middle East banks.
H3: There is no positive relation between investing in IB and FP of Middle East banks.
H4: There is no positive relation between investing in POS and FP of Middle East banks.
H5: There is no positive relation between investing in TB and FP of Middle East banks.

3. Research Methodology

The sample utilized for this study is made up of ten best performing banks in Middle East, despite the population being large, still it may be used to draw conclusions. Purposive sampling was used in the study in selecting the necessary sample of banks among total banks operating in Middle East. The researchers used the published data of annual reports from the websites of the banks for ten consecutive years, that is 2011-2021, as this is the period when banks mainly invested in information technology and they experienced their greatest progression.

The influence of Information Technology investments on financial performance across Middle East banks has been examined for the aim of this research using sources from secondary data. As a result, information for the study was taken from the annual reports for the years 2011-2021. As such, Automated Teller Machine (ATM), Mobile Banking (MB), Internet Banking (IB), Point of Sale Terminals (POS) and Telephone Banking (TB) are among the data for independent variables.

3.1 Dependent Variable

A detailed examination of the firm performance studies reveals that many methods are used by researchers to gauge its performance. According to [32] financial performance measures show if strategy, application and accomplishment are adding to main concern improvement of the firm. Hence in this study the financial performance as a dependent variable is measured through CAMELS method [33], [34]. The model was first used in USA but later on was viewed as a beneficial instrument by supervisory bodies from many nations to evaluate the stability of financial institutions [35]. The five essential areas of a bank's operations—Capital Adequacy, Asset quality, Management competency, Earning and Liquidity—are represented by the abbreviation CAMEL. The sixth component, "S," was supplementary to the five components in 1996 in order to place a higher emphasis on market risk, transforming the CAMEL method into the CAMELS approach [34]. Additionally, according to [33] Financial performance (FP) was estimated in view of six components of CAMELS technique. Initially, a sub-rating for every component of every distinct yearly report was determined accompanying equations: Capital Adequacy (CA): total deposits/total equity; Asset Quality (AQ): total investments/total assets; Management Capability (MC): admin expenses/interest income; Earning Quantity and Quality (EC): net income/total assets; Liquidity (LQ): cash and cash equivalents/current liabilities; Sensitivity (SN): doubtful debts/loans. Second, a composite score for each distinct yearly report was calculated. Third, evaluating from one to five was designated for every composite rating of every distinct yearly report:

- Rating 1: 1.00-1.49/ Strong
- Rating 2: 1.50-2.49/ Satisfactory
- Rating 3: 2.50-3.49/ Fair
- Rating 4: 3.50-4.49 /Marginal
- Rating 5: 4.50-5.00/ Unsatisfactory

3.2 Independent Variable

Taking into consideration that the purpose of this study is examination of the IT investments effect on the performance of the ten largest Middle East banks, hence IT investments are counted as independent variable. Therefore, the estimation is done according to: installed ATMs by banks. The second estimation is done through MB. The third estimation includes IB. The forth estimation is POS and the last one is TB. Each component takes own values while calculating them.

4. Empirical Findings

4.1 Descriptive Statistics

In this part is done the description of the dependent and independent variables. As explained in detail in part three, the dependent variable in this research is FP that is estimated according to CA, AQ, MC, EC, LQ, and SN), whereas the independent variable is considered IT investments that also is calculated through these components: ATM, MB, IB, POS and TB. The complete number of observations for every variable is 100. This number is reached because we analyzed 10 banks and covered the time series from 2011 until 2021. Additionally, the data are analyzed according to values of: minimum, maximum, mean and standard deviation (see table 1).

Table 1. Descriptive statistics of dependent and independent variables

	N	Minimum	Maximum	Mean	Std. Deviation
ATM	100	.00	1.00	.5000	.50252
MB	100	.00	1.00	.9000	.30151
IB	100	.00	1.00	.9000	.30151
POS	100	.00	1.00	.9000	.30151
TB	100	.00	1.00	.7600	.42923
FP	100	1.00	2.00	1.2100	.40936

Source: own calculation (SPSS)

The first independent variable analyzed in table 1 is ATM, with mean and standard deviation of 0.5, as well as minimum as zero and maximum as one.

The second variable is MB with mean of 0.9 and SD of 0.3. The minimum and maximum ranges of zero and one respectively.

Besides the descriptive statistics for IB and POS are having similar values, with mean 0.9 and SD of 0.3. Additionally, the minimum has a range of 0 and maximum as one.

The last analyzed independent variable is TB, with mean of 0.76 and standard deviation to be 0.4. While, the minimum and maximum ranges is similar to other independent variables, that is zero and one respectively.

Finally, the dependent variable FP shows higher mean than independent variables, 1.2 and standard deviation of 0.4. Besides the minimum and maximum ranges are also higher, one and two respectively.

4.2 Correlation Analysis

Additional analysis in this study is about the correlation between independent variables among each other and dependent variable. As such, the results show that moderate positive relationship exists among independent variables, with the range of 12.5% to 33.3%, with exception of weak or no linear correlation among IB with ATM and MB, 6.7% and 0% respectively. Besides the findings also confirm moderate relationship between ATM and TB (32.8%), MB and POS (33.3%). Moreover, some of the variables are moderately negatively correlated, like ATM and MB (-26.7%), ATM and POS (33.3%), MB and TB (-18.7%), as well as IB and POS (11.1%). Further, table 2 shows important relationship between dependent variable – FP and independent variables ATM, IB, POS and TB, with correlation of 31.9%, 17.2%, 17.2% and 29% respectively. The results confirm that multicollinearity does not occur among the independent variables. In addition, variation inflation factor (VIF) scores also identifies moderate correlation of independent variables (see table 2).

Table 2. Correlation matrix and VIF test

	ATM	**MB**	**IB**	**POS**	**TB**	**FP**	**VIF**
ATM	1						
MB	-.267**	1					
IB	.067	.000	1				
POS	-.333**	.333**	-.111	1			
TB	.328**	-.187	.125	-.187	1		
FP	.319**	.008	.172	.172	.290**	1	

Source: own calculation (SPSS)

4.3 Regression Analysis

With the purpose of studying the effect of IT investments on the performance of ten largest banks in Middle East, we have applied a multiple regression analysis with the following model:

$$FP = \beta 0 + \beta 1\, ATM + \beta 2\, MB + \beta 3\, IB + \beta 4\, TB + \beta 5\, BC + \beta 6\, POS + \varepsilon \qquad (1)$$

from which: FP: Financial Performance; ATM: Automated Teller Machines; MB: Mobile Banking; IB: Internet Banking; POS: Point of Sale Terminals; and TB: Telephone Banking. Accordingly, the results of the model 1 are summed up in ensuing tables 3-5.

Table 3. Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.514[a]	.264	.225	.36034

a. Predictors: (Constant), TB, IB, MB, POS, ATM

Source: own calculation (SPSS)

Table 3 shows the results of the model indicating R as 0.514, R Square as 0.264 and adjusted R square as 0.225. This suggests that 26.4% of the varieties in generally speaking Financial Performance of ten largest banks in Middle East is described by the given independent variables (implementation of ATM, MB, IB, POS and TB).

Table 4. ANOVA

Model[a]		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.385	5	.877	6.754	.000[b]
	Residual	12.205	94	.130		
	Total	16.590	99			
a. Dependent Variable: FP						
b. Predictors: (Constant), TB, IB, MB, POS, ATM						

Source: own calculation (SPSS)

In table 4 analysis of variance is given which shows p-value of 0.000, indicating that we reject the null hypothesis and confidently confirm that in general our model is statistically significant to predict that IT investments impact positively on financial performance of ten largest Middle East banks. This finding is also verified by [11], [12], [9], but disapproved by [7].

Table 5. Coefficients

Model [a]		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.256	.210		1.217	.227
	ATM	.291	.081	.357	3.612	.000
	MB	.043	.130	.032	.334	.739
	IB	.214	.122	.158	1.762	.081
	POS	.461	.133	.340	3.462	.001
	TB	.212	.091	.222	2.343	.021
a. Dependent Variable: FP						

Table 5 represents the significance and coefficients for each independent variable. Overall, all variables have positive impact, whereas some with higher and some with lower importance. The first independent variable is ATM has coefficient of 0.291 and it is considered to be significant (0.000). Therefore, we reject the first null hypothesis. Hence, ATM has significant positive impact in financial performance of Middle East banks. This outcome confirms the findings of [8], [17], [24], however contradicts with the results of

[31], [18] and [6] that concluded with negative impact of ATM banking in FP of banks. The implication from the finding is that with one-unit increase in implementation of ATM equipment, the financial performance of Middle East banks increases by 0.291.

The second independent variable in the study is MB with positive coefficient of 0.043, and it is not considered to be significant (0.739). Consequently, we don't reject the second null hypothesis. Hence, the suggestion is that with one-unit increase in implementation of MB, the financial performance of Middle East banks improves very little by just 0.043. This finding specify that despite the positive impact of MB on bank FP, still it is not counted as statistically significant variable. This outcome confirms the findings of [18] and [36]. Mobile banking might be viewed as the following stage of banks concerning growing new services to clients in addition to exploiting the most recent technology related to business plans and decrease of expenses [37].

The third independent variable in this research is IB with positive coefficient of 0.214, and it is also not considered to be significant (0.081). As such, we reject the third null hypothesis. Therefore, the advice is that is that with one-unit increase in adoption of IB, the financial performance of Middle East banks improves by 0.214. This finding specifies that despite the positive impact of IB on bank FP, still it is not counted as statistically significant variable. This finding confirms with the results of [18] and [38], however contradicts with the results of [31]. Internet banking has showed up being amongst the most beneficial web-based business application [39].

Regarding the POS terminal, the coefficient is positive (0.461) and is significant (0.001). Accordingly, hypothesis 4 is not rejected. The finding shows that providing POS terminals to customers it influences significantly the financial performance of Middle East banks. The finding harmonizes with the findings of [8] whereas, opposite results are found by [18], [21].

The last independent variable in our study is TB which result is positive (0.212) and is significant (0.021). This specifies that applying TB it has significant impact in financial performance of Middle East banks. As such, hypothesis 5 is not rejected. The finding contradicts with the results of [18] and [31].

Conclusions, Limitations, and Future Research

The study objective was to encompass earlier research and analyze the impact of IT investments on financial performance of ten largest Middle East banks, covering the period between 2011-2021. In particular, the examination intended to lay out if there is a relation among the financial performance as dependent variable, estimated through CAMELS system and independent variables like: installed ATMs by banks, implementation of MB, IB, POS and TB. Additionally, the paper has suggested a conceptual framework that was

validated empirically by data from financial reports of the ten banks in Middle East. The findings show significant empirical sustenance for three out of five hypotheses between independent (ATM, POS & TB) and dependent variable (financial performance). Hence, the findings show that no significant relation exists between MB, IB and financial performance of ten largest Middle East banks. The present evidence that ATM, POS terminal and TB are crucial for comprehending financial performance is expanded by the findings of this study. Mobile and internet banking are contemplated as the main factors in influencing financial performance of banks. Consequently, providing high-quality mobile and internet banking services must be accomplished in order to boost financial profitability. The quality of the existing mobile and internet banking service resulted to not have significant relation with financial performance, so expanding these services might consequently improve financial performance.

Answering faster to client necessities, in addition to giving clients the potential chance to direct themselves autonomously online remain additional significant approaches to further developing online excellence of banking. Thusly, banks ought to be in a superior situation to assist the clients with partaking and give a decent component of correspondence. The management could likewise deliberate own financial products with affordable prices online, thus, this could contribute in expanding the financial performance of banks.

Consequently, this study is a significant commitment to the knowledge because has discovered that ATM, POS & TB play important role in financial performance of ten largest banks in Middle East. As of our knowledge, the study is done for the first time covering financial performance of Middle East bank and will make a considerable contribution in increasing the consciousness of all stakeholders in this process. Understanding more deeply the factors of financial performance could help banks to prepare better policies on ideal usage of ICT components. Nevertheless, as other studies, also it has limitations. The study covered only ten largest banks in Middle East. This research can be of a good guidance for further exploring the issues to other banks in Middle East or in other countries like in North Africa. The financial data of the study was completely based on yearly reports which might have expected predisposition. Hence it is recommended the future studies to collect data from primary sources, like interviews or questionnaires. Additional recommendation for future studies is to deliberate further financial ratios from the uses of the current study.

Conflict of interest statement

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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