



Analysing the Relationship between Financial Technology and Commercial Banks' Financial Performance in South Africa

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Abstract: During the last decade (2010-2020), the use of financial technology within the banking sector has increased over the world. Therefore, the article aims to determine the relationship between financial technology and commercial banks' financial performance. A simple linear regression was used along with descriptive analysis and correlation analysis based on the top five banks in South Africa. Two measures of financial performance, return on equity and return on assets, were utilised using secondary bank data for the period of 2011-2021. The findings indicated that within the chosen sample period, there is a relationship between the financial performance of the top five banks in South Africa and the incorporation of financial technology led by the number of mobile subscriptions used for internet banking. Findings also showed that competition within the banking sector is emerging, meaning that South Africa's banking sector is moving from an oligopolistic environment into a more competitive one. This may be viable for experts within the banking space as it can provide substantial evidence that the transition from traditional-based banking to a more digital approach will be to their benefit in terms of financial performance and gaining market share within the sector.

Keywords: Financial development; fintech; banking performance; technology; South Africa.

JEL Classification: G2; G21; G32; O33

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1. Introduction

Financial development occupies an important contribution to a country's commercial growth. With the aid of advanced technological methods, there is a likelihood of improved economic performance due to the facilitation of technological innovation which improves productivity levels (Frame, Wall & White, 2018:4). According to the World Bank (2020), the financial sector development consists of overcoming the costs that are incurred within the financial system. Over the years, there has been an increase in technological use. This is a result of the automation of financial services offered by banks which has proved to be more cost-effective in the financial sector space (Navaretti, Calzolari, & Pozzolo, 2017). In South Africa, the South African Reserve Bank (SARB) is the custodian of banking regulations and part of its mandate includes maintaining the status quo to maintain trust within the financial sector (Coetzee & Genukile, 2020). This is important to note since as the banking sector takes a digital stance to realise financial development, the reserve bank may also have to closely monitor the adoption of technology within the financial sector and ensure that the founding regulations are still maintained within the financial system. A financial system can be considered to be developed when the size, efficiency, and stability backed by improved access to financial markets can yield positive results for the economy (Guru & Yadav, 2019). According to Kagan (2020), financial technology describes the new technology seeking to improve and automate the delivery of financial services. This is a positive approach as it caters to most of the banking customers and serves as a financial vehicle that is used to achieve the overall financial sector development.

The development of financial technology is to observe financial inclusion and allow improved access to financial services for consumers and organisations (Kelly et al, 2017). Matsebula and Yu (2020) define financial inclusion as the ability to access a wide range of affordable financial services. Omar and Inaba (2020) further define financial inclusion as a key aspect that may be used for the advancement of opportunities for parts of the population that has been previously disadvantaged. As per definition according to Genesis Analytics (2019), financial literacy rate refers to an individual's ability to select and make use of the correct financial services to suit their needs. Through the increased use of cell phones, financial exclusion is slowly being eradicated as financial service providers can access vulnerable areas that the traditional banking model fails to access (Kunyanjui, 2019). This development, however, has been observed as a disruption of the existing financial system or traditional banking which contradicts the main foundations of financial technology. These disruptions towards traditional banking are self-inflicted since the financial institutions are actively trying to respond to innovations presented by financial technology and empower their customers (PWC, 2019).

The overall effect of financial technology has greatly been observed in developed

countries. Kauflin (2020) asserts that the United States of America (USA) in 2018, reported \$18 billion in financial technology investments. For developing countries which are prone to issues such as inequality, skill shortages, and high data costs, it was predicted that by 2020, financial technology investment in Africa would have reached the \$3 billion mark with South Africa and Nigeria being the main beneficiaries (PwC, 2019). In South Africa's case, this is since, in 2019, there were more than 200 financial technology operations with the number expected to grow with the increased technological adaptations from financial institutions (Treasury, 2019). This then brings forth the main purpose of this article which is to analyse the relationship between banks' financial performance and access to financial technology using mobile subscriptions as a proxy. The study is specifically based in South Africa since it is a developing country faced with many barriers and restrictions to technological inclusion.

2. Literature Review

According to Nicoletti (2017), financial technology or fintech can be defined as a set of initiatives that have a disruptive business model which leverages information and communications technology within the finance sector. These initiatives can be able to cater a wide range of areas within the financial sector and connect investors with borrowers, making access to banking more realistic (Nicoletti, 2017). The disruption of this predetermined business model is defined by Coetzee (2019) as the process of redefining how banks conduct their business. The disruptions may arise from legacy systems used by traditional banks which the new digital banks can take advantage of by using effective market segmentation to differentiate their service offering from the existing traditional banks (PWC, 2018).

Financial technology advantages include the high opportunity for innovation which may have a positive effect on overall economic development. With this opportunity, there is an increased interest in modern financial services which aim to provide quality financial services to clients from anywhere in the world (Saksonova & Kuzmina-Merlino, 2017). According to Jagtiani and John (2018), financial technology is expected to have a positive effect on the advancement of financial services, especially in less developed countries. Buckley and Webster (2016), emphasize that the different customer journeys, including those of developing countries, are yet to be captured by financial technology firms.

This matters because of the high-profit potential and how financial technology in banks can ensure financial inclusion with such actions (Buckley & Webster, 2016) However, these advantages also bear risks or shortfalls. Barefoot (2020:5) contends that the emergence of financial technology presents risks such as loss of privacy and questionable data security. Barefoot (2020:5) further alludes that from this

disadvantage, traditional banks are greatly affected as they are in the realm of a data breach due to their ageing technological systems.

In South Africa, the adoption of financial technology presents both an opportunity and risk because of the pre-existing risk-averse approach of the country's commercial banks (Coetzee, 2019). The opportunity presented in South Africa is being able to address the inherent socio-economic issues such as unemployment and inequality. The risk-averse approach may be facilitated by Simbanegavi et al. (2014) as they contextualized the South African banking sector as an oligopolistic sector that is dominated by five large banks. The ranking of banks is mainly based on performance attributes and their respective market capitalisation. Bank performance is an important aspect because a well-performing bank is a profitable one (Lawa et al., 2017). According to Nassreddine et al. (2013), banking performance is directly reflected by quantitative aspects such as the return on equity (ROE) and return on assets (ROA). With the concentration of these banks in South Africa, it is estimated that the top banks cater for approximately 90 percent of the banking sector's assets in the form of deposits and the problem arises as there are rising concerns of non-competitive behaviour amongst these banks (Simbanegavi et al., 2014). Since these five banks have been identified to create an oligopolistic banking sector, Simatele (2015) finds that this may be a disadvantage to the entire financial sector. This is because the level of competition is reduced and as this happens, efficiency is also reduced and there is a likelihood emerge non-competitive behaviours from banks. This can serve as a disadvantage as Al-Qaisi (2018) highlights that competition within the finance sector is a good thing to have since it enhances innovation, growth, and productivity.

As Coetzee (2019) defines the general risk appetite for the adoption of technology as risk-averse, part of this may be due to the legacy systems used by South African banks. However, in the defence of these traditional banks, Puckrin (2020) identifies that these are systems that have been in operation for approximately 30 years. Therefore, it may be a difficult task to have a change in operations. A contrasting view has been provided by a publication from the International banker (2020) as it is noted that the legacy systems in argument are those that have been built on outdated architecture, therefore, the strides taken to improve customer experience using these systems result in being inefficient and not reaching their ideal targets. This inefficiency may be caused by the banking systems that have been subjected to underinvestment over the years. Not only can the inefficiency be linked to underinvestment, but it is also becoming expensive to maintain these traditional banking legacy systems as the market forces indicate a needed shift from traditional systems to a more digitalised form of banking (Deloitte, 2020).

Traditional banks have started to experience disruption from new entrants such as online and virtual banks which have no physical branches and rely solely on their

customers having access to a mobile subscription that they can use to access the bank and bank services online (Businesstech, 2019). These “disruptions” are an alternative way of describing new entrants within the banking space that have understood the importance of modernised banking systems. The implications, therefore, are that by 2035, South Africa will be having a competitive banking industry, as opposed to the current capitalization of a large market share by the few large banks. This is a good indication as increased competition will lead to much more competitive service fees, creativity and financial inclusion (Bank of England, 2021). Not only will this have a direct impact on the financial performance of banks, but will also lead to better economic conditions. The main benefit for individual customers will be that those households that are unbanked will now have access to banking. Ntimane (2020), notes the entrance of these new banks as a disruption since the existing traditional banks already have the market share of high-earning clients and compete for this portion of customers. Therefore, a large number of consumers are being left unbanked- leaving a gap for new, digitalised banks to capture this market share.

Over the past decade (2011-2020) South Africa has been described as a country without the necessary resources to maintain the implementation of the new digital banks that are observed to be disruptors within the banking environment. One of the reasons is that throughout many other countries that have implemented digital banking prospects, there has been proof that within the world of digital banking, the key to survival is regularly having new customers. This may be a concern within the Sub-Saharan African region as in 2019, it was found that most individuals are still unbanked due to a lack of access to mobile subscriptions and technology which enables them to bank online and need an opportunity to be part of the formal economic structures within the region (ABSA, 2019). With many of the individuals being unbanked, Mashigo (2020) finds that these are the previously disadvantaged individuals, those that have low income and have been rejected by the formal financial sector (Mashigo, 2020).

Over the years, the big top five banks have taken significant steps toward cellphone banking. This is large since the rate of cellphone registration is increasing in South Africa (World Bank, 2020). The boom in this cellphone-banking industry may be attributed to the many generation Z individuals that may not be able to differentiate between traditional banking and digital banking as they have been exposed to the latter for most of their lives (Kent, 2020). According to Deventer et al. (2018), the new generation of consumers for banks is important in the era of mobile banking and through empirical findings, it has been identified that South Africa’s later generations identify the positive contribution that mobile banking has within their lives.

Dagada (2013) further asserts that the growing use of cellphone banking may pose an opportunity for criminals to take advantage of. For example, according to the

South African Banking Risk Information Center (SABRIC, 2020), almost 24 million South African bankers have been subjected to a data breach where their personal banking information was exposed. According to Aravazhi (2020), the banking industry is one of many that relies on the development of technology and the internet to carry out their daily business. Therefore, banks are vulnerable to cybercrimes where confidential data can be accessed anywhere around the world without any face-to-face contact (Aravazhi, 2020).

Sita (2019), characterizes the South African banking industry as one of the most sophisticated systems around the world, however, it is also a system that bears low competition levels, high concentration, low financial inclusion, and high banking costs. These are, amongst other reasons, the traditional legacy banking systems which still largely remain within the banking structures of South Africa and are only being threatened by relatively new entrants. Therefore, with the recent incorporation of digital banking services or financial technology (fintech), it is important to identify whether there is a relationship between banking and fintech. From this relationship, a conclusion can be made on whether financial inclusion is realised from this relationship as Arner et al. (2020) argue that financial technology is the key driver for financial inclusion. At the current state, a relative portion of South Africans still can't use the available financial services efficiently in their banking lives due to access to technology and banking access. Taking the abovementioned demographics into consideration, the specific study by Matsebula and Yu (2020) reveals that the current increase in the use of financial services is likely to be facilitated by the recent increase in the use of financial technology which caters to most of the high-earning groups.

3. Methodology

The following sections within the methodology represent the research approach and instrument used, the sample size, formulated hypothesis, and the statistical analysis.

3.1. Data and Data Availability

A quantitative approach was applied and was based on identifying the relationship between the financial performance of commercial banks and the adoption of financial technology in South Africa. To prove this, secondary data was used from IRESS Expert (2022) and the World Bank. Data collected from IRESS Expert was the return on equity (ROE) and the return on assets (ROA) from the different identified banks. From the World Bank site, data obtained was the mobile broadband subscriptions (MBS) for South Africa within the sample period of 2011 until 2021. Replicating previous studies that investigated bank performance such as that of Liu *et al.* (2021), this research article employed the return on equity (ROE) and return

on assets (ROA) to measure commercial banks' financial performance and MBS as a proxy for financial technology use and access.

3.2. Research Sample Selection

The sample used comprises the top five South African commercial banks by market size. According to the South African Reserve Bank (2018), these banks make up 90.5 percent of the banking sector in South Africa and thus relatively represent the South African banking sector. These five banks were used in an act of capturing what has been found by previous studies such as those of Sita (2019), which found that more than 90 percent of the revenue in the banking sector is generated by these five banks. Over and above, the overall aim of this research article was to add to the knowledge gap identified through literature analysis regarding financial technology and bank performance. MBS data in South Africa was used to capture the overall effects of financial technology on commercial banking performance. This was due to the reason that it comes as one of the close proxies for financial technology based on the indication that it represents the number of individuals with access to the internet through Hypertext Transfer Protocol Secure (HTTPS) and use this access to complete their everyday tasks such as banking.

3.3. Hypothesis

According to the Bank of International Settlements (2018), the new, abrupt wave of financial technology (fintech) within the banking industry is seen as a disruption to traditional banking practices. These disruptions may be derived from that which is presented by financial technology such as the use of algorithms, artificial intelligence, and the use of big data within banking. These disruptions may lead to the performance of traditional commercial banks being influenced by the adoption of financial technology. Therefore, to test this theoretical aspect, the null hypothesis, represented as H_0 , and the alternative hypothesis represented as H_1 , were as follows:

H_0 : financial technology affects commercial banks' financial performance in South Africa

H_1 : financial technology does not affect commercial banks' financial performance in South Africa

E-Views statistical package was used for the statistical analysis utilising financial ratios discussed in Section 3.4. The ROE was put as the dependent variable ahead of the ROA as it was understood that the ROE is a central performance measurement within the banking industry (Moussu & Petit-Romec, 2017).

3.4. Statistical Analysis

This research article made use of the classic linear regression model to assist in identifying the linear relationship between financial technology and commercial banks' financial performance in South Africa. The model was established to be as follows:

$$Y_t = a + \beta X_t + U_t \quad (1)$$

In this model, the dependent variable was set to be the bank's financial performance, whereas the independent variable was set as the MBS which had been rendered as a representation of financial technology. The error term was included to cater for any model misspecification that might have been encountered.

Y_t = dependent variable (banking performance shown by ROE and ROA)

$\beta + a$ = unknown parameters

X_t = Independent variable (financial technology shown by MBS)

U_t = disturbance term (To cater for any model misspecification and functional misspecification)

Therefore, to account for the two measures of bank performance the following models will be used:

$$ROE_t = a + \beta MBS_t + U_t \quad (2)$$

$$ROA_t = a + \beta MBS_t + U_t \quad (3)$$

4. Empirical Results and Discussion

This section includes the empirical results aiming to determine the relationship between commercial banks' financial performance and financial technology.

4.1. Graphical Analysis of Performance Measures

Trend analysis of both dependent and independent variables is presented and discussed. Trend analysis is important because it gives an overview of how the variable relates to each other, it looks at whether there is a pattern or not between the variables. Figure 1 to 3 plot the two performance measures ROE, ROA for each of these banks and independent variable MBS in South Africa during the observed period (2011-2021).

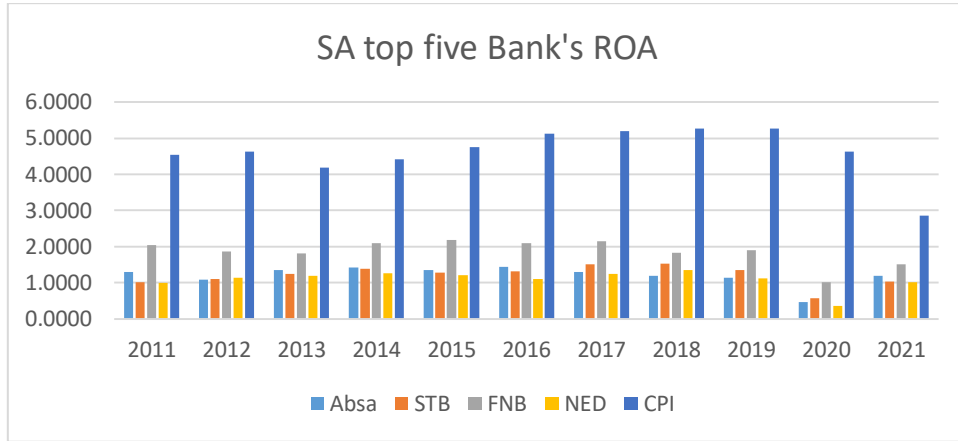


Figure 1: Trend Analyses of Performance Measures in the Five Banks' ROA

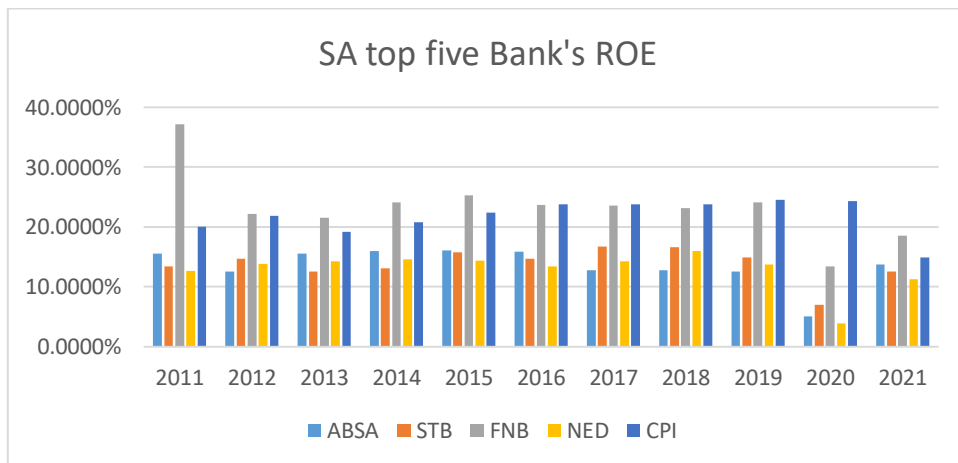


Figure 2. Trend Analyses of Performance Measures in the Five Banks' ROE

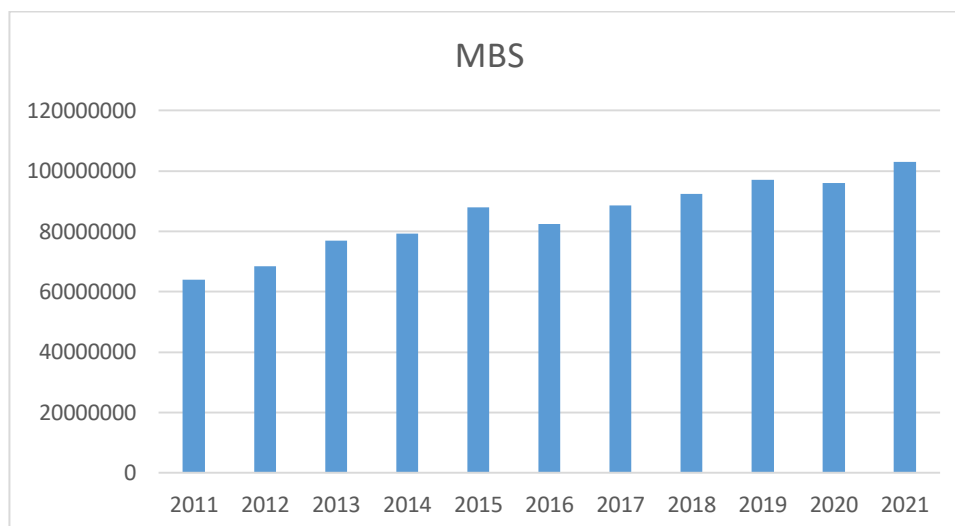


Figure 3. Trend Analysis of MBS in South Africa

Figure 1, presents the trend of the ROA for all the banks in South Africa (SA). ROA performed well for all the banks over the period under study, with Capitec bank raking the lead on averages of 40% throughout the period study, this can be attributed to the bank structure of Capitec Bank compared to the other four traditional banks. Figure 2, represents ROE for all the banks in SA during the period of the study. ROE looks stable and follows the economic cycles of the country compared to the other measure ROA, ROE stayed positive for all the banks except for the period under study. Except for FNB in 2011 when it reached close to 40%. This could be explained by other internal policies as the other four banks' performance was symmetric during that period. Lastly, Figure 3, represents the MBS in South Africa for the period ranging from 2011 to 2021. Overall, there was a strong positive trend and a favourable gain in momentum. With this positive trend, it was clear that as the years advanced, more South Africans incorporated technological use into their operations. Since the MBS data were employed as a proxy of financial technology, Figure 3, therefore, indicated that people were increasingly utilising financial technology within their banking lives.

4.2. Descriptive Statistics

The descriptive statistic summary represents results where the mean, median, maximum, minimum, kurtosis, and standard deviation values were obtained for the different banks using the ROE. This was shown in Table 1 while Table 1.2 depicted the same variables, however, with the ROA of the different banks reflecting their performance. The MBS were also included to be used as a benchmark of these

different variables used in the analysis. Although the mobile broadband subscription figures were well beyond the ROE figures mainly due to what was described as slow adoption of financial technology (Coetzee, 2019), they portrayed a picture in which banks were mostly influenced by the financial technology proxy. Therefore, the results were as follows:

Table 1. Descriptive stats between the top five banks' ROE and the MBS in South Africa

	ABSA ROE	STB ROE	FNB ROE	NED ROE	CPI ROE	MBS
Mean	13.47423	13.79888	23.32888	12.92237	21.75445	85061474
Median	13.67830	14.62900	23.55570	13.85730	22.41950	87999492
Maximum	16.04960	16.70810	37.13570	15.96600	24.48170	1.03E+08
Minimum	5.083400	7.006800	13.41380	3.895900	14.91570	64000000
Std. Dev.	3.160022	2.700391	5.673533	3.216185	2.899845	12171096
Observations	11	11	11	11	11	11

Looking at the ROE trend in Figure 2, it was evident that the banks chosen in this research article showed a positive ROE trend which corresponded with the positive trend shown by the MBS. Since ROE showed various banking performances, Capitec bank and FNB were the two banks that reported superior performance over the sample period compared to their competitors. Both these banks had outliers in their ROE trend between the period 2011 and 2021 when mobile broadband in South Africa was starting to gain momentum. This shows that based on the ROE trend, Capitec bank and FNB best took advantage of the rise in financial technology use in South Africa to boost their performance. This increase in the use and accessibility of banking around 2011, which was the start of a positive trend for the banks in consideration, may be attributed to the positive economic impact presented by the 2010 FIFA World Cup hosted in South Africa. According to Venter (2010), a total of 4.3 per cent in employment was generated during this time. This meant that these newly employed individuals needed to have bank accounts to which they can be paid, hence the overall start of the positive trend due to the spillover effect to the following year 2011.

Observing the results of the different banks presented in Table 1, both FNB and Capitec had the highest Maximums of 37.14 and 24.48 respectively. Though high ROE is associated with high risk, shareholders prefer higher ROE compared to ROA since ROE indicates how well management is employing the investors' money and it is also used as a company's growth rate. From the standard deviation value, it can be observed the indicator with the widest spread is ROE which has a standard deviation of 5.67 percent which is less than the mean then there is no high variability. This means that ROE is not distributed away from the data set mean, meaning that it is low in volatility.

This meant that the latter's ROE distribution was not too clustered around the mean value compared to the other banks which had lower standard deviation values that signified a clustering around the mean value. This was in confirmation with the above analysis where FNB's ROE performance proved to have a peak in distribution. Overall, the bank which proved to be affected by financial technology in its ROE performance was FNB.

Table 1.2. Statistical Analysis between the Top Five Banks ROA and the MBS in South Africa

	ABSA ROA	STB ROA	FNB ROA	NED ROA	CPI ROA	MBS
Mean	1.199922	1.212413	1.862659	1.092036	4.623931	85061474
Median	1.288359	1.281229	1.902865	1.143813	4.635112	87999492
Maximum	1.439298	1.534724	2.183021	1.354041	5.272856	1.03E+08
Minimum	0.471093	0.572971	1.021521	0.362663	2.848489	64000000
Std. Dev.	0.267544	0.274365	0.341479	0.263565	0.694099	12171096
Observations	11	11	11	11	11	11

Having conducted the same trend analysis with the ROA figures of the top five banks in the sample observed in figure 1, the banks' performance resulted in a moderate but positive trend with less volatility compared to the ROE as a basis of performance. With the ROA, Standard Bank, FNB, Nedbank and ABSA had a strong trend with no outliers this time around. Capitec bank was the only one with higher ROA figures over the sample period and due to this reason, it showed a strong, positive trend. This meant that in terms of ROA, Capitec bank led compared to its competitors in terms of performance. A significant trend amongst the banks was a positive ROA reported within the sample period. Therefore, the results obtained were mostly observed with positive but low volatility as opposed to ROE values. With ROA FNB and Capitec also had higher maximums of 2.18 and 5.27 respectively. This is consistent with the ROE results since both are measures of performance.

The standard deviation for the MBS followed the general trend that has been observed while analyzing the results obtained, where the data distribution points for MBS overwhelmingly exceed that of the banks under analysis. As mentioned earlier, this may be attributed to the slow appointment of financial technology within South Africa's banking activities. Nedbank had the lowest standard deviation which meant that over the sample period, the bank's ROA performance was, compared to the other banks, more clustered around the mean. This meant that financial technology or MBS had little impact on Nedbank's ROA performance. Contrary to that, Capitec bank had the highest standard deviation amongst the banks, and this meant that the bank's ROA data distribution was not clustered around the mean but broadly distributed, in a positive trend. This meant that based on the standard deviation, Capitec bank's ROA figures were highly affected by the adoption of financial technology.

4.3. Correlation Analysis

To further determine the correlation between financial technology and the performance of various banks, a correlation analysis was initiated. Since the prior analysis' has been employing a method of firstly analysing financial technology's impact on the ROE of different banks and then following further to analyse this impact on the banks' ROA, the same principle was followed with the correlation analysis. The results were presented in table format wherein table 2 incorporated the banks' ROE correlations while table 2.1 presented the banks' ROA correlations. The results were as follows:

Table 2. Correlation between the Top Five Banks' ROE and MBS in South Africa

Correlation coefficient	MBS	ABSA ROE	STB ROE	FNB ROE	NED ROE	CPI ROE
MBS	1.0000					
ABSA ROE	-0.4263	1.0000				
Prob.	0.1910	-----				
STB ROE	-0.1233	0.6169	1.0000			
Prob.	0.7179	0.0432	-----			
FNB ROE	-0.6411	0.6429	0.4754	1.0000		
Prob.	0.0335	0.0329	0.1394	-----		
NED ROE	-0.3034	0.8037	0.8955	0.5184	1.0000	
Prob.	0.3644	0.0029	0.0002	0.1023	-----	
CPI ROE	0.0524	-0.3641	0.1706	-0.0517	-0.0466	1.0000
Prob.	0.8782	0.2710	0.6159	0.8800	0.8916	-----

Since MBS has been used as a proxy for financial technology throughout this research article, the table above served as a summary statistic for the correlation between financial technology and the different banks' ROE. From the results obtained, all banks present a moderate but negative correlation with MBS, this is with the exception of Capitec bank which shows a positive correlation with MBS compared to the other banks with 0.0524 and a coefficient of 0.87. These results can be expected given the trend analysis performed indicating Capitec as the leading bank in terms of ROE.

Table 2.1. Correlation between the Top Five Banks' ROA and MBS

Correlation Probability	MBS	ABSA ROA	STB ROA	FNB ROA	NED ROA	CPI ROA
MBS	1.0000					
ABSA ROA	-0.3510	1.000				
Prob.	0.2897	-----				
STB ROA	-0.0127	0.7559	1.0000			
Prob.	0.9703	0.0071	-----			
FNB ROA	-0.4494	0.8804	0.7838	1.0000		
Prob.	0.1655	0.0003	0.0043	-----		
NED ROA	-0.2186	0.8484	0.9242	0.8184	1.0000	
Prob.	0.5182	0.0010	0.0000	0.0021	-----	
CPI ROA	-0.1382	0.0233	0.4266	0.3903	0.1927	1.0000
Prob.	0.6851	0.9456	0.1907	0.2353	0.5702	-----

Analysing correlation based on ROA, all the banks maintained a negative correlation to the MBS – the same as the results obtained using running the regression as presented in Table 4, this is due to the correlation of the asset to the profitability calculations on ROA compared to ROE. This means that when measuring the bank's performance with ROA in mind, it means that the bank's performance cannot only be explained by MBS.

4.4. Regression Analysis

In the simple linear regression, the banking performance (ROE) and (ROE) were set as the dependent variable while the financial technology proxy was set as the independent variable. This method was applied to all five banks, Table 3 and Table 4 summarise the results of the regression:

Table 3. Regression Results ROE Model

Regression Results ROE Model						
	ROE Model ABSA BANK			ROE Model STANDARD BANK		
Variable	Coeff.	Prob.	R-Squared	Coeff.	Prob.	R-Squared
MBS	5.1108	0.6894	0.904599	-1.0907	0.3937	0.879974
	ROE Model FNB			ROE Model NEDBANK		
Variable	Coeff.	Prob.	R-Squared	Coeff.	Prob.	R-Squared
MBS	1.4007	0.7225	0.716526	-6.25E-08	0.0204	0.998164

ROE Model CAPITEC BANK			
Variabl e	Coeff.	Prob.	R-Squared
MBS	-1.05E- 07	0.1772	0.884394

In testing the relationship between bank performance and financial technology using ROE as a measure of profitability, the following models were formulated:

Mode 1: $ROE\ ABSA = 16.31913 + 5.1108\ MBS$

Mode 2: $ROE\ STANDARD\ BANK = 43.51354 - 1.0907\ MBS$

Mode 3: $ROE\ FNB = 12.86157 + 1.4007MBS$

Mode 4: $ROE\ NEDBANK = 39.67714 - 6.2508MBS$

Mode 5: $ROE\ CAPITEC = 27.84915 - 1.0507MBS$

Through the examination of the results presented in Table 3. Model 1 represents Absa bank's results. MBS has a positive impact on the bank's profitability when it is measured by ROE, having a coefficient of 5.1108 this means that a 1 percent increase in financial technology (MBS) in the bank's system will increase profitability by 5.11 million since there is a positive relationship. However, model 2 representing Standard bank's results shows a negative impact on profitability with coefficients of -1.0907, since there is a negative relationship, this indicates that if there is a 1 percent change in MBS and will result in a decrease in profitability (ROE) by 1.09 million. Contrary to the second model, model 3 representing FNB results shows a positive impact on profitability with a coefficient of + 1.4007 indicating that a 1 percent change in MBS will increase profitability (ROE) by 1.4 million. The two remaining models, models 4 and 5 representing Nedbank and Capitec respectively both have a negative impact on profitability. With coefficients of - 6.2508 and - 1.0507 this means that a 1 percent change either in MBS will decrease profitability by, 6.25 million and 1.05 million respectively.

In terms of the significance levels, the independent variable MBS is significant for only one bank Nedbank meaning that MBS affect profitability while the other four banks profitability cannot be attributed or explained to be because of MBS. Model 4 with p-values of 0.0204, has a strong significant level impacting ROE at 5 percent level, compared to the other banks with p-values that are statistically insignificant, this means that their performance or profitability might be because of other factors other than MBS. Nedbank had the highest R-squared value wherein 99.81 percent of its performance data fit the model described above. This meant that the error probability with this aspect of data was only quantified as 0.19 percent. These findings correlated with those of Coetzee (2018), wherein it was found that Nedbank

had been inclining towards a more digital approach within their branches in a quest to achieve more from the rising use of technology within the finance sector.

Table 4. Regression Results ROA Model

Regression Results ROA Model						
	ROA Model ABSA BANK			ROA Model STANDARD BANK		
Variable	Coeff.	Prob.	R-Squared	Coeff.	Prob.	R-Squared
MBS	-7.7209	0.2897	0.123265	-2.8710	0.9703	0.0000163
	ROA Model FNB			ROA Model NEDBANK		
Variable	Coeff.	Prob.	R-Squared	Coeff.	Prob.	R-Squared
MBS	-1.2608	0.1655	0.201965	-4.7409	0.5182	0.047827
	ROA Model CAPITEC BANK					
Variable	Coeff.	Prob.	R-Squared			
MBS	-7.8909	0.6851	0.019122			

In testing the relationship between bank performance and financial technology using ROA as a measure of profitability, the following models were formulated:

Mode 1: $ROA_{ABSA} = 1.856400 - 7.7209 MBS$

Mode 2: $ROA_{STANDARD BANK} = 1.236859 - 2.8710 MBS$

Mode 3: $ROA_{FNB} = 2.935179 - 1.2608 MBS$

Mode 4: $ROA_{NEDBANK} = 1.494872 - 4.7409 MBS$

Mode 5: $ROA_{CAPITEC} = 5.294720 - 7.8909 MBS$

Through the examination of the results presented in Table 2. All the models one to five representing Absa bank, standard bank, FNB, Nedbank and Capitec bank respectively indicate that MBS has a negative effect on bank performance when measured by ROA, having a coefficient of -7.7209, - 2.8710, - 1.2608, - 4.7409 and - 7.8909 respectively, since there is a negative relationship this indicates that if there is a 1 percent change in MBS then this will result in a decrease of profitability (ROA) by 7.72 million, 2.87 million, 1.26 million, 4.74 million and 7.89 million on respective banks.

The results on the MBS impact of profitability when measured by ROA are generally negative this can be attributed to the fundamental definition of both ROE and ROA, generally banks ROA will be much lower than ROE and this means that the effects of ROA will be felt more compared to ROE. According to Ramadan, *et al.*, (2011),

ROE measures how much the investor will gain in return after tax has been accounted for in the net income for each rand the investor has invested in the company this is compared to Guru *et al.*, (1999) who describes ROA as the ratio that measures the bank's management efficiency and profitability and is denoted by net income to total assets. As banks increase their assets by increasing their Artificial intelligence and technological advancement systems this increase cash flows, and the denominator in profitability calculation will also be higher due to increased assets. As a result, ROA will be reduced while ROE remains unchanged or increases. Given the above explanation, in terms of the significance levels, the independent variable MBS has lower significant p-values on all banks indicating that MBS does not affect the banks' performance when measured by ROA. This means that the change in banks' performance cannot only be explained by technological advancement in the sector.

5. Conclusion

Since South Africa has been known to be a developing country where the adoption of financial technology has been described as a slow one, it was important to impose this analysis to understand whether this is true and whether it has led to either increased or decreased performance within commercial banks. Contributing to literature, this research article found that although there are risks attached to the implementation of financial technology within the paradigms of a developing country, the benefits outweigh the risks since financial technology does indeed have an impact on commercial banking performance. Therefore the article aims to determine the relationship between financial technology and commercial banks' financial performance. A simple linear regression was used along with descriptive analysis and correlation analysis based on the top five banks in South Africa. Two measures of financial performance, return on equity and return on assets, were utilised using secondary bank data from 2011 to 2021.

As banks increase their assets by increasing their Artificial intelligence and technological advancement systems this increase cash flows, and the denominator in profitability calculation will also be higher due to increased assets. As a result, ROA will be reduced while ROE remains unchanged or increases. Given the above explanation, in terms of the significance levels, the independent variable MBS has lower significant p-values on all banks indicating that MBS has no effect on the bank's performance when measured by ROA. This means that the change in banks' performance cannot only be explained by technological advancement in the sector. For the ROE on the other hand results are in line with Nedbank's technological financial innovation trend over the years within their branches in a quest to achieve more from the rising use of technology within the finance sector. The ROE for Nedbank could be explained by its technological behaviour over the years.

This research article will benefit the banking industry in a sense that industry experts can understand that investing in financial technology will not only yield positive results in terms of profitability but will also assist in terms of reach where many other individuals can be incorporated within the banking scenery through technological means that await. This will allow the researcher to get a sense of the ever-evolving world of technology and advise commercial banks based on the changing consumer sentiments. As facilitation to future research, more variables that measure banking performance other than ROE and ROA such as the Net Interest Margin (NIM) and efficiency ratio may be employed to capture the full effect which may also allow the researcher to make forecasts based on the models used.

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