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Article History

ABSTRACT

Purpose: The purpose of the study was to investigate the effect of automated teller machines and mobile banking on financial inclusion among commercial banks in Somalia.

Methodology: A descriptive survey design was adopted targeting 6 commercial banks in Somalia that had successfully rolled out electronic banking while the respondents covered the Banks staff, like managers and officers from each institution respectively and census was used. Primary data was collected on automated teller machines, mobile banking and customer deposits with the aid of the questionnaire. The analysis was conducted through the Statistical Packages for Social Sciences version 24 utilizing descriptive statistics (means and standard deviations) and inferential statistics (correlation and regression analysis) and presented through tables.

Findings: The study found out that automated teller machines banking and mobile banking are significant predictors of financial inclusion among commercial banks in Somalia. Thus, electronic banking is a significant enabler of financial inclusion of commercial banks.

Unique contributions to theory, practice and Policy: The study contributes to the extension of the views of financial intermediation theory and the diffusion of innovation theory. The study implies that the adoption of electronic banking as influenced by the diffusion of innovation theory allow financial institutions to effectively realize their financial intermediation role in the economy. The senior management team of commercial banks in Somalia should allocate more resources towards financial innovation and enhancement of the existing electronic banking channels and infrastructures. The policy makers at the Central Bank of Somalia need to develop progressive regulations and rules that would promote the adoption of financial innovation while boosting financial inclusion

Key Words: *Electronic banking, financial inclusion, mobile banking, automated teller machine banking, commercial banks, Somalia*

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INTRODUCTION

Background to the Study

Financial inclusion seeks ensure that individuals have access to affordable and useful financial products and services that are well aligned to their needs (Jepchumba & Simiyu, 2019). Accessibility and ownership of a formal account with a financial institution is the first broader perspective of financial inclusion. Financial inclusion seeks to ensure that the excluded and underserved population is able to access and use formal financial services and products (Asli, Klapper & Singer, 2017). In developed countries like Japan, there is higher financial literacy which is directly linked with high probability of utilization of fintech services. Most people in Japan with greater financial literacy have high probability of using fintech services particular electronic money (Yoshino, Morgan & Long, 2020). In China, financial inclusion has been characterized by significant progress especially with the rise of digital technologies (Chen & Yuan, 2021). In most developing countries in Asia and Africa, most people living in rural areas are financial excluded from formal financial services (Cicchiello, Kazemikhasragh, Monferrá & Girón, 2021). It is important for developing countries to adopt financial technologies like electronic banking channels to address financial exclusion issues (Isukul & Tantua, 2021). In Somalia, mobile money has accelerated the pace of financial inclusion among people in the country (Gas, 2017).

Electronic banking is a form of financial innovation among financial institutions that include such elements as adoption if automated teller machines (ATMs), mobile banking and internet banking to provide services and products to customers. The adoption of electronic banking allows customers to access and utilize financial services and products from financial institutions more easily and conveniently as opposed to transacting through physical banking halls (Kariuki, Kimundi & Makambi, 2018). Electronic banking is the delivery of services and information through multifaceted devices like mobile phones or computers (Dzombo, Kilika & Maingi 2018). Ozili (2018) defines e-banking as the ability to leverage information and communication technologies (ICTs) and other electronic devices by financial institutions so as to allow customers execute their transactions. The definition of e-banking given by Nwude, Igweoji and Udeh (2020) is that it is payment system where transactions are conducted in electronic devices. Therefore, e-banking infers that financial institutions provide products and services to customers through electronic channels. For quite some time, e-banking has existed among financial institutions through channels as automated teller machines (ATMs) and mobile phone banking. However, with advancement in technology, the internet has transformed and revolutionized the way financial institutions execute their transaction hence internet banking (Jepchumba & Simiyu, 2019).

The key indicators when it comes to financial inclusion are accessibility, safety and utilization besides fairness. Financial inclusion aims at allowing the unbanked population of the people in the country to access formal financial services (Cihak, Mare & Melecky, 2016). It essence is to lower the transaction costs incurred by people when accessing financial services and products. Given that financial institutions are highly regulated, their transaction costs are relatively lower as compared to what shylocks offer (Kariuki, Kimundi & Makambi, 2018). Financial inclusion

allows people to gain basic financial knowledge and information like financial literacy and the need to save and make investment (Ndegwa & Koori, 2019). In this study, financial inclusion will be measured by the value of customer deposits.

Research Problem

Financial inclusion seeks ensure that individuals have access to affordable and useful financial products and services that are well aligned to their needs (Kariuki, Kimundi & Makambi, 2018). The adoption of electronic banking allows customers to access and utilize financial services and products from financial institutions more easily and conveniently as opposed to transacting through physical banking halls. Theoretically, adoption of e-banking is likely to allow customers to access financial services and products more easily and conveniently (Jepchumba & Simiyu, 2019).

The available global studies include Mago and Chitokwindo (2014) who did a study in Zimbabwe to explore mobile banking and financial inclusion and noted that e-banking is a significant predictor of financial inclusion among financial institutions. Asare and Sakoe (2015) focused on Ghana to link e-banking and financial services where a significant link was noted. Ene, Abba and Fatokun (2019) used Nigerian context to explore how e-banking impacts on financial inclusion where ATMs were not found to be significant. Wanjiku (2020) did an examination of technological innovations and their link with financial inclusion and established that internet, electronic, mobile and agency banking channels positively contributed towards financial inclusion. Aduda and Kingoo (2012) determined the link between e-banking and financial performance using Kenyan commercial banks where a positive interplay was registered. Jepchumba and Simiyu (2019) adoption of e-banking and it link with performance using Kenyan commercial where a positive relationship was noted.

The aforementioned studies create gap as some like Mago and Chitokwindo (2014) and Asare and Sakoe (2015) were conducted in other countries away from Somalia creating contextual gap. Other studies like Aduda and Kingoo (2012) and Jepchumba and Simiyu (2019) used financial performance and not financial inclusion as the dependent variable. This creates gaps that the present study sought to fill by providing answers to the following research question: what is the effect of electronic banking on financial inclusion commercial banks in Somalia?

Research Objectives

i. To investigate the effect of automated teller machines banking on financial inclusion among commercial banks in Somalia

ii. To determine the effect of mobile banking on financial inclusion among commercial banks in Somalia

LITERATURE REVIEW

Theoretical Review

Financial Intermediation Theory

The theory of financial intermediation and the diffusion of innovation (DOI) theory provided anchorage to the study. Developed by Gurley and Shaw (1960), the financial intermediation theory consider financial institutions as intermediaries whose role is to mobilize deposits and savings from surplus units that are accumulated and latter loaned out in areas with deficit in form of credit facilities. This way, the financial institutions are able to realize financial inclusion.

Diffusion of Innovation Theory

The DOI theory was dev eloped by Rodgers (1962) and it provides a discussion of how new innovations get to be adopted by the users as time gets to lapse. The theory further provides a clarification of the actions of the end users during adoption of the new innovations like electronic banking in the financial institution. This theory defends the position that organizations take part in the dissemination of innovation so as to acquire competitive benefit, minimize charges and safeguard their tactical spots. The philosophy as suggested by Rogers expounds on in what manner a novelty is dissolved amongst consumers over a specific period (Liu & Li, 2009). The underpinning demonstrates that the adopters' partakers of any advancement in technology assume a bell-shaped scatter curve which can be categorized into five portions to group consumers by way of innovativeness (Rodgers, 1962). Rogers categorized clients as pacesetters, initial adopters, primary majority, late majority and dawdlers. The relevance of the theory to the study is that it explains that forces that drive commercial banks to adopt electronic banking channels like ATMs with the aim of enhancing financial inclusion.

Empirical Review

Ene, Abba and Fatokun (2019) did a study whose focus was on e-banking and financial inclusion using the context of Nigeria. The proxies of e-banking in this study included ATMs and point of sale devices. It was noted that ATMs do not have significant effect on financial inclusion of banks in Nigeria. Wanjiku (2020) covered commercial banks in Kenya and sought to link technological banking innovations and financial inclusion. The variables covered in this study were internet, electronic, agency and mobile banking nd all were seen to influence financial inclusion. Nazaritehrani and Mashali (2020) did an analysis whose focus was on e-banking channel development and the implication on market shares of developing nations. Among the variables that were covered in this study include point of sales, mobile, internet and ATM banking and these were found to have positive influence on market share of the banks. Shihadeh (2021) used the case of Palestine to explore how financial inclusion impacts on performance of banks. The inquiry showed that penetration of banks, adoption of ATMs could enhance the performance of banks. Ezekiel (2021) determined ATMs and their contributions towards financial inclusion using the case of Nigeria. The findings were that penetration of ATMs is a significant predictor of financial inclusion among commercial banks. Isabwa (2021) analyzed mobile banking and the role it plays on financial inclusion borrowing evidence from Kenyan

banks. The findings were that mobile banking is a significant predictor of financial inclusion among banks in Kenya.
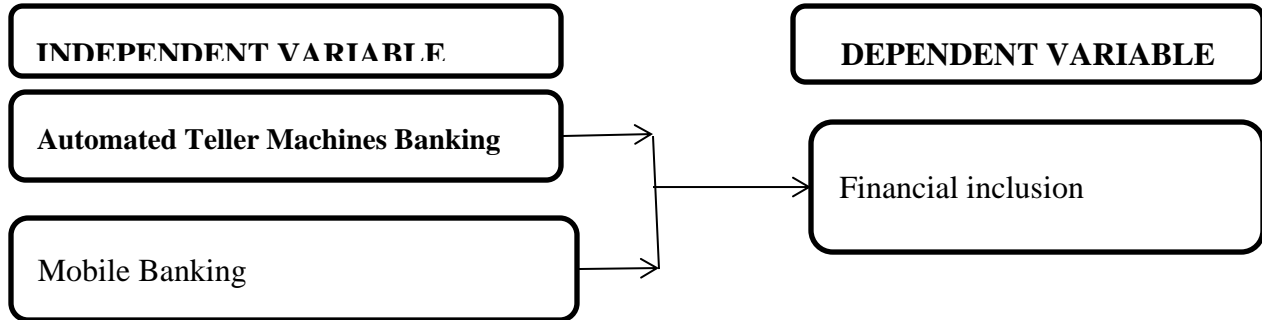
Conceptual Framework

Figure 1: Conceptual Framework

RESEARCH METHODOLOGY

Research Design

The study adopted cross sectional descriptive survey design to meet the objectives. This design supported quantitative methods. The use of cross sectional design is justified on account that data was collected at a single period of time. The descriptive survey design helped in covering all the commercial banks in Somalia.

Population

The study targeted 6 commercial banks in Somalia that had successfully rolled out electronic banking. The respondents included the bank managers and officers from each institution respectively. Since the population was small, census was used and thus all these firms were included. This information is broken down in Table 1.

Table 1: Target Population

Bank Name	Population
	Target Population
International Bank of Somalia	7
Premier Bank	7
Salaam Somali Bank	8
Dahabshiil Bank International	7
My Bank	4
Amal Bank	3
Total	36

Data Collection

The study collected primary data using the questionnaire on ATMs, mobile banking and customer deposits. The questionnaire had three sections covering the ATMs, mobile banking and financial inclusion.

Data Analysis

The study adopted panel data method of analysis that begun with descriptive statistics (means and standard deviations) as well as regression analysis. The analytical software used in this study was SPSS version 24. The specified regression model used in this is as under:

Model Specification

$$Y_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \square it$$

Where Y is the financial inclusion (represented by customer deposits)

α refers to the Y intercept of the linear model

X_{1it} refers to ATMs of bank i at time t

X_{2it} refers to Mobile banking of bank i at time t

β_1, β_2, β_3, β_4 and β_5 are the coefficient of X_{1it}, and X_{2it}, respectively while $\square$ is error term

Diagnostic Tests

The study performed normality, multicollionearity and Heteroskedasticity test before carrying out regression analysis, these were meant to test for the assumptions of regression analysis.

FINDINGS AND DISCUSSION

Response Rate

From the 36 questionnaires that were administered to respondents, 31 of them were dully filled and returned representing a response rate of 86.1%. This response rate was adequate as supported by Babbie (2010) who shared that an above 80% response is excellent for analysis.

Summary of Descriptive Statistics

The descriptive statistics were determined through frequencies and percentages and presented as below on the specific objective variables that guided the study.

Automated Teller Machine Banking

Table 2 is a breakdown of the descriptive statistics on ATM banking as a proxy of electronic banking covered in this study.

Table 2: Descriptive Statistics on ATM Banking

Category	Classification	Frequency	Percentage
Kindly indicate the % of revenues that are due to ATM banking in your bank	Less than 20%	1	3.2%
	21-40%	8	25.8%
	41-60%	16	51.6%
	61-80%	4	12.9%
	Above 81%	2	6.5%
	Total	**31**	**100.0**
What extent do you think ATM banking has contributed towards financial inclusion in your bank?	No extent	3	9.7%
	Little extent	2	6.5%
	Moderate extent	4	12.9%
	Large extent	17	54.8%
	Very large extent	5	16.1%
	Total	**31**	**100.0**

Table 2 shows that ATM banking contributes 41-60% towards revenue of the commercial banks in Somalia as supported by 51.6% of the respondents. This means majority of the commercial banks in Somalia leveraged ATMs to grow their revenues. The findings in Table 2 indicate that ATM banking has contributed towards financial inclusion among commercial banks in Somalia to a large extent as supported by 54.8% of the respondents.

Mobile Banking

The findings of descriptive statistics on mobile banking were determined and presented as shown in Table 3.

Table 3: Descriptive Statistics on Mobile Banking

Category	Classification	Frequency	Percentage
Kindly indicate the % of deposits that are due to mobile banking in your bank	Less than 20%	3	9.7%
	21-40%	2	6.5%
	41-60%	6	19.4%
	61-80%	13	41.9%
	Above 81%	7	22.6%
	Total	**31**	**100.0**
What extent do you think mobile banking has contributed towards financial inclusion in your bank?	No extent	1	3.2%
	Little extent	4	12.9%
	Moderate extent	3	9.7%
	Large extent	17	54.8%
	Very large extent	6	19.4%
	Total	**31**	**100.0**

The findings in Table 3 are that 61-80% of the deposits among commercial banks in Somalia are from mobile banking as shared by 41.9% of the respondents. This means that commercial banks in Somalia leverage mobile banking to mobilize and grow their deposits. The study further established that mobile banking has contributed towards financial inclusion among commercial banks in Somalia to a large extent as shown by 54.8% of the respondents. The result is consistent with Isabwa (2021) who analyzed mobile banking and the role it plays on financial inclusion borrowing evidence from Kenyan

banks where the findings were that mobile banking is a significant predictor of financial inclusion among banks in Kenya.

Financial inclusion

Table 4 is an overview of the findings on financial inclusion among the studied banks.

Table 4: Descriptive Statistics on Financial inclusion

Category	Classification	Frequency	Percentage
Over the last 5 years, the value of customer deposits in your bank has been?	Not changed	4	12.9%
	Slightly Reduced	2	6.5%
	Not sure	1	3.2%
	Slightly increased	18	58.1%
	Greatly increased	6	19.4%
	Total	**31**	**100.0**

The results in Table 4 are that 58.1% of the respondents were of the opinion that over the last 5 years, the value of customer deposits in their bank slightly increased. This means that financial inclusion had been realized in the studied banks.

Correlation Results

Correlation analysis was conducted to establish the nature and strength of relationship between e-banking and financial inclusion. The findings were determined and summed up as shown in Table 5.

Table 5: Correlation Matrix

		Financial inclusion	ATM Banking	Mobile Banking
Financial inclusion	Pearson Correlation	1		
ATM Banking	Pearson Correlation	.504	1	
Mobile Banking	Pearson Correlation	.600	.332	1

The findings in Table 5 imply that ATM banking is a strong and positive correlate of financial inclusion of banks in Somalia (r=.504). The finding is consistent with Ezekiel (2021) who determined ATMs and their contributions towards financial inclusion using the case of Nigeria. The findings were that penetration of ATMs is a significant predictor of financial inclusion among commercial banks. Tables 5 further indicate that mobile banking is a strong and positive correlate of financial inclusion among commercial banks in Somalia (r=0.600). This finding is supported by Isabwa (2021) who analyzed mobile banking and the role it plays on financial inclusion borrowing evidence from Kenyan banks where the findings were that mobile banking is a significant predictor of financial inclusion among banks in Kenya. It then follows that e-banking has strong and positive implication on financial inclusion of commercial banks in Somalia. This finding is consistent with Mago and Chitokwindo (2014) who did a study in Zimbabwe to explore mobile banking and financial inclusion and noted that e-banking is a significant predictor of financial inclusion among financial institutions. Asare and Sakoe (2015) focused on Ghana to link e-banking and financial services where a significant link was noted. Ene, Abba and Fatokun (2019) used Nigerian context to explore how e-banking impacts on

financial inclusion where ATMs were not found to be significant. Wanjiku (2020) did an examination of technological innovations and their link with financial inclusion and established that internet, electronic, mobile and agency banking channels positively contributed towards financial inclusion. Aduda and Kingoo (2012) determined the link between e-banking and financial performance using Kenyan commercial banks where a positive interplay was registered. Jepchumba and Simiyu (2019) adoption of e-banking and it link with performance using Kenyan commercial where a positive relationship was noted.

Regression Results

The findings of regression analysis were determined and summarized as indicated in Table 6.

Table 6: Regression Results

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	.120	.010		12.098	.000
ATM Banking	.021	.003	.406	7.362	.000
Mobile Banking	.034	.003	.700	11.446	.000
R=.786^a	R^2=.617	Adjust. R^2=.609	F=70.620	p=0.000	

Table 6 indicates the value of R –square as 0.617, this means that 61.7% change in financial inclusion of commercial banks in Somalia is explained by variation in e-banking represented by ATM and mobile banking respectively. The value of F calculated is 70.620 with p<0.05, this means that on overall, the regression model used in the study was significant. At 5% level of significance, the study established that mobile banking (β=.034, p<0.05) had the greatest significant effect on financial inclusion among commercial banks in Somalia. This finding is supported by Isabwa (2021) who analyzed mobile banking and the role it plays on financial inclusion borrowing evidence from Kenyan banks where the findings were that mobile banking is a significant predictor of financial inclusion among banks in Kenya. The study further noted that ATM banking (β=.021, p<0.05) was a significant predictor of financial inclusion among commercial banks in Somalia. The result contradict with Ene, Abba and Fatokun (2019) who did a study whose focus was on e-banking and financial inclusion using the context of Nigeria where it was noted that ATMs do have significant effect on financial inclusion of banks in Nigeria

This therefore imply that electronic banking is a significant predictor of financial; inclusion of the bank. This finding is consistent with Asare and Sakoe (2015) who focused on Ghana to link e-banking and financial services where a significant link was noted. Ene, Abba and Fatokun (2019) used Nigerian context to explore how e-banking impacts on financial inclusion where ATMs were not found to be significant. Wanjiku (2020) did an examination of technological innovations and their link with financial inclusion and established that internet, electronic, mobile and agency banking channels positively contributed towards financial inclusion. Aduda and Kingoo (2012) determined the link between e-banking and financial performance using Kenyan commercial banks where a positive interplay was registered. Jepchumba and Simiyu

(2019) adoption of e-banking and it link with performance using Kenyan commercial where a positive relationship was noted.

CONCLUSION AND RECOMMENDATIONS

Conclusion

This study was set out to investigate the effect of automated teller machines banking on financial inclusion among commercial banks in Somalia. From correlation analysis, it was observed that ATM banking is a strong and positive correlate of financial inclusion of banks in Somalia ($r=.504$). The study further noted from regression analysis that ATM banking ($\beta=.021$, $p<0.05$) was a significant predictor of financial inclusion among commercial banks in Somalia.

The second objective of the study was to determine the effect of mobile banking on financial inclusion among commercial banks in Somalia. In light of the correlation results, mobile banking is a strong and positive correlate of financial inclusion among commercial banks in Somalia ($r=0.600$). The study established from regression analysis that mobile banking ($\beta=.034$, $p<0.05$) had the greatest significant effect on financial inclusion among commercial banks in Somalia.

Recommendations for Management and Policy

The study recommends that the senior management team of commercial banks in Somalia should allocate more resources towards financial innovation and enhancement of the existing electronic banking channels and infrastructures. The policy makers of the commercial banks in Somalia should formulate sound policies and strategies to promote the effectiveness of the existing electronic banking channels and platforms. The policy makers at the Central Bank of Somalia need to develop progressive regulations and rules that would promote the adoption of financial innovation while boosting financial inclusion.

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