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# The Impact of Innovation on Financial Inclusion Case of the Financial Sector of Cameroon

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## Abstract

*In third world countries, more than half of the population do not have an account with a financial institution and the situation is particularly acute in Sub-Saharan Africa. Financial inclusion is a key component of an all-inclusive social, political and economic development in any country since exclusion from the formal financial system has been identified as one of the major bottlenecks to a world without poverty. Consequently, the importance of an all-inclusive financial system is widely recognized in the policy circle and has become a key consideration in financial policy formulation in many countries including Cameroon. The objective of this research was to establish the effect of financial innovation on financial inclusion in Cameroon. The study adopted a descriptive statistic and used secondary data from the BICEC of Cameroon. The data on the number of deposit accounts, number of automated teller machines, number of registered bank agents, number of mobile money transactions and number of licensed deposits taking microfinance institutions was collected for the period between 2010 to 2019 quarterly. The data collected was analysed using descriptive and inferential statistics. Descriptive statistics included a trend analysis of the variables over the period of the study. Inferential statistics used include Pearson correlation and regression analysis. Regression results showed that the number of deposits taking microfinance institutions and the number of mobile money transactions had a positive effect on financial inclusion while agency banking had a negative effect on financial inclusion. Overall, the regression model showed that financial innovation was a good predictor of financial inclusion. The study concluded that financial innovation has a significant effect on the level of financial inclusion.*

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**Keywords:** *Innovation, Financial Inclusion, financial innovation.*

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## 1. Introduction

According to Global Findex 2017 Survey, about 69 percent of adults in the world have bank accounts, and about 1.7 billion adults do not have access to an account at a financial institution or through a mobile financial services provider. According to Triki and Faye (2013), less than a quarter of adults in Africa own an account at a formal financial institution. According to Fin Access (2016), the number of adults who have direct access to formal financial services in Cameroon increased from 31 to 40 percent in urban locations and from 15 percent to 17 percent in rural locations between 2010 and 2019.

Since 2010, the G-20 and the World Bank have led the initiative for increased financial inclusion in developing countries to help reduce poverty levels in developing and emerging economies (GPFI, 2010). Today, the relevance of digital finance and financial inclusion for poverty reduction and economic growth is attracting the attention of policymakers and academics, primarily because of the number of issues that persist which, if addressed, can make digital finance work better for individuals, businesses, governments, and the economy. Digital finance and financial inclusion have several benefits to financial services users, digital finance providers, governments, and the economy, such as increasing access to finance among poor individuals, reducing the cost of financial intermediation for banks and Fintech providers, and increasing aggregate expenditure for government.

Notwithstanding its benefits, digital finance and financial inclusion have not adequately permeated vast segments of the population (G20 Summit, 2013). This suggests an existing gap between the availability of finance, its accessibility, and its use. One area where the disparity is quite pervasive and is receiving increased attention, particularly among Fintech providers, is digital financial inclusion, financial data inclusion, and digital finance.

Financial inclusion is a critical component of an all-inclusive social, political, and economic development in any country. In addition, an all-inclusive financial system helps reduce the proliferation of informal sources of credit, which can be exploitative and undermine the stability of a country's financial system as a whole.

The Cameroon Vision 2035 identifies the role of financial sector development as a key stimulant towards achieving broad macroeconomic goals and objectives. Consequently, an all-inclusive financial system has been recognized as a key policy consideration for most countries, including Cameroon.

Over the last decade, Cameroon has taken steps to increase the level of financial inclusion in the country and strengthen confidence in the country's financial sector.

Through lenses of Vision 2035, the country seeks to benchmark its economic performance against some of the fastest-growing economies, such as Vietnam or middle-income countries like South Africa. Against such benchmarks, a conservative target for access to formal finance by 2035 would be doubling formal financial inclusion by fifty percent. It is no doubt that the Cameroonian government is committed to enhancing an all-inclusive financial system for all.

Financial service providers are finding innovative ways to expand mobile-enabled financial services through two different models: partnerships between mobile network operators (MNOs) and banks that run a mobile virtual network operator (MVNO), which allows them to offer all their financial services through a mobile platform (Bill and Melinda Gates Foundation 2017). Other financial innovations that have been implemented in the country, including but not limited to, the following: agency banking, online banking, credit card payments, and Automated Teller Machines (ATMs). These financial innovations have offered immense possibilities, including sustainable development, poverty reduction, and economic growth. Cameroonians in remote areas can now access financial services through mobile money, ATMs, and agency banking.

In recent years, Cameroon has made substantial progress in achieving financial inclusion, but a significant portion of the population, especially those living in the rural area, remain excluded. Innovation in the Financial Sector entails design, creation, and implementing innovative financial instruments and processes and the development of feasible solutions to challenges in the financial arena (Lawrence 2010). Financial innovation is the process of creating and then popularizing new financial products as well as new financial, technological advancements, financial institutions, and markets (Tufano 2003).

Innovation in the financial sector has been majorly viewed as the evolution of new financial services and instruments as well as new and more efficient methods of providing financial services (Misati et al., 2010). Financial inclusion, on the other hand, is the ability to access and use financial services in an affordable manner. The Access through Innovation Subgroup (ATISG) notes that financial innovation has emerged as an invaluable way to expand access to financial services. The group recognized innovations through technology as a long-term solution to expanding access to finance (ATISG Report, 2010).

Some of the notable landmark innovations in the financial sector including but not limited to mobile banking, agency banking, credit and debit card payments and internet banking. Such digital financial innovations have risen the levels of financial inclusion in recent decades. For instance, with mobile money, many people can access financial services through mobile

banking and mobile money transfer services. Similarly, through agency banking, the financially excluded rural population can access financial services since most of the bank agents are located in rural areas where it is not economical for banks to start a branch.

Many changes have taken place in the banking sector that has led to the rapid increase of financial products and services and organizational reforms, which have improved and increased the efficiency of the delivery of services in the financial sector. These changes, amplified by the rapid developments in the international financial arena and the increasing integration of domestic and global financial markets, have increased financial innovations. Some of the notable financial innovations which have been witnessed in the financial sector include the advent of ATMs, Agency banking, Automated Clearing House, Magnetic Ink Recognition. This ensures speedy and efficient clearing of cheques, leading mobile money transfer innovations such as MTN Mobile Money and Orange Money, and among others have taken root and are fast growing in the country.

In many advanced economies, innovation in the financial sector has become a key contributor to increased productivity, economic growth, and development not only for the manufacturing sector but for the service industry and mainly the financial services sector. Thus, granting access to affordable financial services (financial inclusion) to the excluded population results in the creation of a massive depository of savings and investable funds, which facilitates boom in investment activities, which in turn promotes economic growth and development.

In the global context, Ozili (2017) observed that digital finance had a positive effect on financial inclusion in emerging and advanced economies. According to Lumsden (2018), implementing mobile-based financial systems can increase financial inclusion and improve economic development, particularly in emerging and developing economies.

It is at the center of such mixed results, conclusions, and literature gaps that motivated and necessitated the need to carry out a study from the sub-Saharan region, precisely the Cameroonian context, to establish the impact of innovations in the financial sector on financial inclusion. The study sought to answer the question, what is the effect of financial innovation on financial inclusion in Cameroon. This study's main objective was to examine the linkage between innovation in the financial sector and Cameroon's financial inclusion.

## **LITERATURE REVIEW**

Financial innovation is seen as a process undertaken by any institution which involves development, promotion, as well as the adoption of new products and services, processes, or technological improvements that bring new methods or changes to how financial activities are done (Khraisha and Arthur 2018). Financial innovation increases the level of penetration of financial products and services to the financially excluded population. Furthermore, with the advancement in technology, financial services and products have been easily accessible to many who would otherwise be financially excluded. For example, seven out of ten Cameroonians are financially included mainly driven by mobile money, and approximately 97% of the financially included population have mobile money accounts (Bill and Melinda Gates Foundation, 2017).

Financial innovations have significantly transformed banking services globally, and their impact on economics globally is becoming increasingly noteworthy. A classic example is agency banking, which has revolutionized the banking industry and the majority of the rural population. According to Nato (2011), there are various types of innovations in the financial sector. These include financial innovations, product innovations, and process innovations, technological innovations, and circumventive innovations. He notes that institutional innovations relate to changes in legal and supervisory frameworks, while process innovations aim to increase efficiency in operations. Product innovations are done to meet changes in the

market demand, while technological innovations are those who take advantage of technological advancements either one or all of the other types of innovations. Circumventive innovations arise as a result of bypassing certain monetary and regulatory controls imposed in pursuance of certain public policy goals.

Similarly, According to Merton (1995), financial innovations are the forces driving the world financial system towards greater economic efficiency. Financial innovation increases the financial system's efficiency by supporting credit market development, facilitating monetary policy operations, and the monetary policy transmission mechanism. It is no doubt that financial innovations are critical in the development of the financial system. The primary role of innovation in the financial sector is to facilitate financial intermediation. Innovation in the Financial Sector serves several other functions in an economy. Innovations in the financial sector are complete inherently the incomplete financial markets, to respond to agency concerns as well as information irregularity, to reduce transaction, searching and marketing costs, to address taxes and regulations issues, to respond to the increasing globalization and risks, to counter technological disruptions (Tufano,2003).

According to Atakora (2013), financial literacy can be defined as the possession of knowledge of how money works and how to manage, invest, and spend. Financial literacy focuses on an individual's ability to make informed and prudent financial decisions. Financial literacy contributes to financial stability and economic growth. Financial literacy is often a precondition for financial access since one cannot access what they are not aware of. Therefore, an increase in financial literacy is expected to increase the level of financial inclusion. Wafula (2017), examined the effect of financial literacy on financial inclusion among small scale farmers in Trans Nzoia County and found out that there was a significant positive relationship between financial literacy (saving practices, debt management, investment practices, financial planning services) and financial inclusion.

According to Camara and Tuesta (2015), access to financial products and services is determined by the supply of the same and is necessary for financial inclusion.

Reliable access to financial services and products is an integral component of financial inclusion. It is often obstructed by lack of infrastructures such as means of transport to reach a financial institution, lack of network coverage to access mobile banking, or even lack of internet access to online banking, procedural rigidities, and much documentation able to access credit in financial institutions. Chithra and Selvam (2013) conducted an empirical study on the determinants of financial inclusion in India. They found out that physical infrastructure for connectivity and information was closely associated with levels of financial inclusion.

Johnson and Kwak (2012), examined whether financial innovations were good for the economy. They observed that there had been much debate on financial innovations, but the social value was unclear. Innovation is one of the commanding forces which define and shape human society, and improvement in living standards for Americans was attributable to innovation. They noted that financial innovations stood accused of the recent global financial crisis in 2008. They noted that the conventional reasoning that financial innovation is often good needed to be reviewed more keenly. According to them, financial innovation does not necessarily promote economic growth since it affects the concentration of risks in the financial system.

Ho (2006), examined the effect that financial innovation had on fiscal policy transmission mechanisms. He observed that the emergence of electronic payments systems could substitute demand deposits and other liquid deposits, thereby weakening the proper operation of the monetary policy transmission system. This is mainly due to the weakening of the association

between change in bank demand deposits and a change in real sector activities. Bara and Mudzingiri (2016) studied the linkage between financial innovation and Zimbabwe's economic growth for the period between 1980 and 2013. The data was analyzed using Autoregressive Distributed Lag bound tests and Granger causality tests. The study found out that financial innovation had a positive relationship to economic growth, which varied based on the parameters used to quantify and measure financial innovation.

Yawe and Prabhu (2015) carried a review of innovation and financial inclusion. The review covered several areas of financial innovations such as savings, payments, banking services for the excluded poor, and financial literacy. The results of the research indicate that financial inclusion should go beyond the traditional banking sector. They noted that mobile operators had initiated mobile financial services, although it is not in their mandate. This has led to competition between them and financial institutions. The study recommends for partnerships between the two to enhance interoperability. They recommended the need to have an institutional framework composed of regulators of financial institutions and telecommunication companies to expand financial inclusion without necessarily compromising on policies towards combating contemporary global issues such as money laundering. This research focused on financial innovation and how it related to the financial needs of the financially excluded under various categories; savings, payments, banking services for excluded poor, financial literacy, and consumer protections.

Triki and Faye (2013) define financial inclusion as all initiatives which make formal financial services readily accessible and affordable to all subgroups of the population in a particular country. Financial inclusion is also defined as the process which ensures accessibility, availability, and utilization of financial systems by members of an economy (Sarma 2008). Financial inclusion refers to the provision of affordable financial products and services by the formal financial system, particularly to members of an economy who tend to be excluded (Usha Thorat, 2007). The CGAP defines digital financial inclusion as "digital access to, and the use of, formal financial services by the excluded and underserved population" (CGAP, 2015). Currently, innovative digital financial services via mobile phones and similar devices have been launched in at least 80 countries (GSMA, 2014), encouraging millions of poor customers to use digital financial services rather than cash-based transactions exclusively.

Furthermore, Triki and Faye (2013), again examined financial inclusion in Africa. They found a more comprehensive definition of financial inclusion, which encompassed three aspects; access, affordability, and availability of financial services. They studied financial services penetration and found out that the African continent lagged behind other developing areas in terms of cost and access. That distance and cost remained as key challenges for the growth and development of all-inclusive financial systems. They noted that economic and social and cultural barriers and inefficiencies in-laws and regulations were denying women access to financial products and services in Africa.

The study found that twenty-three percent of adults in Africa had an account with a formal financial institution. This level of inclusion varied between Southern (42%) and seven percent in Central Africa. For example, in the Democratic Republic of Congo, more than 95% of adults are unbanked. Boro (2017) studied mobile banking's effect on Cameroon's financial inclusion period between 2007 and 2016. Secondary data was used for the study, and descriptive and inferential statistics were used to estimate the link between mobile banking and the level of financial inclusion.

The relationship between financial innovation and financial inclusion has not been exhaustively explored, though it remains a policy priority for many countries, including Cameroon. The scanty literature on the relationship between the two aspects motivated the



conduct of this research to contribute to the ongoing debate on financial inclusion and financial innovation. Due to these literature gaps, this study examined the effect of various financial innovations in the country's financial system on the level of financial inclusion.

## 2.1 Conceptual framework of the study

A Conceptual framework is a diagrammatic representation that shows the link between the independent and dependent variables. For this research, financial innovations were represented by agency banking, mobile money transfer, Automated Teller Machines (ATMs), and Micro Finance Institutions (MFIs). Financial inclusion represents the number of deposit accounts in financial institutions owned by adult Cameroonians. Theoretically, innovations in the financial sector are expected to increase the level of financial inclusion. Several empirical studies indicate that relationships hold while others hold that innovations in the financial sector are mainly focused on reducing operational costs by the innovating institutions and not fostering financial inclusion. Below is the conceptual framework for the study

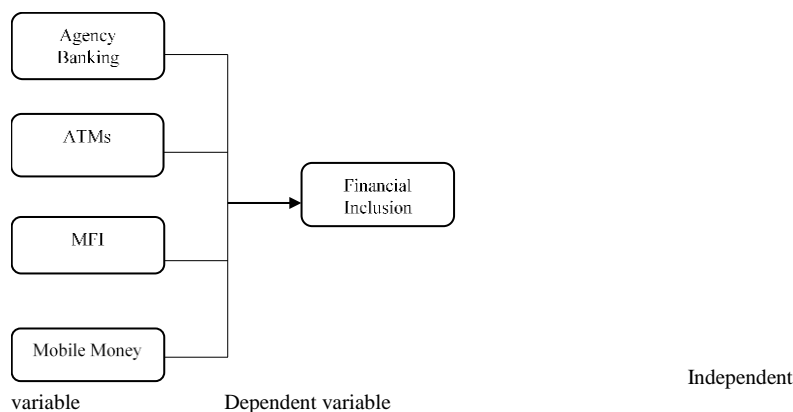


Figure 2.1 Conceptual framework source; Author (2020)

## 3.0 Methodology

This study adopted a descriptive research design. Cooper and Schindler (2003) contents that descriptive research is focused on finding out what, where, and how of a phenomenon. This research design was chosen as it enabled the researcher to generalize the study findings to the larger target population. The study used secondary data mainly from BICEC Secondary data was used since it was cheaper, more accurate, and easily accessible. Data on agency banking, MFIs, mobile money transfer, ATMs, and deposit accounts were collected from BICEC for the period between 2010 to 2019.

The data were analyzed using regression and correlation analysis with the help of SPSS version 25. Pearson's correlation analysis was used to assess the nature of and degree of relationship between the variables, while regression analysis was deployed to determine the existing link between the variables.

After determining financial inclusion and various financial innovations, the link between the two variables was determined. This involved regressing financial inclusion as the dependent variable in the regression equation and while independent variables were measures of various aspects of financial innovations. The regression equation that was used in this research is as follows:

$$Y = (\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon), \text{ where:}$$

$Y$  = Financial inclusion

$\beta_0$  = Constant-Other factors which affect financial inclusion such as income level, age, financial literacy level among others

$\beta_1, \beta_2, \beta_3, \beta_4$  = Regression coefficients

$$\begin{aligned}
 X_1 &= \text{Agency banking} \\
 X_2 &= \text{MFIs} \\
 X_3 &= \text{ATMs} \\
 X_4 &= \text{Mobile money transfer services} \\
 \epsilon &= \text{Probabilistic error term} \quad (1)
 \end{aligned}$$

**Table 3.1 Operationalization of Study Variables**

The table below describes the various study variables and how they were measured.

Variable	Description	Measurement
Y	Financial inclusion	Financial inclusion was measured as natural the logarithm of the number of deposit accounts in financial institutions.
X <sub>1</sub>	Agency Banking	Agency banking was measured as a natural logarithm of the total number of registered bank agents.
X <sub>2</sub>	MFIs	MFIs were measured as a natural logarithm of the total number of licensed MFIs.
X <sub>3</sub>	ATMs	ATMs were measured as the natural logarithm of the total number of ATMs in the country.
X <sub>4</sub>	Mobile Money Transfer Services	This was measured as the natural logarithm of the total number of mobile money transactions in the country.

### Test of Significance

The study used t and F-test to determine statistical significance. F-test was used to assess the statistical significance of the whole model. In contrast, a t-test was used to assess the statistical significance of the regression coefficients at a 5% level of significance.

## 4. Data Analysis, Findings, and Interpretation

### 4.1 Descriptive Statistics

Table 4.1 presents a summary of the descriptive statistics of the study variables.

**Table 4.1 Summary of Descriptive Statistics**

	Minimum	Maximum	Mean	Std. Deviation
No of deposit accounts 40	15.44	17.73	16.7358	.68675
No of registered banking 40 agents	.00	11.02	7.7223	4.27768
Number of Mobile Money 40 Transactions	14.69	18.76	17.6090	.97333
No of Deposit Taking 40 Micro Finance Institutions	.00	2.56	1.6260	.98587
No of ATMs 40	6.97	7.95	7.6893	.25993
Valid N (listwise) 40				

Table 4.1 shows that financial inclusion had a mean of 16.73 and a minimum and a maximum of 15.44 and 17.73, respectively, in terms of the natural log of the number of deposit accounts. The average number of bank agents in terms of the natural log was 7.72, whereas the minimum and the maximum number of transactions were zero and 11.02, respectively. The mean number of ATMs in terms of the natural log was 7.68, while minimum and maximum were 6.97 and 7.95, respectively. The average number of mobile money transactions in terms of the natural log was 17.6, while the minimum and the maximum number of transactions were 14.69 and 18.76, respectively. The table also shows that the average number of deposits taking microfinance institutions in terms of the natural log was 1.62 while the minimum and maximum numbers were 0 and 2.56 respectively.

#### 4.2 Pearson's Correlation Analysis

The table below shows the degree of association between the five variables used in the study. Correlation ranges between -1 and 1, where -1 shows a strong negative association, and 1 shows a strong positive association, while zero shows a lack of association between the variables. The correlation between the number of deposit accounts and the number of registered bank agents, number of ATMs, number of mobile money transactions, and number of registered MFIs was strong, positive, and statistically significant, as shown in the table below.

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#### Table 4.2 Pearson Correlation Analysis

	Financial Inclusion	Agency Banking	Mobile Money	MFIs	ATMs
Financial Inclusion	1				
Agency Banking	.871*	1			
Mobile Money	.957*	.875*	1		
MFIs	.941*	.954*	.911*	1	
ATMs	.939*	.910*	.987*	.931*	1

\*. Correlation is significant at the 0.01 level (2-tailed).

#### 4.2.1 Multicollinearity Analysis

Table 4.3 below shows the test for multicollinearity among the predictor variables. Variance Inflation Factor (VIF) shows the correlation between independent variables and the strength of that correlation. The rule of thumb is that VIF of 1 indicates no correlation among the variables. If VIF is more than 4, further investigation, and if more than 10, it shows serious multicollinearity requiring correction. As shown below, except MFIs, VIFs were more than 10, which was corrected by dropping ATMs from the model since it had the highest VIF. As shown in Table 4.3, the resultant VIF was less than 10, and hence the model used the three remaining variables.



	Collinearity	Statistics VIF
No of bank agents	0.097	10.350
No of Mobile Money	0.020	48.791
No of MFIs	1.08	9.238
No of ATMs	0.14	73.444

### 4.3 Regression Analysis

Table 4.4 shows the summary of the regression model results. The coefficient of determination (R-Squared) was 0.951. The results show that the independent variables explained that 95.1% of the change in the dependent variable, while a 4.9% change in the dependent variable was explained by other factors not included in the regression model. Autocorrelation between the variables was measured using the Durbin Watson Test. Autocorrelations are model errors that determine whether autocorrelations exist among the variables. Durbin Watson suggested value of 1 to 4 is considered appropriate, while a value of more than 4 shows that the model has significant autocorrelation to results in errors in the model. The Durbin Watson value in this model is 0.33, which is within the acceptable limits for autocorrelations.

**Table 4.4 Regression Model Summary**

R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin Watson
.975 <sup>a</sup>	.951	.947	.15765	0.330

#### 4.3.1 Analysis of Variance

Analysis of variance (ANOVA) results is presented in table 4.5 below. The table shows the joint effect of various financial innovation variables in explaining financial inclusion in Cameroon through the F-test. The regression was undertaken at a 5% significance level, and hence alpha value was 0.05. The alpha value was compared to p-value to determine the significance of the model. If the alpha is greater than the p-value, it is concluded that the model is significant and vice versa. In the table below, the p-value is 0.000, which is less than the alpha value of 0.05, and therefore it is concluded that the model is significant.

The null hypothesis states that financial innovation does not affect financial inclusion. In order to reject or fail to reject the null hypothesis, the F critical value from the F distribution table at 5% significance level and degrees of freedom of 3 and 36 should be less than or more than F calculated, respectively.

The F critical value at 5% significance level and 3 and 36 degrees of freedom is 2.87, which is less than F calculated of 234.673, as shown in the table below. The study, therefore,

**Table 4.5 Analysis of Variance**

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	17.499	3	5.833	234.675	.000 <sup>b</sup>
Residual	.895	36	.025		
Total	18.393	39			

### 4.3.2 Coefficients

Table 4.6 below shows the results of the effect of individual independent variables on the dependent variable. The results indicate that mobile money and the number of deposit-taking microfinance institutions had a positive and statistically significant effect on the level of financial inclusion. The results show that number of bank agents had a negative and significant effect on financial inclusion.

**Table 4.6 Coefficients**

	Unstandardized Coefficients		Standardized coefficients	t	Sig.	Statistics VIF
	B	Standard error	Beta			
Constant	8.313	1.055		7.878	.000	
No of bank agents	.039	.016	-.232	-2.360	.024	7.138
No of Mobile Money Transactions	.460	.066	.652	6.991	.000	6.430
No of MFIs	.390	.077	.560	.060	.000	9.078

These coefficients, therefore, help to explain the relationship between the dependent and the predictor variables and was modeled as follows:

$$Y = 8.313 - 0.039X_1 + 0.390X_2 + 0.460X_3 \quad \text{where } X_1 = \text{Agency Banking}, X_2 = \text{DMFIs}, X_3 = \text{Mobile Money Transactions. (2)}$$

The model shows that a unit increase in a number of bank agents, reduces the number of deposit accounts by 0.039 units, a unit increase in a number of mobile money transactions increases the number of deposit accounts by 0.46 units, and a unit change in the number of deposit-taking microfinance institutions increases the number of deposit accounts by 0.39 units. Further, holding all factors constant, the level of financial inclusion would be 8.313.

### 4.4 Discussion of Study Findings

The results of the research showed that the number of deposit accounts with financial institutions grew by 87% from 6.43 million in 2010 to 49.88 million accounts in 2019.

The number of bank agents grew by 84% from 9748 agents in 2015 to 61,290 agents in 2019. The results suggest that a unit increase in the number of bank agent's decreases financial inclusion by 0.39 units. These findings are contrary to Waihenya (2012) findings, who found that agency banking had a positive effect on financial inclusion. However, the findings were consistent with those of Michele (2016), who found out that agency banking had a negative effect on financial inclusion.

The number of mobile money transactions processed grew by 96% from 21.77 million in

2010 to 1.66 billion in 2019. These transactions included transactions from MTN Money, Orange Money, in Cameroon. The results suggest that a unit increase in the number of mobile money transactions increased the level of financial inclusion by 0.460 units. The results of this study are consistent with those of Nato (2010), who found that mobile money highly contributed to the probability of access to financial services in Kibera Slums.

The number of registered deposits taking microfinance institutions increased by 92% from 1 in 2010 to 13 in 2019. The steady increase in the number of these institutions indicates the government's commitment to ensuring the marginalized population has access to formal financial services.

The results indicate that a unit increase in the number of registered deposits taking microfinance institutions led to an increase in the number of deposit accounts by 0.390 units. This was consistent with results of a study by Pamela (2016) who found that micro banking enhanced financial inclusion in Cameroon

The number of ATMs increased by 53% from 1325 in 2011 to 2825 in 2019. This was a sluggish growth compared to the other financial innovations partly explained by competition offered by the other financial innovations such as agency banking and mobile banking.

Summary of descriptive statistics of the five variables for the 10-year period shows that the number of deposit accounts had a mean of 16.7358 and a standard deviation of 0.68675. The number of registered bank agents had a mean of 7.72 and a standard deviation of 4.27768. The number of mobile money transactions had a mean of 17.6090 with a standard deviation of 0.97333. Further, the number of licensed MFIs had a mean of 1.6260 and a standard deviation of 0.98587. The number of ATMs in the country had a mean of 7.6893 and a standard deviation of 0.25993

Regression analysis showed that the independent variables were statistically significant determinants of financial inclusion, as evidenced by the strong relationship with the independent variables. The four independent variables explained that 95.1% of financial inclusion while 4.9% of financial inclusion was explained by other variables not included in the study. Therefore, financial innovations are significant and should be considered in an effort to increase the country's financial inclusion.

Correlation results indicated that financial inclusion had a strong and positive correlation with agency banking (0.871), mobile money (0.957), MFIs (0.941), and AMTs (0.939) Collinearity diagnostics test showed that VIF of variables was above the tolerable limit of 10, which required corrections. Since AMTs showed high-level multicollinearity with other variables, it was dropped from the model, and VIFs values for remaining variables was below 10, which was assessed not to have a significant impact on the model. These diagnostics lead to the use of only three variables in model-agency banking, mobile money, and MFIs.

The joint effect of the financial innovation variables was tested using F-test. As shown in the analysis of variance, the F statistic was 234.675 and was statistically significant since the p-value was 0.000, which was less than the alpha value of 0.05. Further, the F calculated was 234.673, while the F critical was 2.87. The overall conclusion was that the model as a whole was statistically significant in jointly explaining the relationship between financial innovation and financial inclusion.

The results of individual effect of financial innovation variables on financial inclusion at 5% level of significance, showed that agency banking had 0.024 level of significance, mobile money had 0.000 level of significance and number of deposit-taking microfinance institutions had 0.000 level of significance and thus the two most significant factors in enhancing financial inclusion.

## 5. Conclusion

The study makes various conclusions based on the results of the study. The finding that there exists a significant negative relationship between agency banking and financial inclusion leads to the conclusion that financial institutions have adopted agency banking model as a way of reducing operating costs by providing banking services to areas where it would have been difficult to reach due to high costs of establishing branches or lack of infrastructure. Therefore, the motive of financial institutions is to maximize their profits and not necessarily enhance the level of financial inclusion using the agency banking model of doing business.

The study showed that an increase in the number of licensed deposits taking microfinance institutions increased the level of financial inclusion. Licensing of microfinance banks by BICEC helped to ensure the majority of the population can access financial services from the microfinance banks, which have mainly set up branches in the rural areas where commercial banks have not been able to reach.

The study also concludes that the continued use of mobile money services has significantly enhanced financial inclusion in the country. Most Cameroonians are now able to access financial services by use of their mobile phones with the help of mobile money platforms. Mobile money has also supported mobile banking, which has further enhanced financial inclusion in the country.

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