Financial Innovations and Financial Inclusion among Small Scale Coffee Farmers in Kiambu County, Kenya

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Abstract:- Despite the strong presence of various financial technologies in remote areas, most inhabitants in these areas remain financially excluded. In Kenya, majority of the small-scale farmers are the aged people and presumed to be slow in adoption of technology. For this reason, financially it is not clear to what extent financial innovations have improved financial inclusion among the farmers. The objective of the study was to establish the innovations within mobile banking on how they influence financial inclusion among small scale coffee farmers in Kenya with a scope of Kiambu County coffee farmers. The study was informed by financial intermediation theory and technology acceptance theory descriptive research design was adopted as it is suitable for providing a comprehensive examination of the situation and give a report of diversified features from the analysis. The target population comprised of small-scale coffee farmers situated in Kiambu County. This study was targeting the top 10 coffee co-operatives societies with a target population of 29,455. Using the Cochran formula, a sample size of 395 five was selected. Primary data was collected by use of questionnaires. The data collected was analyzed using descriptive statistics to determine the mean and standard deviation. Pearson correlation and regression was conducted to determine the relationship between the variables. The regression results showed that mobile banking have a statically significant effect on financial inclusion among small scale farmers. The study concluded that innovations in mobile banking are very important in enhancing the rate of financial inclusion in the country. Therefore the study recommends that various stakeholders including financial institutions to consider putting more infrastructure and innovation in mobile banking to ensure financial inclusion among small scale farmers in Kenya.

Keywords:- Financial Innovations, Mobile Banking and Financial Inclusion.

I.   INTRODUCTION

Globally, 2.7 billion adults have a deficiency of modern financial services (Demirguc &Levine, 2009). The Financial Access Initiative (FAT) reported across the globe 2.5 billion people who lack access to financial services reside in developing nations in Africa, Asia, and Latin America. Based on the population breakdown by income level, out of a population of 1.2 billion grown person using modern financial services, about 70%equivalent to 800 million people are ranked in the lowest category of earning. Apart from socioeconomic and demographic features, the main drivers of enhancing inclusion were; an operative governing framework and policy setting and promoting the actions of financial service providers.

Triki and Faye (2013), describes financial inclusion as the process through which formal financial services are made available, accessible and at a lower cost which all can afford. Financial inclusion penetration rate is high in developed nations, which is not the case in middle level and developing countries. A report by the World Bank (2017), indicate that 19% of adults in developed countries face a mild financial inclusion deficiency whereas 72% of adults in developing nations do not have a bank account. An average of various statistics reports shows that an average half of the world's adult population is unbanked (Nyagilo, 2018). Additionally, access to traditional banking services, such as automatic teller machines and over the counter services in bank branches differs significantly from one country to another (Klein & Mayer, 2016). For example, in Ethiopia there is less than one bank branch per every 100,000 people while in Canada the number is 220 bank branches per 100,000 people nation-wide (The World Bank Report, 2017). For countries that have large unbanked populations, mobile technology can be used as an alternative means to extend the reach of financial services.

Most of the African countries have a high percentage of financially left out people, which reflects a high deficiency of access and application of formal financial resources by the people. The World Bank Report (2017) point out that the low spread of banking services in African countries similarly shows a high rate financial excluded. In 2011, fifty four percent of the South African population had bank accounts at formal financial institutions within the country, while the figures for Kenya, Nigeria, Egypt and the Democratic Republic of the Congo (DRC) were slightly low showing a rate of 42 percent, 30 percent, 10 percent and 4 percent respectively (World Bank, 2011). The level of financial inclusion in African countries is generally very low. In poorer rural communities, which comprise the bulk of the financially excluded; Financial exclusion is mainly due to income-related issues and barriers to accessing formal financial institutions (World Bank, 2011). In Sub-Saharan Africa, an estimated 47% of people live below US$ 1.25 in a day. By being financially excluded, it implies that this population mostly relies on informal avenues to access financial services which are so costly. This goes a long way

to adversely affecting the way formal financial institutions perform (Ndegwa & Koori, 2019).

In Kenya, an estimated 46 percent of the residents lives below the national poverty line (Kenya Bankers Association, 2014) and traditionally, banking institutions could not serve these low income individuals (the unbanked) because of the costs involved. This has resulted to adoption of innovations that can effectively help the low-income individuals and micro entrepreneurs to develop hence financial inclusion. The key financial services that result into financial inclusion among the unbanked and the under banked include pension and insurance services and products, loans, savings and payment services (Ndung'u, 2013). Kenya is categorized as a lower middle income nation, according to a UNDP 2018 report. In this regard, 36.1 percent of her population lives below the international poverty level of $1.90 per day, with the majority of them residing in rural areas where formal banking services are difficult to access (Omwansa & Waema, 2018).

Innovations has been refers to as an organizations coming up with new products or new production methods to enhance effectiveness and efficiency in their operations, in which case the new products could be based on the new methods adopted (Lawrence, 2010). In the financial markets, innovation has been presumed as the act of developing and marketing new financial instruments, technologies, institutions and markets, which enable access to information, trading and means financial transaction (Sum & Memba, 2016). The principal purpose of innovation is to reduce operating cost, increase equality and improved services (Mukur, 2014). On the other hand, administrative process innovation involves the indtroduction of a new organization method in the business practices with an aim to increase firm performance by reducing operating expenses and improving workplace satisfaction (Damanpour, 2011).

Financial innovation refers to the action or a process of inventing and implementation of new financial instruments and technologies, markets and institutions (Jofi, 2015). Financial Innovation involves the design, development and implementation of advanced financial products and processes, which are a creative solutions to problems in finance. Ignazio (2007) categorize financial innovations into; new products; new services; new "production" processes for example electronic record keeping and new organizational forms.

Financial inclusion refers to growing access to formal financial which involve various parameters such as possession of bank accounts, using credit and savings facilitated through financial institutions. Across the decades financial inclusion has increased further than physical branch as technology is transforming the access and use of bank services worldwide (Diniz *et al*, 2012). Financial inclusion in Kenya just like it's happening in other nations, has been occasioned by prompt technological change in the sector that hve led to the advancement of financial innovations, new products and new forms of transacting cash. According to the Central Bank of Kenya report (2012), the banking sector has undergone a massive revolution particularly from the year 2007. With the introduction of mobile phone payment platform M-pesa, Airtel money Yu-cash, which intensely changed the financial setting by offering a simple efficient and cost-effective ways to send and receive money (Kenyoru, 2013). Other inventions such as agency banking has enabled bank customers to access the fundamental banking services by authorizing small traders to operate as satellite branches (Musau, 2013). In 2012, Safaricom Company in collaboration with Commercial Bank of Africa in Kenya, launched a service dubbed M-SHWARI that spontaneously opens a bank account for M-pesa registered customer and operates fully like a bank account. This increased the population accessing the formal financial sector. Around 10 to 20 per cent of smallholder farmers in Kenya are part of formal value chains, while the rest of the population operate using old tradition methods.

II. PROBLEM STATEMENT

Farmers are key contributors to the growth of Kenyan economy. They play a double role of production as well as consumption. According to the annual AGRA report (2019) about less than 4 per cent of business loaning is borrowed for the agriculture sector. Public expenditure on agriculture stands at 3 to 6 per cent of the budget. The Agricultural sector in Kenya comprise of majority small scale farmers with a few large scale farmers. While smallholder farmers are significant in contributing to the growth the Kenyan economy, financial amenities barely reach them. Lack of capital, low returns have been attributed to the main challenge hindering growth of small scale farmers in Kenya (KNBS economic survey report, 2022). Smallholders farmers are not well reached by either informal or formal financial sector due to some of the remote location or perceived level of risk and economic value by the service providers.

According to COSA report (2019) on coffee production in Kenya, Smallholder farming controls Kenya's coffee sector, producing about 65 per cent of the total metrics exported. However, there has been a decline in quality of coffee produced due to poor management in the farms. Lack of finances due to delayed payments, difficult in access of credit and harsh weather condition have contributed to the decline in production and quality. Additionally, the farmers also experience lack of research capacity to develop new resistant high producing varieties. According to the year 2017 Global Findex catalogue, 81.6% of the 29.6 million Kenyans aged from 15 years and abovein the urban have an account with a financial institution or mobile money provider. In rural areas, this figure is slightly lower at 81.2 %. Financial inclusion in Kenya has grown as a result of high rates of mobile money adoption and use. 72.9% of the residents aged 15 years and above in urban area a mobile money account. In the rural the figures are equally high at 72.6 per cent. Fin Access survey (2021) asserts that the use of traditional forms to get financial services has decreased to 4.7 per cent in 2021 from 6.1 in 2019. The implication was that there is an increasing formality in the financial sector denoting a good implementation framework. Similarly, the access to informal financial services consumption were showing a declining

trend across the years. In particular, innovations in bank-based products continue to offer competition to unregulated digital lenders, hence the decline in usage of the later from 8.3 percent in 2019 to 2.1 percent in 2021. Despite the strong presence of various financial technologies in rural areas, most farmers remain financially excluded (Fin Access survey, 2021).

Several studies have been conducted to on the area of financial innovation and financial inclusion globally and also in the region. Most of the studies conducted on financial innovation have focused on performance of financial institutions study therefore seeks to bridge the existing gap by investigating the effects of financial innovations on financial inclusion of small-scale coffee farmers in Kiambu.

III.   GENERAL OBJECTIVE

The general objective of the study seeks to explore the effect of financial innovation on financial inclusion among small scale coffee farmers in Kiambu.

A. Specific Objectives

To establish the effect of innovations in mobile banking on financial inclusion among small scale coffee famers in Kiambu.

B. Research Hypotheses

H_0: Innovations in Mobile banking have no significant influence on financial inclusion of small-scale coffee famers in Kiambu.

IV.   LITERATURE REVIEW

A. Theoretical Framework

The study adopted the financial intermediation theory, technology acceptance theory to give an empirical discussion of the innovations of mobile banking adoption.

➢ *Financial Intermediation Theory*

The financial intermediation (FIT) theory was proposed by Diamond (1984). The theory is all about how banks act as intermediaries between borrowers and savers. As financial intermediaries they facilitate access to financial services and also provide financial diversification and utilization. The degree of inclusion influences the level of firmness as long-established by literature. According to Ndebbio (2004), financial intermediation theory explains the role of commercial banks in bridging the gap between deficit spending customers and surplus spending customers in the market.

Diamond (1984) points out that commercial banks play the role of delegated monitoring by putting effective measures necessary to monitor borrowers" behavior. By reducing monitoring costs, banks are able to attain competitive edge in the market. Diamond and Dybvig (1983) examined the position of banks in transforming fixed assets into liquid obligations. Accordingly, similar investors and depositors are characterized by being risk averse; this brings uncertainty in timing future opportunities. Through intermediation, banks assist investors to avoid being locked into long-term illiquid investments yielding high pay - offs to future consumers.

Commercial banks as financial intermediaries play a key role in ensuring good corporate governance, less risk contracts and ease of transaction for players in an economy. By increasing the level of financial inclusion, banks attempt to reduce these market frictions. In turn, this reduces information asymmetry hence reducing market imperfections among the users (Hannig & Jansen, 2010). This theory captures financial inclusion which is explained by financial intermediation. The underpinnings of this theory can be used to help understand how financial intermediation interrelates to financial inclusion. The theory supports the Mobile banking objective considering it operates as intermediary between the service provider and the customers.

➢ *Technology Acceptance Model (TAM)*

The TAM motel was proposed by Davies in 1989, this model was developed anticipate the adoption of information technology in an organization as well as user acceptance of it. The goal of the Technology Acceptance Model is to use specific services or technology to explain attitudes (Bertrand & Bouchard, 2018). TAM addresses fourteen believes in regard to new technology and contends that incase of advancement of new technology to customers, is either due to, perceived ease to operate and perceived usefulness influence their decision (Lule, Omwansa & Waema, 2012). Perceived ease to operate is the level of self-assurance that operators put on a system and if consumers perceive a new technology to be helpful in support of both the current and future, there is that motivation to accept and use the system. Further, the level by which and individual consider a system will enhancement performance the short and long-run in the perceived usefulness (Mojtahed et al, 2011).

Evrn though financial technology has advanced, elemtns such as adequacy, accessibility, affordability and awareness are still lacking in some small scale farmers, preventing them from being completely financially engaged. This is a genial theory that supports the objectives of the study as to have a knowhow of how new technology and innovations influence financial inclusion among the farmers due to their reluctant to accept and adopt the new technologies.

B. Conceptual framework

The independent variable for this study was innovations in mobile banking whereas the dependent variable was financial inclusion as represented in figure 1 below.
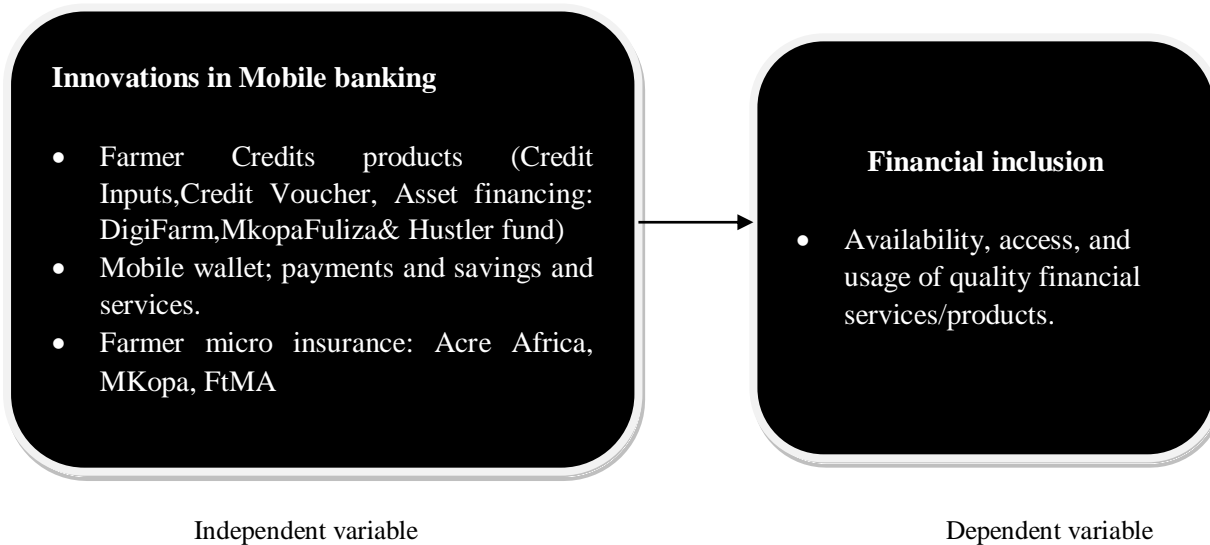
Fig. 1: Conceptual framework

C. Empirical Literature

Mobile banking refers to any financial related transactions relating the transfer or exchange ofmoney, which is initiated and/or completed by using mobile with the aid of computer- mediated networks and an electronic device (Kathuo et al, 2015). The authors further assert that mobile banking involves provision of bank-related financial services with the aid of mobile telecommunication gadgets. Mobile banking mostly transact through confirmation of short message service (SMS) or mobile internet but can also be used by special applications called clients downloaded to the mobile device (Gemechu, 2014).

Mobile banking has enhanced provision of financial services with a multiple applications of services that address the need at hand (Daniyan-Bagudu et al, 2016).Mobile banking offers to majority of customers a possibleway out in developing markets that have access to a cell phone, yet remain excluded from the financial mainstream (Too et al, 2016). Mobile money transfers has provided basic financial services more available by reducing time and distance to the nearest physical bank branches (CGAP, 2006). The innovation has also helped minimize the bank's own fix costs and other operating expenses. Mobile banking offers an opportunity for financial service provides to extend banking services to new customers thereby increasing their market (Ritho & Jagongo, 2015).

Mago and Chitokwindo (2014) conducted an inquiry on the influence of cellular banking on monetary inclusion in Masvingo Province, Zimbabwe. The investigators assumed a qualitative approach in their survey design. The representative proportion of the population was made up of 270 participants from districts, informal sector and tertiary learners. The outcomes of the research exposed that the poor people were keen to embrace cellular banking and that there is an affirmative relationship amid cellular banking and monetary inclusion. The work was done in Zimbabwe, rendering scarcity in terms of context and this is the gap that the current study sets out to address.

In Kenya, Antoine and Leo (2017) conducted a research on mobile money and financial inclusion. The study conducted was for the period between 2011 and 2013. The research main objective was to gather information about financial behaviour at the family level. Families were picked randomly based on the latest available census. According to the findings, the majority of poor and uneducated people do not benefit from this banking system since they are unable to get frequent and speedier remittances. According to another study conducted by Joseph (2018), in Kitui County, Kenya, Mobile money technology significantly impacts financial inclusion in the country. The study applied systematic research design approach. The target population included of 7060 individual residents positioned in urban centers in Kitui County. The target population comprised of Mpesa agents, petrol stations, supermarkets and mobile banking agents. Stratified sampling technique was applied to select a sample of 351 respondent. The research used a researcher administered questionnaire to collect data. The study concluded that policymakers should consider mobile technologies when formulating policies. The impact of mobile banking could be greater if more customers use these services and if technology evolves.

V. RESEARCH METHODOLOGY

Descriptive research design was applied for this study with an interview method. The sign involves collecting information by administering questionnaires or through interviews to a sample of respondents. The design was suitable for this studyconsidering that it is more precise and accurate as it involves explanation of events in a systematic manner way (Babbie, 2004). This research design was also portray the characteristics of a population fully (Chandran, 2004). Target population of interest in this study comprised of small scale coffee farmers in Kiambu County. There are 23 coffee co-operatives societies in Kiambu with a total of 52,234 members registered as at December 2020 (Kiambu County government resource data). This study targeted the top 10 coffee co-operatives societies with a target population of 29,455. The sample frame of this study consisted of

random selected farmers from the coffee cooperative societies. The researcher used Cochran, (1963) formula to determine the sample size of 395 small scale farmers in Kiambu County.

$$n = \frac{N}{[1 + N(e)^2]}$$

Where; n = sample size; N = Target Population size; e =Level of significance, at 95% confidence level

$$n = \frac{29,455}{[1 + 29,455(0.05)^2]} = 395$$

The study used questionnaires as the data collection tool where relevant information related to the study objective was gathered. The questionnaire was structured in such a way that it contained both close ended questions and open ended questions. 395 questionnaires were administered to the selected coffee farmers. The questionnaire was administered inform of interview to guide the responded on how to answer the questions provided. Interview was also providing room for interpretation to farmers who may not be in a position to read and write. The study carried out a pilot test to test the validity and reliability of the questionnaires in gathering the data required for purposes of the study.

Data collected was sorted out to ensure completeness and consistency. The data was then analysed using descriptive statistics on various measures of central tendency. The descriptive statistical tool (SPSS) was used to aid the researcher to describe the data. The findings were presented using tables and graphs for further analysis and to facilitate comparison. The quantitative reports were presented through tabulations and measure of central tendency.

The researcher further employed multivariate regression model to study the relationship between financial innovations and financial inclusion among small scale farmers in Kiambu.

The regression model is as follows:
$Y = \beta_0 + \beta_1 X_1 + \varepsilon$ Where:
Y = Financial inclusion
β_0 = Constant Term
β_1 = Beta coefficients
X_1 = Mobile banking
ε = Error term

VI. FINDINGS AND RESULTS DISCUSSION

A. Descriptive statistics

Table 1: Reliability test

Variables	Number Of Items	Cronbach's Alpha
Financial inclusion	5	0.987
Mobile banking	10	0.935

Table 1 presents the results on reliability test. The finding revealed that reliability and internal consistency of the items constituting; Financial inclusion, Mobile banking constructs were established. The individual Cronbach's Alphas for the two items tested were 0.987 and 0.935 respectively. The results were all above the required cut-off minimum value of 0.7; therefore, all the items in the questionnaire were reliable.

B. Response Rate

Table 2: Response Rate

Response Rate	Number	Percentage
Responded	360	91
Non response	35	09
Total	395	100

Table 2 specifies that out of the 395 questionnaires that were administered, 360 were duly filled and picked from the respondents. 35 were not respondent to. The overall response rate was 91 %, which was high and adequate for further analysis.

C. Mobile Banking

Table 3: Mobile banking

Mobile banking	Mean	Std. Deviation
I make deposits through the mobile phone for every daily sale.	3.27	1.074
I withdraw money through mobile phone for petty cash use In case of shortages	3.36	1.111
Am aware of *Fuliza* service, and it helps in emergency times.	3.38	1.093
Am aware of *hustlers fund* service, and it helps in emergency times.	3.22	1.020
I am aware of farmers digi farm application	3.15	1.127
I am able to transact using farmers digi farm application	3.24	1.170
I am aware of mobile wallet	3.17	1.173

I have made some transaction via mobile wallet	3.06	1.074
I use M-Pesa to pay my employees and suppliers	2.97	1.233
I have heard about Farmer micro insurance: Acre Africa, MKopa, FtMA	2.93	1.116

The study aimed to find out the respondent's opinion on various measures of Mobile banking. Table 3, presents the analyzed results which show that on a scale of 1 to 5 (where 1= strongly disagree; 2 = disagree; 3= moderate and 5 = strongly agree). The means were; I make deposits through the mobile phone for every daily sale 3.27, I withdraw money through mobile phone for petty cash use In case of shortages 3.36, Am aware of Fuliza service, and it helps in emergency times 3.38, Am aware of hustlers fund service, and it helps in emergency times 3.22, I am aware of farmers digi farm application 3.1556, I am able to transact using farmers digi farm application 3.2444, I am aware of mobile wallet 3.1778, I have made some transaction via mobile wallet 3.0667, I use M-Pesa to pay my employees and suppliers 2.9778, I have heard about Farmer micro insurance: Acre Africa, MKopa, FtMA 2.9333. the mean implies that majority of the respondents were to the same opinion regarding the various construct of innovations in mobile banking.

D. Financial inclusion

Table 4: Financial inclusion

Financial inclusion	Mean	Std. Deviation
Various financial innovations have made ease access to financial services	3.33	1.087
The available financial technology services enable payment ability.	3.51	1.121
The available financial technology services have increased credit accessibility ability	3.42	1.076
That the cost and charges of transacting though financial innovations is affordable	3.42	1.076
That there is an increase in production of coffee since the development of financial technology.	3.40	1.053

The study sought to examine the respondent's level of agreement or disagreement on the various measures of financial inclusion. Table 4, presents the relevant results which show that on a scale of 1 to 5 (where 1= strongly disagree and strongly agree=5).The means were; Various financial innovations have made ease access to financial services 3.33, The available financial technology services enable payment ability 3.51, The available financial technology services have increased credit accessibility ability 3.42, That the cost and charges of transacting though financial innovations is affordable 3.42, That there is an increase in production of coffee since the development of financial technology 3.40. The results show an element of normal distribution as the mean variance in the various statement was minimal.

E. Regression Analysis

Table 5: Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.922	0.850	0.849	0.40608

Table 5, presents the Fitting Statistics results for the study variables from the results it was observed that the explanatory power of the study variables was R Square 0.850 and Adjusted R-Square 0.849 respectively. The interpretation was that all the variables are statistically significant. Thus they were relevant and were retained for regression level.

Table 6: Analysis of variance

Model		Sum of Squares	df	Mean Square	F	p-value
1	Regression	333.500	3	111.167	674.127	0.000
	Residual	58.706	356	0.165		
	Total	392.206	359			

Table 6, presents the ANOVA results for the study variables from the results it was observed that the ANOVA value was 674.127. The interpretation was that the variables are statistically significant since the associated p =value was found to be 0.000.

Table 7: Regression Results

Variables	Coefficient	Std Error	t-Statistic	P-Value
(Constant)	0.356	0.082	4.347	0.000
Mobile Banking	0.616	0.042	14.821	0.000

$$Y = 0.356 + 0.616 \, X_1 + \varepsilon$$

Where:

Y = Financial inclusion, X_1 = Mobile banking and ε = Error term

From table 7, the regression coefficient of mobile banking was found to be 0.616. This value shows that holding other variables in the model constant, an increase in mobile banking by one unit causes the financial inclusion among small scale coffee farmers to increase by 0.616 units. The value of the coefficient is also positive. The positive effect shows that there is a positive relationship between mobile banking and financial inclusion. The associated p = value was 0.000 for the 14.821 t-statistic which show statistically significance of the mobile banking variable. The variable was thus found to be the most influential variable on financial inclusion among small scale coffee farmers in Kiambu county, Kenya.

VII. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

A. Summary of Findings

The specific objective of the study was to establish the effect of innovations in mobile banking on financial inclusion among small scale coffee famers in Kiambu. All the constructs of Mobile Banking were found to influence financial inclusion among small scale coffee farmers since their descriptive values had values greater than the middle / mean value of 5/2 = 2.5 on the Likert scale. The regression coefficient for the association between innovations in mobile banking and financial inclusion among small scale coffee famers in Kiambu was found to be significant (p<0.05) and positive. **Therefore the study rejects null hypothesis; H0₁. Innovations in Mobile banking have no significant influence on financial inclusion of small-scale coffee famers in Kiambu.** The study finding shows that innovations in mobile banking have greatly lead to financial inclusion among the scaled farmers sampled.

B. Conclusions

The study concluded that Mobile Banking has influence on financial inclusion among small scale coffee farmers. The study found that the farmers were aware of; making deposits through the mobile phone for every daily sale, withdrawing money through mobile phone for petty cash use In case of shortages, usage of Fuliza service helps in emergency times, use of hustlers fund service, helps in emergency times, awareness of farmers digi farm application, ability to transact using farmers digi farm application, awareness to mobile wallet, usage of M-Pesa to pay my employees and suppliers and Farmer micro insurance such as Acre Africa, MKopa, FtMA. This study also concluded that mobile banking was an influential variable.

C. Recommendations

The mobile banking variable was revealed to be an important determinant of financial inclusion among small scale coffee farmers. Financial institutions such as commercial banks, micro finance banks and SACCOs should therefore come up with strategies to ensure that then usage of mobile banking is encouraged the small scale coffee farmers to participate in the financial inclusion initiatives. Since the findings showed Mobile Banking enhanced the financial inclusion among small scale coffee farmers, the central bank, county and national governments should hatch plans to enhance the usage of mobile banking by making sure that there are adequate infrastructure to do so. The key stakeholders should do something to enhance the usage of Mobile Banking to ensure inclusive access to banking services in the country.

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