Determinants of Mobile Fintech Uptake in Kenyan Microfinance Sector

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Original Research Article

ABSTRACT

The Kenyan microfinance sector faces many challenges such as high operation costs, increased credit risk, low visibility and poor understanding of emerging technology opportunities and risks among others. These problems are persistent due to low levels of innovation and limited uptake of digital financial technologies. This research aimed to identify the determinants that influence uptake of mobile fintech and propose an appropriate model for uptake of mobile fintech within the sector. A descriptive survey of all 30 Microfinance institutions registered with Association of Microfinance Institutions (AMFI) 2018 in Kenya was carried out. Data was collected using questionnaires from 120 respondents. Data was analyzed using descriptive and inferential statistics. Based on correlation model, this study established that technology factors (r=0.862, $P<.05$), environmental characteristics (r=0.387, $P<.05$) and organizational factors (r=0.256, $P<.05$) have a strong influence on the uptake of mobile fintech. Using regression model, technology factors (β=.563, $P<.05$), organizational factors (β=.281, $P<.05$) and environmental characteristics (β=.562, $P<.05$) all have positive and significant influence on uptake of mobile fintech. These factors include technology availability, perceived technology benefits, organization size, resources availability, and competition, regulatory and legal environment among others. Uptake of mobile fintech was found to reduce

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operation costs and improve business operations efficiency. Understanding of the factors derived in this study will help microfinance institutions, software developers and policy makers as they develop strategies directed at promoting successful implementation of mobile fintech.

1. INTRODUCTION

Digital disruption is affecting every sector of economy including the banking industry which has been traditionally recognized as conservative. Today the market place is highly competitive with volatile business environment for all financial institutions ranging from big players like banks to players like microfinance institutions. The emergence of financial technology (fintech) is disrupting the financial markets by creating new business models and new markets [1]. Fintech generally refers to the application of innovative technologies to the financial services industry. These technologies are characterized by flexibility, speed and agility which is allowing financial institutions to provide better, faster and highly customized services to their clients in a more flexible and cost-effective manner. As result, fintech have gained attention from the industry players particularly among the banks for making delivery of financial service more flexible and affordable. The potential of fintech to successfully drive financial inclusion has become apparent [2].

Microfinance mainly refers to small-scale financial services provided to the people who are in the lower tier of the economic pyramid. Microfinance institutions provide financial capital to the people in the local level resulting in increased entrepreneurial activity which in turn result in economic growth and poverty alleviation [3]. Microfinance organizations need to understand the digital technology innovations and adopt them in their business strategy to improve their market share and promote financial inclusion. The business environment is also fast changing yet uncertain, implying that these institutions need adapt their way of doing business to the new trends effectively and efficiently [4]. In addition, the booming use of internet and smart-phones combined with variety of digital habits globally will have a lever effect which is difficult for traditional financial institutions to anticipate. Therefore, these institutions need to understand the implications of the disruptive technologies on their business and adopt the current financial technologies in order to be efficient and effective in their operations [5].

In Kenya, microfinance is one of the significant sectors with profound effect in the economy. However, the sector is plagued by many challenges among them increased credit risk, low visibility of the institutions, poor understanding of emerging technology opportunities and risks, increased need for customer centricity and declining financial income [6]. These challenges can be resolved by the industry players adopting emerging digital innovations such as fintech to improve financial efficiency of their businesses. Global Findex Data [7] emphasizes that the opportunities toimprove financial inclusion among the unbanked exist in leveraging the new digital technologies. Therefore, there is need for Kenyan microfinance institutions to uptake the emerging digital financial technologies for cost effective service delivery. Better understanding of the factors that influence mobile fintech uptake is thus critical.

In addition, fintech is an emerging technology whose interest has increased considerably in the past five years, with significant research gaps and much work to be done [8,9]. This study is thus designed to fill the gap by establishing the mobile fintech uptake situation in Kenyan microfinance sector. Understanding the factors and conditions that influence the uptake of mobile fintech by microfinance will provide researchers and practitioners with insights to devise strategy to promote their uptake.

2. LITERATURE REVIEW

2.1 Mobile Fintech

Fintech is a phenomenon of levied combination between finance and technology. The term broadly refers to use of technology innovations in provision and delivery of financial services. While technological innovations in the financial industry is not a new thing, since well-established innovations like the ATMs (automated teller machines) were introduced more than a decade

ago, fintech refers to novel digital innovations and business models that bear disruptive potential for the financial industry. Thus, Fintech can be described as range of emerging digital technologies in the financial service industry which are facilitating unprecedented connectivity with users and revolutionizing financial intermediation. It comprises of all financial products and services created on highly innovative and disruptive technologies and delivered to consumers through digital channels [10,11,12].

Mobile fintech refer to mobile technology based innovations that are applied in financial services delivery. Mobile technology is a form of information technology that supports computing on the move through use of portable devices and wireless networks. There are various mobile fintech solutions for different areas within the financial sector like banking fintech, insurance industry fintech specifically known as Insurtech, asset management, crowd funding, crypto currency, investment management, credit scoring, marketplace lending, payments, money management, information and advisory, trading, real estate and equity markets fintech. Mobile banking is an example of mobile fintech innovation that has been widely used by financial institution as a strategic tool for growth [13]. Payments and lending are the other major areas in finance that mobile fintech have profound effect. The key development is electronic payments systems which allow people to make payments with no cash involved [14]. Some of the channels of payments provided by mobile technology include the following: mobile payments, peer-to-peer payments, e-wallets like Apple Pay, m-wallets, digital currencies etc. In lending, mobile fintech provide digital lending platforms where underwriting is automated and lending decisions are made by use of computer algorithms [15]. Mobile fintech can be used throughout the process of lending from client on-boarding, credit assessment to loans disbursal.

While quite effective and flexible in providing services in novel ways, fintech solutions have a major limitation, which is market concern over data security. Since new technologies cannot be fully tested and validated beforehand, there have been challenges of building solid trust on fintech innovative services [16]. In addition, with the increased levels of cyber threats, there is increased risk related to cyber fraud, customer information confidentiality and potential service disruption.

2.2 Mobile Fintech in Microfinance Institutions

Ongoing digital technology innovations are contributing to reshaping the microfinance sector in different ways ranging from the operation models, industry tradition practices, risk profile to even regulation structures. Here are some examples of mobile fintech innovations use and impact in the microfinance business.

Studies on Indian microfinance sector documented successful application of fintech solutions in lending and payments processes. Fintech solutions such as psychometric credit assessment were being used for credit assessment and mobile financial services used in loan disbursement and collections. This helped greatly in increasing outreach and improving operation efficiency of the institutions [17]. Use of cashless digital payments reduced the risk of cash-based transactions and improved operation efficiency and cost saving. Use of cashless models was reported to have reduced risk of errors and fraud in loan disbursements and repayment, reduced turnaround time and made reconciliation tasks easier due to data shared by technology service providers [17].

Use of mobile based fintech was shown to mitigate the microfinance marketing inefficiencies in emerging markets. A research on Ghanian microfinance institutions reported that using mobile banking enabled the clients to have a cost effective, convenient and flexible channel to access microfinance services. Mobile money wallets allowed the clients to make easy payments and funds transfer. Use of these fintech provided the microfinance institutions with real-time business intelligence which could be used to enhance the effectiveness of the channels, improve credit analysis data and improve market place information [18].

Use of technology in microfinance could ignite disruptive models which would promote self-sustainable growth [19]. Use of mobile apps and B2C social apps could be conveniently used to link microfinance institution with their clients increasing their outreach while cutting the operation costs. microfinance institutions can also increase their visibility through social networks and other technology enabled communication like through use of SMS which is cheaper. Peer-2-peer social lending could also

be leveraged by microfinance institutions to transform how they mobilize for deposits and distribute funds to their clients [19].

In Islamic microfinance institutions, adoption of m-payments fintech has provided improved performance as a result of effectiveness and efficient in terms of cost, time and services offered. The m-payment systems provide borrowers a different channel to make loan payments. These systems have enabled easy and convenient reach of customers in remote areas as well as enabling customers to repay funds at any time of the day. This has saved the customers the time and costs of having to visit the microfinance institution branch and reduced the need for many staff in the branch [14].

Though uptake of mobile fintech has benefits to the microfinance industry, some emerging challenges have also been identified. One major issue is the increased competition from the technology-driven fintech companies and the mainstream banks due to increasing overlap of markets. Fintech lenders are providing micro-credit to underserved markets. Mainstream banks are able to overcome the hurdle of costs and information asymmetry through use of these technologies hence they can better target clients and provide micro-credits. The fintech solutions are fast blurring the boundaries within and outside the usual market increasing competition [17]. Other challenges include reduced human interaction in the microfinance business as operations get increasingly digitalized. Physical interaction between client and loan officers in the microfinance business has always been known to help the clients overcome their reluctance to participate and also helps loan officers to reduce the probability of delinquency. These challenges are however outweighed by the efficiency benefits especially for large microfinance institutions with large-scale transactions.

2.3 Mobile Fintech Uptake Factors

There are streams of research studying different aspects of technology innovations uptake in IT literature. Although various factors have been identified by researchers to affect technology innovations uptake in financial sector, the factors are not consistent across all studies.

Park & Choi [20] examined digital innovation adoption and its economic impact. Their findings show that technological innovation capabilities took time to show impact in terms of economic

growth than the other factors. They suggested policy perspective in building innovation strategy that directly affects the economic growth of nations. Kauffman & Riggins [21] have demonstrated use of ICT for microfinance sustainability by discussing the role and impact of ICT at the customer, institutional, donor, and industry levels.

A research conducted in Sudan [22] to explore the factors which influence adoption of m-banking in the country's microfinance sector, revealed that the following variables influenced m-banking implementation: ICT infrastructure, financial resources, ICT expertise, organizational size, perceived benefits, top management support, government support, regulatory environment, market and products, business model.

Bultum [23] conducted a study to identify factors that influence Ethiopian banks uptake of e-banking. The findings revealed that factors like regulatory framework, competition from local and foreign banks, IT infrastructure lack and security risk significantly impacted e-banking adoption by Ethiopian banks. The work of Chuang, Liu & Kao [24], using theory of reasoned action extended to include service trust and brand, sought to explain the consumer behavioral intention effect in fintech service usage, revealed that the determinants of behavior intentions are perceived usefulness, service trust, perceived ease-of-use and brand significantly affected attitudes towards using positively. Kim et al. [25] study also supported that the usefulness, convenience and ease-of-use were the most critical variables influencing adoption of payment-type fintech service.

A survey by Mbogo [26] on attributes that influence successful mobile payments adoption by micro-business operators showed that convenience, cost, accessibility of service and security factors influenced the intention to use and actual usage. Liébana& Rubio, [27] research to explore mobile payment adoption from the merchants' perspective through predictive and explanatory modeling highlighted utility of the mobile payment systems, perceived use-advantage, experience with tradition payments systems, income of the company and the number of employees as the five variables most significant in the intention to use m-payment services. Ryu [28] identified economic benefit as the most common and consistent motivation for adoption. The economic benefit was in terms of

lower capital and transactions costs as compared to traditional financial services.

2.4 Theoretical Frameworks

This study reviewed the following theoretical frameworks for adoption of technology innovations to inform the appropriate research framework for this study: Technology Acceptance Model (TAM) [29]; Diffusion of Innovation Theory (DOI) [30]; Disruptive Innovation Theory; and Technological, Organizational and Environmental (TOE) model [31].

TAM is a model largely applied in studies to predict adoption of fintech like mobile payments, from the individual's level [24,28,25,26]. TAM does not consider external variables such as impacts from technology providers, monetary resources and clients [32]. In addition, firm level factors such as size of the organization, culture and beliefs which influence adoption of technologies are not considered.

Some literatures have proposed Disruptive Innovation Theory(DOI) as relevant to explain adoption of technological innovations in the finance industry specifically in banks due to the disruption happening in the industry as a result of new technological innovations [33,32,34]. DOI explains why adoption of fintech by microfinance institutions is important however it does not include the aspects of how and what variables influence the process of innovations adoption. The DOI model posits that at the firm level, adoption of innovations is linked to variables like internal structural characteristics, individual (leader) characteristics and external characteristics of the organization [30]. Although this model considers salient aspects of adoption like communication system, the innovation itself and social system, it does not include the organization's environment context which is crucial for microfinance sector due to the ongoing disruptive changes in the financial sector.

Technology-Organization-Environment (TOE) framework explains the attributes of technological innovations adoption from the firm level. The model identifies three perspectives of enterprise's context; technological context, organizational context, and environmental context, whose attributes influence the enterprise uptake and implementation of a technological innovation. This model is one of the prominent theories in IS literature from which many researches on IT adoption at the firm level are derived [35,36]. It has been used in many empirical studies on various IS domains and has demonstrated broad applicability in understanding the adoption of IT innovation with consistent empirical support [36]. TOE is flexible and can be extended to accept more constructs that influence technology innovation adoption and thus can be applied for different research contexts [35].

2.5 Research Framework

Based on the models reviewed earlier and the related empirical studies on fintech, the possible constructs to develop a conceptual framework and develop the relationship between variables were then selected, this study adopted the Technological-Organizational-Environmental (TOE) model as the theoretical basis. In studies building on TOE model, the dependent variable is technological decision making. The independent variables are three categories of business contexts (technology, environment, and organization) that influence the way technology innovations decisions such as to adopt and use are made [35,36].

The *Technology* context was operationalized by technology availability and technology features such as relative advantage, compatibility with existing infrastructure and complexity (the extent to which the technology is perceived as relatively difficult to introduce, learn and operate).

The *Organization* context refers to the attributes that describe the enterprise such as scope, size and organization structure. In this study, the following factors for mobile fintech uptake were used: firm size, resource availability and organizational structure complexity (formal and non- formal linking).

The *Environmental* context describes the internal and external environment in which the organization conducts its business. The environment comprises its industry, the competitors and governmental regulations. In this study, this context is operationalized by following factors; government regulation and technology legal environment, industry characteristics and market structure in terms of competitive pressure and availability of technology support infrastructure in the environment such as availability of reliable internet and telecommunication infrastructure.

From the above argument, the hypothesized relationships between the variables are as follows:

H1: External environment relating to the firm significantly influences mobile fintech uptake decision making.

H2: An organization's characteristics influences mobile fintech uptake decision making.

H3: *Technological factors highly contribute to mobile fintech uptake decision making*

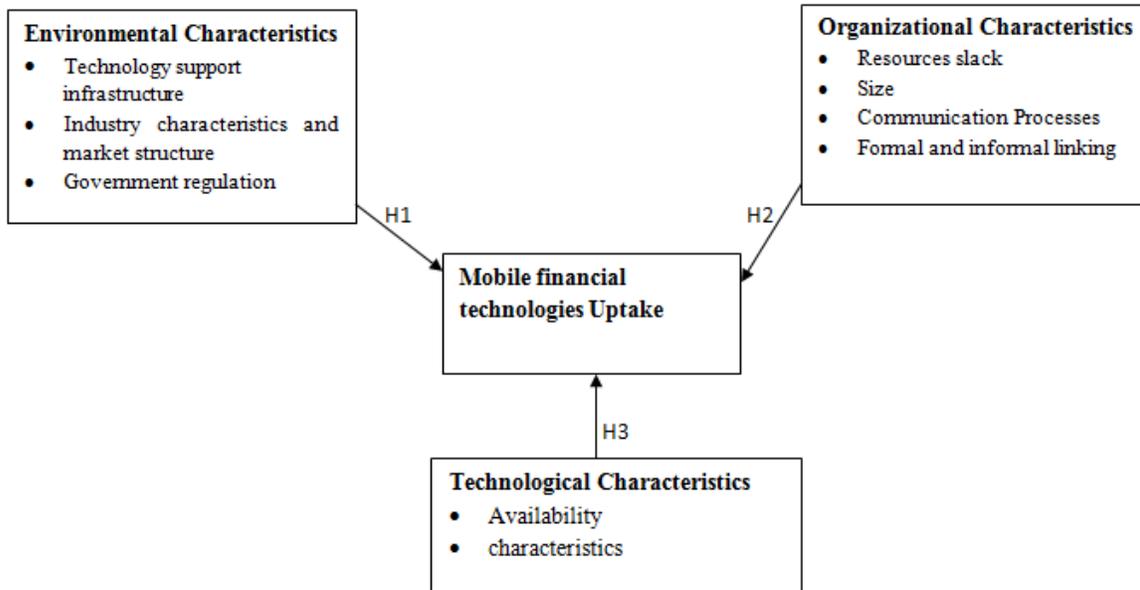The research framework as implied by these hypotheses is as presented in Fig. 1.

Environmental Characteristics
- Technology support infrastructure
- Industry characteristics and market structure
- Government regulation

Organizational Characteristics
- Resources slack
- Size
- Communication Processes
- Formal and informal linking

H1

H2

Mobile financial technologies Uptake

H3

Technological Characteristics
- Availability
- characteristics

Fig. 1. Research model

3. RESEARCH METHODOLOGY

3.1 Research Strategy

A descriptive survey strategy was adopted for this study. The study population included all microfinance institutions in Kenya that were registered with the Association of Microfinance Institutions (AMFI) by year ending 2018. Target respondents were staff and managers in the IT, Accounting and Finance departments. At least four respondents from every microfinance institution were targeted from each firm. Justification for this was based on the argument that the IT and finance managers are mostly the ones involved in decision making concerning technology- related matters in such organizations and the other personnel are the main technology users. Therefore, these respondents were well positioned to give required information sought by the study. Justification for the adopted research strategy was in terms of being economical when collecting data from a large population sample for analysis to look for patterns that can be generalized to the larger population.

3.2 Data Collection

Questionnaires were distributed to respondents using pick-and-drop-later method or through email. Both qualitative and quantitative data was collected. There were close and open-ended questions used for effectively gathering qualitative and quantitative data respectively. The closed questions used five point Likert scale format. Use of questionnaire was considered more efficient method in comparison to other data collection methods like interviews and focus groups. Out of 120 questionnaires distributed to respondents, 92 were filled and returned which was76.7% response rate.A response rate of above 50% is adequate in descriptive research [37].

3.3 Data Analysis

Data was analyzed using both descriptive statistics and inferential statistics with the help of Statistical Packages for Social Scientists (SPSS) software. Descriptive statistics involved calculation of percentages, frequencies and measures of central tendency (mean) and dispersion (standard deviation). Inferential statistics analysis (correlation analysis and regression analysis) were used to establish the relationship between the set of variables.

To ensure reliability of data collected the research questionnaire was subjected to peer reviews and three colleagues to remove ambiguities to allow self-administration and increase reliability. A pilot study was also done to gauge the relevance of the questions and necessary adjustments were made. Cronbach's alpha coefficient was used to determine reliability of the instruments. To evaluate the mobile fintech uptake determinants the following linear multiple regression model was used:

$$Y= \alpha +\beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 +e$$

Where:
Y= Mobile Fintech Uptake
α = is the regression coefficient/constant/ **Y**-intercept, (autonomous factors)
βs represents the beta coefficients of the independent variables (the slopes of the regression equation)
β_1 = Coefficients of Technology
β_2 =Coefficients of Organization
β_3 = Coefficients of Environment
$X_1 =$Technology X_2 =Organization
X_3 =Environment e= Error term

Confirmatory factor analysis was used to validate the model. All statistical tests were conducted at 5% level of significance (95% confidence level).

4. RESULTS AND DISCUSSION

4.1 Mobile Fintech Uptake in Kenyan Microfinance Sector

The study established that Kenyan microfinance institutions used mobile fintech where 73.3% adopted SMS (short message service) banking, 70% USSD (unstructured supplementary service data)-based mobile banking, 16.7% mobile App banking and lastly 6.7% mobile digital passbook. The findings are similar to Mazer & Rowan [38] who found that in Kenya, unstructured supplementary service data (USSD) technology is the dominant m-banking services front-end technology. The USSD and SMS banking mobile fintech are mainly used because of low cost of service and provide financial service to users on nearly any phone. This is unlike the case of mobile app and mobile digital passbooks which can only be used on Smartphone. This explains the low uptake of mobile app and mobile passbooks fintech. The firms reported use of mobile fintech solutions in loans disbursal, loan repayments collections, credit scoring as well as in customer accounts management.

4.2 Determinants of Mobile Fintech Uptake in the Kenyan Microfinance Sector

The findings of this research show that factors of technology, organization and environment contexts of the firms are the determinants of mobile fintech uptake. These factors are technology availability, technology relative advantage and characteristics, organization size, top management support, availability of resources and formal or non-formal linking structures of the firm, availability of supporting infrastructure, market structures, competitive pressure, government support and regulatory policies. Use of technology in the financial institutions was found to bring about efficiency in conducting internal business processes and reduced cost of operations. Technology relative advantage findings concurs with Wijesiri & Meoli [39] and Mbogo [26] studies who identified that economic and efficiency benefit of technology was a critical factor for technology uptake decision making. Organization size findings concurs with Muthinja & Chipeta [40] and Ammar & Ahmed [22] studies. The findings of Ammar & Ahmed [22] support top management support as a factor influencing technology adoption. Importance of availability of resources in technology uptake decision making in organization is supported by Liébana& Rubio [27] and Ammar & Ahmed [22] studies.

Formal or non-formal linking structures of the firm in Kenya influences adoption of technology in Saccos [21]. Availability of supporting infrastructure finding is in line with Ammar & Ahmed [22] study as one of the important variables that influenced m-banking implementation. Government support and regulatory policies findings are in line with Muthinja & Chipeta [40] and Ammar & Ahmed [22] studies that enabling regulatory environment

and government support influence firms' decision to adopt technology innovations. Bultum [23] study support the findings of competitive pressure, regulatory framework and government support as influencing factors in uptake of mobile banking.

4.3 Hypothesis Testing

Based on the correlation and multiple regressions, a more elaborate analysis of the relationship between variable sets is facilitated. The sets of variables in this study are technology factors, organization factors and environment factors which this research aimed to establish their relationship with mobile fintech uptake. Correlation model was used to evaluate the relationship between the identified factors and uptake of mobile financial technologies in microfinance institutions. The variable sets were analyzed to assess what they add to the prediction of the dependent variable.

As shown by Table 1, study established that technology factors (r=0.862, $P<.00$) has a strong influence on the uptake of mobile fintech.

Environmental characteristics (r=0.387, $P<.0001385$) and organizational factors (r=0.256, $P<.0137747$) are positively correlated with the uptake of mobile fintech. It was thus deduced that there exists positive relationship between the identified factors and the uptake of mobile fintech among microfinance firms.

Multiple regression was used to analyze how the identified factors affect the mobile financial technologies uptake among the Kenyan microfinance institutions. As shown in Table 2, the factors have an R square value of 0.790 which implies 79.0% change in uptake of mobile fintech among microfinance firms is explained by environmental characteristics, technology factors and organizational factors.

Further analysis of variance (ANOVA) findings was conducted at 5% level of significance as shown in Table 3. The ANOVA findings show that the value of F calculated is 110.350, which implies that the overall regression model was significant in estimating. Thus, the model was stable in predicting the factors influencing mobile fintech uptake.

Table 1. Correlation analysis

		Uptake of Mobile Fintech	Technology factors	Organizational Factors	Environmental Characteristics
Uptake of Mobile Fintech	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	92			
Technology factors	Pearson Correlation	.862**	1		
	Sig. (2-tailed)	.000			
	N	92	92		
Organizational Factors	Pearson Correlation	.256*	.262*	1	
	Sig. (2-tailed)	.014	.012		
	N	92	92	92	
Environmental Characteristics	Pearson Correlation	.387**	.253*	.723**	1
	Sig. (2-tailed)	.000	.015	.000	
	N	92	92	92	92

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed)

Table 2. Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.889a	.790	.783	1.78485

a. Predictors: (Constant), Environmental Characteristics, Technology factors, Organizational Factors
Source; Research Data (2019)

Table 3. Analysis of variance

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	1054.617	3	351.539	110.350	.000b
Residual	280.340	88	3.186		
Total	1334.957	91			

a. Dependent Variable: Uptake of Mobile Fintech
b. Predictors: (Constant), Environmental Characteristics, Technology factors, Organizational Factors
Source; Research Data (2019)

Table 4. Regression coefficients

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	-11.316	3.848		-2.941	.004
Technology Factors	.563	.034	.832	16.364	.000
Organizational Factors	.281	.106	.188	2.644	.010
Environmental Characteristics	.562	.128	.313	4.403	.000

a. Dependent Variable: Uptake of Mobile Fintech
Source; Research Data (2019)

Table 5. Hypothesis testing

Hypotheses	Beta (β) and correlation coefficients (r) and p-values (p)	Remarks
H1:External environment relating to the firm significantly influences mobile fintech uptake decision making.	(β=.562, r=0.387 &*P*<.05)	Accept Hypothesis
H2: An organizations characteristics influences mobile fintech uptake decision making.	(β=.281, r=0.256 &*P*<.05)	Accept Hypothesis
H3:Technology availability and technology features highly contribute to mobile fintech uptake decision making	(β=.563, r=0.862 &*P*<.05),	Accept Hypothesis

Source; Research Data (2019)

Table 4 shows the findings on the regression beta coefficients and the *P* values signifying significance. Thus, it can be shown that technology factors (*β*=.563, *P*<.05), organizational factors (*β*=.281, *P*<.05) and environmental characteristics (β=.562, *P*<.05) all have positive and significant influence on uptake of mobile fintech. The finding is consistent with the correlation results where all the identified factors had a significant andpositive link with uptake of mobile fintech among microfinance firms.

Table 5 summarizes the testing of hypotheses based on the findings of correlation and regression analysis.

The study therefore accepts all the hypotheses formulated. It is thus concluded that external environment relating to the firm significantly influences mobile fintech uptake decision making. An organizations characteristics and resource availability influences mobile fintech uptake decision making. Technology availability and technology features highly contribute to mobile fintech uptake decision making.

5. CONCLUSION AND RECOMMENDA-TIONS

5.1 Conclusion and Implications

The research concluded that in uptake of mobile fintech, key factors of the technological, organizational and environmental contexts of an organization are critical. Technology factors for example availability and relative advantage of the technology are the major factors influencing the

level of uptake. The environmental factors such as competition create the need for organizations to implement mobile fintech. Organization factors such as organization size and resource availability influence speed and level of uptake. Technological advance in the organizations leads to increased productivity and growth. Thus, with uptake of mobile fintech, microfinance firms will be able to provide cost effective, convenient and flexible services to their clients hence promoting financial inclusion. However, the level of mobile fintech uptake in the Kenyan microfinance sector is still low. The firms acknowledge the need to utilize technology in operations to maintain competitiveness. There is efficient and affordable technology support infrastructure in the market (e.g. Fibre optic cabling, reliable internet access) to support mobile fintech uptake.

A critical reflection of the existing research has demonstrated overlaps and differences in the findings. Results on mobile fintech uptake overlap with finding on uptake of other technology innovations in firms. However, no previous studies have explored the specific uptake of mobile fintech in the Kenyan microfinance sector. Evaluation of theoretical frameworks and empirical data against existing knowledge shows that this study provides new insights that contribute both to theory and practice. For practice, the study has application in firms, policy making and fintech developer's dimensions.

For policymakers, valuable insights are offered to help them devise policies that will increase mobile fintech acceptance and use in Kenyan microfinance sector. Understanding of the factors derived in this study will help microfinance institutions and software developers as they develop strategies directed at promoting successful implementation of mobile fintech. The microfinance management will wield it to enhance the effectiveness of their current digital innovation strategy. The study provides up-to-date content to new entrants looking to enter the microfinance service industry as well as existing providers within the industry. The main theoretical contribution is adding new information to the knowledge about fintech specifically the factors that influence uptake of mobile fintech by microfinance sectors. Fintech in business world is an emerging topic and there is limited understanding of its concepts and significant research gaps in the area [8,9]. This study addresses the current literature gap and contributes to existing knowledge in mobile fintech.

Mobile fintech uptake by microfinance institutions is central to promoting financial and operations efficiency and consequently financial inclusion. It is evident that with uptake of mobile fintech, microfinance firms will be able to provide cost effective, convenient and flexible services to their clients hence promoting financial inclusion. Increased financial inclusion is very important for the achievement of the sustainable developments goals (SDGs). Klapper, El-Zoghbi& Hess [41] asserts that the influence of financial inclusion on development is increasingly becoming clear. Financial inclusion plays a major role as an enabler of conditions that facilitate achievement of the SDGs. Findings of this research show that uptake of mobile fintech by microfinance institutions reduce operation costs and increase their market share which means increased financial inclusion. Therefore, this research is timely to help policy makers and microfinance management promote financial inclusion for economic development.

5.2 Recommendations

These are the recommendations based on the research study:

1. The top management of Kenyan microfinance institutions should be highly involved in formulating the IT strategy and support fintech solutions implementation.
2. IT infrastructure should be enhanced for mobile fintech systems to run efficiently.
3. Microfinance firms should have an appropriate mobile fintech implementation strategy which should be aligned to the general organization's strategy.
4. Adequate resources should be availed by firms' management for effective implementation of mobile fintech. This can be implemented by having an annual IT budget that can be used to acquire necessary technology infrastructure and new mobile fintech solutions
5. Microfinance institutions should hire competent staff with skills and competency to implement the mobile fintech solutions and perform necessary technology upgrades.
6. Government and policy makers should improve policies to battle cybercrime and strategies to promote technology uptake in financial sector.

7. Microfinance institutions should train technical staff and other employees on risks involved in use of mobile fintech solutions and develop risk management mechanisms.

5.3 Suggestions for Further Studies

Further studies should determine how uptake of mobile fintech is affecting the microfinance business model as well as other disruptive technologies that microfinance can implement to increase financial efficiency and improve financial inclusion in Kenya.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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