

MOBILE PHONE USAGE AND ITS IMPACT ON PERFORMANCE OF MICRO AND SMALL ENTERPRISES IN THE KENYAN INFORMAL ECONOMY

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Abstract

Micro and Small Enterprises are contributing a lot to the Kenyan Growth Domestic Product, yet their longevity is debatable and the owner's livelihoods are vulnerable. The mobile phone is the most widely used Information and Communication Technology tool in the informal economy. However, studies done on the role of Information and Communication Technologies in micro businesses tend to concentrate on computers and internet usage. Furthermore, contradicting results have been given on the benefits of using these Information and Communication Technologies. Empirical evidence on the role of mobile phones usage in e-commerce among Micro and Small Enterprises in Kenya is lacking. This study attempted to narrow this knowledge gap. Cross-sectional research design and line transect sampling method was used to identify the 384 respondents who were interviewed from 8 sub-counties of Nairobi County. The linear probability model, logit, and probit models were used to estimate the results. The findings of the study show that the usage of mobile phones in business has a significant effect on sales of Micro and Small Enterprises. The characteristics of the owner managers of Micro and Small Enterprises and their locations have no impact on their sales; however, having a business plan has an effect on the sales. The study recommends that Micro and Small Enterprises should be trained in best management practices which should follow an interdisciplinary approach that takes into account the environmental and social dimensions of the mobile phone users in the informal economy.

Key words: Mobile Phone Usage, Micro and Small Enterprises, Informal Economy, Sales, Logit and Probit Model

INTRODUCTION

United Nations Economic and Social Council (2009) report stated that mobile phones are important tools for development in poor countries because of their ability to bypass the infrastructure barriers in remote rural areas in Africa. Furthermore, the rapid advancements in technologies and the ease of usage in addition to falling prices of mobile handsets, present the mobile phone as an appropriate and adaptable Information and Communication Technology (ICT) tool to bridge the digital divide. The Information Economy Report (2007-2009) stated that mobile telephony had emerged as the most important ICT for developing countries, and its increased diffusion points to the mobile phone as a “digital bridge” between developed and developing countries. McCoy and Smith (2007) argue that people in developing countries are welcoming mobile phones as life changing devices. The basic question underlying the formulation of this study was whether or not the use of mobile phones in the informal economy in Kenya improves performance of Micro and Small Enterprises (MSEs). A mobile phone is an electronic telecommunications device which connects to a wireless communications network through radio wave or satellite transmissions. It is used to provide voice communications, Short Message Service (SMS), Multimedia Message Service (MMS), and Internet services among many other usages (Litondo, 2013).

Informal Economy

The informal economy is that section of an economy that is neither taxed, nor properly monitored by government agencies. Unlike the formal economy, the economic activities that are engaged in the informal economy are largely not included in the gross national product (GNP) and gross domestic product (GDP) of a country (Frey and Schneider, 2015). There is a lot of concern about the informal world economy because of its significant contribution to the global workforce and economy. Vanek *et al* (2012) stated that informal employment accounts for more than 50% of non-agricultural labour force in most developed regions and 82% of non-agricultural workforce in South Asia. Currently, scholars are focusing on developing holistic frameworks that take into account all perspectives of informality and all different types of informal labour force. Nevertheless, social scientists are concentrating on the livelihoods of the informal economy and what motivates its different components, as well as the linkages between informal and formal economies (Chen, 2006).

It is important to note that there is no consensus on the multiplicity of policies suggested to support the informal economy even though they may all produce positive results. Policies have failed to come up with a comprehensive strategic plan to poverty eradication (Tokman, 2007). A general understanding of informal economic activities is founded on the fact that the

major players are micro businesses which are operating beyond the prevailing regulatory systems. Furthermore, they do not comply fully with legal or administrative requirements and regulations. This is largely due to lack of clear development policies and specifically due to limited access to credit facilities, training and development, and market for their products and services (Litondo, 2013). Ondieki *et al* (2013) explained that the informal sector provides reasonably priced goods, services, income and employment to a number of people. It is for this reason that there is interest and concern by the government, researchers and development agencies for the performance of micro businesses.

Micro and Small Enterprises

Micro enterprise is a firm, trade, service, industry or a business activity which employs less than ten people and whose annual turnover does not exceed five hundred thousand shillings, while small enterprise is a firm, trade, service, industry or a business activity which employs between ten and fifty people and whose annual turnover ranges between five hundred thousand and five million shillings (Republic of Kenya, 2012). MSEs play a key role in the economic and social development in Africa. For example 90% of the businesses in Kenya are MSEs and generate so much wealth and employment in the country. They are widely regarded as important players of the Kenyan economy (Wanjohi & Mugure, 2008). MSEs are responsible for promoting basic economic growth and sustainable development (Pelham 2000; Ondieki *et al*, 2013; and Reinecke, 2002). The informal sector in Kenya has the potential of bringing millions of people from the survivalist level to the mainstream economy. The National Base Line Survey of 1999 indicated that, despite the increase in the number of micro businesses, many of them stagnate or fail altogether. The survey shows that only 38% of the MSEs were expanding while 58% had not added workers, and many others were most likely to close in their first three years of existence.

The concept of environment includes the forces that regulate the operations of an enterprise which can be either internal or external to the business. Given the important role of entrepreneurship in micro business development, some research findings indicated that external environments can be hostile to these businesses in developing countries (Ntakobajira, 2013; and Smallbone & Welter, 2001). Environmental factors like, the limited resources, informal social networks, limited capital, and low rate of market reforms in developing economies can constrain MSE performance (Njeru *et al.*, 2012). Fogel and Zapalska (2001) emphasized that macro-economic policies and procedures contributed significantly on to the performance of MSEs. For example, there is evidence to suggest that fixed capital formation in MSEs is a function of external financial resources. Therefore, weak financial markets have a negative

impact on the performance of MSEs. There is evidence to suggest that countries with minimum legal and institutional barriers are more likely to constrain the performance of MSEs in the informal economy (Nalyanya, 2012; and Kenya Economic Report, 2013).

Mobile Phone Usage

A mobile phone is a unique ICT tool that has become part and parcel of many people's lives. It is a simple and integrated ICT tool. Mobile phones can be with the users at all times because of their portability and convenience (Molony, 2006). To date, mobile phones are used to market various products and services online to the convenience of the buyer and seller. The regular use of mobile phones in the day to day activities has contributed significantly to the improvement of living standards of the people (Okello *et al*, 2010). Therefore, there is need to investigate the benefits of mobile phone because they are changing people's livelihoods (Wei, 2007). Litondo (2013) and Esselaar *et al.* (2007) asserted that the major development in ICT sector is the use of mobile phone in micro businesses. Rapid usage of various mobile phone services has characterized the Kenyan economy (Muto & Yamano, 2009). This has been enabled by the easy access to mobile phones and their steady progress in technological innovations. For instance, mobile phones can be used to access various information such as news, weather reports, timetables, traffic information, and internet services (address and number inquiry, nearest service location, geographical maps, routes etc). These are among the many services that create high utilization value and help mobile phone users to improve their business performance.

Mobile Phone Services

In the 21st Century, the future of mobile phone services is promising, revealing more opportunities to bring positive changes and progress to the world. Mobile phone services have fundamentally improved the livelihoods of MSEs which are brought about by e-commerce. Donner (2009) highlighted different livelihood functions of mobile phones as agricultural extension services, market information systems, virtual markets, financial services and direct livelihood support. Mobile banking is one of the key ICT innovations, which has manifested itself in various ways cutting across numerous sectors of economy and industry. Majority of regular M-banking users are MSEs which are struggling to survive in the informal economy. This sector happens to have the higher percentage of business people without traditional bank accounts. M-banking services are alternative to mainstream bank accounts (Pénicaud, 2013).

Mobile phone-enabled financial services and mobile payment systems are rapidly expanding in developing countries (Omwansa & Sullivan, 2012; and Klapper & Singer, 2014).

These systems are often initiated by mobile network operators which have the necessary communications and distribution network to run the services. More advanced mobile financial services are generally linked to local commercial banks (Ndiwalana *et al.*, 2011). M-payments are used to pay for utility bills such as water or electricity or insurance premiums. The success story of mobile banking is M-Pesa which is m-payment system launched in 2007 by the Kenyan mobile network operator Safaricom in conjunction with Vodafone (Omwansa & Sullivan, 2012; and Moyer, 2010).

Chowdhury and Wolf (2003) assessed the use of ICTs and their impact on the economic performance of MSEs of Kenya, Uganda and Tanzania and thereby found out that investment in ICTs had a negative impact on labour productivity and positive impact on general market expression. Further, investigation was recommended to reveal the contemporary factors that influence the link between ICTs and MSEs' performance. However, Donner and Escobari (2009) argued that mobile phones improve the performance of MSEs and investing in the mobile phone is not a constraint to the owner.

Mwaura (2009) asserted that mobile phones in Kenya were used by micro enterprises for both business and social purposes which were found to increase profits in business and enhance social networks respectively. Mobile phones play the same role that fixed-phone networks played in facilitating growth in Europe and North America in the twentieth century. Moreover, increased access to the mobile phones, drives the economic growth in developing countries (Mendes *et al.* 2015). Nevertheless, the current supporting evidence on the potential of mobile phones to increase productivity of MSEs is scarce, methodologically heterogeneous and economically unreliable, for example, there is a difference between using the phone to checkout market situations and using it to bypass middlemen (Donner and Escobari, 2009).

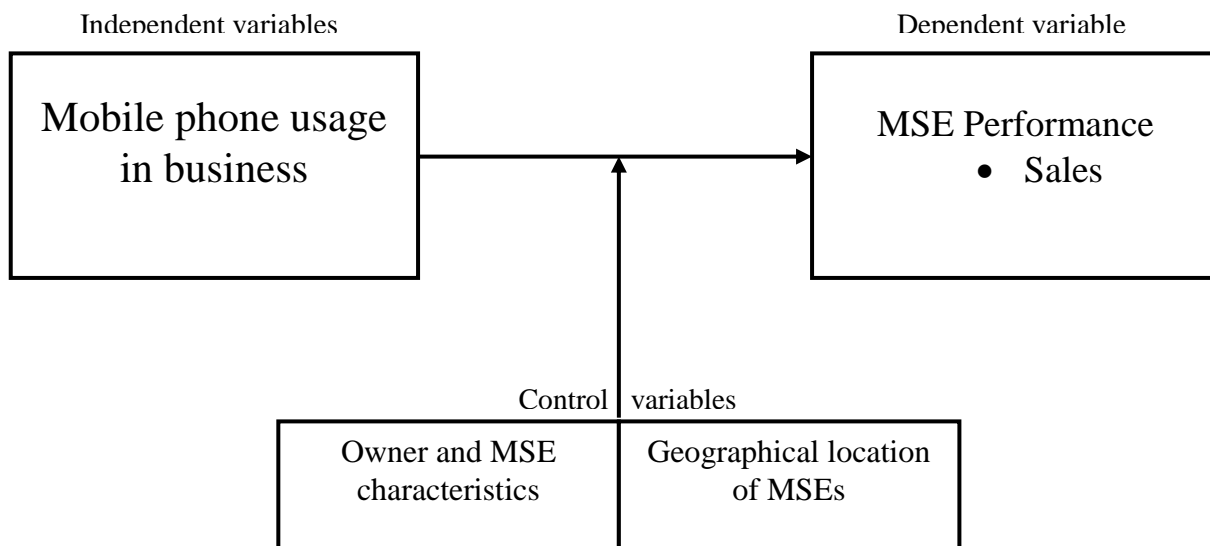
Theoretical Foundation

This study was based on Technology Acceptance Model (TAM) which is described as an information systems theory that models how users come to accept and use a technology. The model suggests that when users are presented with a new technology, a number of factors influence their decision about how and when they will use it, for instance, perceived benefit is the extent to which a person believes that using a particular system would improve his or her work performance. In addition, perceived ease-of-use is the extent to which a person believes that using a particular system would be free from effort (Davis, 1989). On the other hand, Dees *et al.*, (1998) stated that Peter Drucker defined an entrepreneur as an agent of change brought about by technology. He further argued that the entrepreneur is not necessarily the one to cause change, but the one to exploit the opportunities brought by change: the entrepreneur

always searches for change, responds to it, and exploits it as an opportunity. The usage of mobile phones for business transactions has turned many operators in the informal economy of Kenya into entrepreneurs. They are exploiting the many opportunities provided by the phones, for instance, m-payment to suppliers, advertisement of products, contacting customers, e.t.c.

Conceptual Framework

Figure 1. Conceptual Framework



Literature suggests that use of mobile phones in business increases the probability of sales increase among the MSEs in the informal economy. However, owner and MSE characteristics and business location can also affect to sales of a business. This conceptual framework is informed by TAM and Peter Drucker's theory of entrepreneurship.

METHODOLOGY

The data for this study was collected from Westlands, Dagoretti, Makadara, Kamukunji, Embakasi, Langata, and Starehe locations which are geographically dispersed in Nairobi County. The choice was informed by the variability in attributes of MSEs and the environment under which the MSEs operated. Without this variety, one would not be able to test the hypotheses, postulated because the study would have concentrated in only one location, and attributes across MSEs may not vary sufficiently. It used line transect sampling technique in collecting data from the respondents. Data was collected from 384 MSEs and three estimating models, namely, the logit model, the probit model and the Linear Probability Model (LPM) were used to analyze the data. Ntale (2013) used the models to estimate the effects of economic

activity diversification on the livelihoods of smallholder agriculture in Thika. The assumption of the study is that a mobile phone user is rational and he/she will use mobile phone for business if he/she perceives benefits of doing so. Therefore, the probability of an MSE using a mobile phone for business is denoted by the following formulae.

Probit model

$$P_i = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{Z_i} e^{-\frac{1}{2}z^2} dz \quad (1)$$

Logit model

$$P_i = \frac{1}{1 + e^{-Z_i}} \quad (2)$$

Linear Probability Model (LPM)

$$P_i = bX + u_i \quad (3)$$

Where; P_i is the probability of sales increase in business given that an MSE using a mobile phone over and above one which is not using a mobile. e is a natural number (≈ 2.718), π is a mathematical constant (≈ 3.141), Z_i is the logit or probit index of MSE; the logit or probit index Z_i is the measure of benefits that an MSE perceives in using a mobile phone for business. As Z_i becomes infinitely large ($+\infty$), the more the probability that an MSE will use a mobile phone for business. The LPM of an MSE is expressed in linear form in equation four while equation five expresses the Z index of logit and probit models:

$$S_i = \beta_0 + \beta_1 M_i + \beta_2 X_i + \beta_3 W_i + \beta_4 LC_i + \varepsilon \quad (4)$$

$$Z_{Si} = \beta_1 M_1 + \beta_2 X_2 + \beta_3 W_3 + \beta_4 L_4 + \varepsilon \quad (5)$$

In the linear model, S_i is a dummy variable that takes a value of one if sales were reported to have increased prior to the survey and a value of zero if otherwise. In the logit and probit models, Z_{Si} is an index associated with sales increases. M_i is a dummy variable with a value equal to one indicating mobile phone usage. X_i and W_i are vectors for characteristics of the business owner and MSE respectively, while LC_i are dummies of locations for MSEs and ε is the error term. The parameters $\beta_0, \beta_1, \beta_2, \beta_3$ and β_4 in the linear probability model were estimated by OLS while maximum likelihood methods was used to estimate the parameters in the logit and probit model using the following likelihood function.

$$L = \prod_{i=1}^N \prod_{k=1}^k P_i^{Q_{ik}} \quad (6)$$

Where: L = Likelihood function, N = observations, k = alternatives ($k = 1, 2$); Q_{ik} = A dummy variable which takes a value of 1 for mobile phone usage in business. An increase in sales due to the use of a mobile phone is used as a measure of performance.

RESULTS AND DISCUSSIONS

Descriptive Statistics

Primary data was collected from 8 sub-counties of Nairobi County namely: Westlands, Dagoretti, Makadara, Kamukunji, Embakasi, Langata, Starehe, and Kasarani. It was established that about 90 percent of the MSEs have been operating for less than 15 years and 74 percent for less than 10 years. 90% of the businesses are registered. Registration for these MSEs means paying a fee of 20 Kenya shillings to the local authority every day of business on city premises. The 10 percent of MSEs that were not registered were mostly found in the locations considered to be a security threat to the Nairobi City Council officers. About 75 percent of the MSEs kept records of their transactions, which contradicts the notion of some studies that MSEs in the informal sector do not keep records (Kubr, 2002).

The number of people employed by the MSEs ranged from 1 to 8 persons, with a mean of 1.6, including the owner. A large number of MSEs had only one employee, who was the owner of the business, and 99 percent had up to 5 employees. This concurs with many studies on this sector, including the 1999 Kenya baseline survey on the MSE sector which found that micro enterprises employ 1 to 9 people, with the majority being operated by the owner alone. Although the MSE stands for micro and small enterprises, all the MSEs investigated fell under the category of micro enterprises as defined by the (Republic of Kenya, 2012).

64% of the MSEs are in retail business while 13% are in manufacturing. The service industry which includes hotels, shoe shining and hair dressing has 21% of the MSEs. The reason for a large concentration of MSEs in the retail industry could be because it is easy to enter and exit and requires little start up capital. Some of the products that are sold, for example, a bunch of bananas in open air sites were from gardens of business owners, which meant that start up capital is not required for such businesses; neither is rent payment required, except for the 20 shillings which is paid to the Nairobi City Council. In the service industry, for example, hair saloons and hotels, some inputs must be bought, meaning that some start up capital is needed. The same applies to the manufacturing industry, where if a product such as food is to be processed, the equipment for processing it has to be bought. Also, if furniture is to be made or metal has to be fabricated, raw materials have to be bought. Very few MSEs were in the wholesale industry. These were included in other industry classification, which comprised 7% of the MSEs. This category included MSEs selling herbal medicines, which require little capital to start.

With regard to occupations of neighbours, on average 50% had businesses similar to those of the MSEs interviewed. This could be taken to mean that there is little innovation in starting businesses in this sector or that people fear venturing into new businesses. However, since 50% of neighbours were in different businesses, this could be evidence of

entrepreneurship in this sub sector. The 50% of business owners not having similar businesses with their neighbours, could have been unwilling to face competition, and therefore looked for something different from common businesses. The similarity of businesses was mainly in areas with high concentrations of fruits and vegetables, or in second hand clothes. This pattern of businesses among neighbours could be a strategy by traders to assist customers, so that if a customer at a clothes MSE for example, needs vegetables, he or she can obtain it nearby. The most surprising finding is that not all MSEs operating in the informal sector are poor. Amount sales for 5% of MSEs are in the manufacturing industry, were in millions of shillings exceeded by far the official poverty line. However, the vast majority of MSE owners are extremely poor.

Predictor Models

The LPM, logit, and probit models show that mobile phone usage has a significant effect on the business performance. The results in the table indicate that the coefficients on mobile phone usage in all the models are 0.459 and statistically significant. The results show that mobile usage increases the probability of a sales increase, i.e. the MSEs in the informal sector that are using mobile phones for e-commerce have a 46% higher chance of their sales going up than the MSEs not using mobile phones. On controlling for effects of other variables, i.e. owner and business attributes and locations where MSEs operate from, the effects of a mobile phone usage for e-commerce on the probability of sales increase, is still high. LPM estimates indicate a 56% ($t = 6.49$) higher chance of sales going up among the MSEs using mobile phones for e-commerce. Logit models shows an increase of 63% ($t = 2.8$) in the probability, while the probit coefficient indicate an increase of 61% ($t = 3.6$) in the probability of an increment in sales.

A one year increase in the average age of the owner of an MSE decreases the chance of sales going up in all the estimated models, although the coefficients are statistically insignificant; when the age is doubled, the effects become zero. This finding might suggest that the performance of businesses of younger people within the informal sector is better than that of the older operators. These results correspond with those of correlations whereby, there was a negative correlation between the age of the owner of an MSE and an increase in sales. Gender is only statistically significant in the LPM estimates, whereby the probability of sales of men within the informal sector going up is 21% ($t = 1.92$) higher than that of women. When gender is interacted with mobile use, the results show that a woman using a mobile phone for e-commerce in the informal sector, has a higher chance of sales going up as compared to men using the phone in the sector. However, these results are only statistically significant in the LPM estimates whereby the chance of sales going up for women is 21.3% ($t = 1.86$) higher than that of men.

Table 1. The effect of mobile phone Usage on MSEs performance (Sales)
(absolute *t*-Statistics in parentheses)

Variables	Model parameters (marginal effects)					
	LPM (OLS)		Logit (MLE)		Probit (MLE)	
<i>Communication Technology</i>						
Mobile phone use (1 = Used a mobile phone for business)	.4590 (8.07)	.5625 (6.49)	.4590 (3.87)	.6323 (2.82)	.4590 (5.29)	.6081 (3.68)
<i>Owner and business characteristics</i>						
Education level		.0014 (0.28)		.0004 (0.13)		-.0008 (0.21)
Owner age		-.0032 (0.35)		-.0020 (0.28)		-.0018 (0.21)
Owner age squared		.0001 (0.48)		.0000 (0.42)		.0000 (0.34)
Gender (1 = male)		.2113 (1.92)		.0123 (0.28)		.0144 (0.25)
Business registration (1 = registered)		.1001 (1.98)		.1502 (1.19)		.1736 (2.10)
Business accounts (keeps accounts)		.0542 (1.51)		.0675 (1.54)		.0747 (1.95)
<i>Interactions</i>						
Gender x mobile use		-.2130 (1.86)		-.0284 (0.64)		-.0278 (0.45)
<i>Sub-counties dummies (Kasarani and Kamukunji are omitted)</i>						
Westlands		.0050 (0.08)		-.0150 (0.27)		-.0219 (0.39)
Dagoretti		.0104 (0.17)		-.0066 (0.12)		-.0179 (0.30)
Makadara		.0247 (0.41)		.0192 (0.62)		.0293 (0.62)
Kamukunji		.0857 (1.39)				
Embakasi		-.0763 (1.19)		-.1049 (0.83)		-.1035 (1.28)
Langata		.0015 (0.02)		.0078 (0.24)		.0136 (0.31)
Starehe		-.0062 (0.10)		-.0249 (0.41)		-.0236 (0.43)
Constant	.5 (9.11)	.2846 (1.43)				
R^2	0.2004	0.2695				
Pseudo R^2			0.2045	0.3379	0.2045	0.3349
<i>F</i> - statistics (<i>p</i> -value)	65.17 (0.0000)	5.90 (0.0000)				
χ^2 - statistics (<i>p</i> -value)			27.87 (0.0000)	42.39 (0.0001)	27.87 (0.0000)	42.01 (0.0001)
Observations	262	256	262	225	262	225

Registration of MSE and keeping of business records have impacts on the probability of an increase in the sales of an MSE as the results in table indicate. Keeping of business accounts is a good business practice and it is known to improve the performance of many MSEs (Kibera, 1996). Therefore, the results are as expected. The registration of a MSE, which in this case means a payment of daily fee of twenty shillings to the council officers, could have a positive impact on sales. The assumption is that the MSE stays closed on the days that the fee is not paid. Therefore, the MSE loses sales for that particular day. Registration of MSEs was found to improve profits (McKenzie and Sakho, 2007). This implies that best management practices like registration of business have an impact on the performance of MSEs in the informal economy.

The R^2 of the model using only the effect of mobile use on the increase in the probability of a sales increase is 0.2004, meaning that 20% of the variations in the probability of sales going up can be explained by the use of a mobile phone for e-commerce, and the p -value for the F-statistic = 0.000 in the linear model. The pseudo R^2 for the logit model is 20.5%, and an R^2 of 20.45% for the probit model. The p -values for the test statistics of models are zero, implying that the null hypothesis that using a mobile phone for business does not increase the chance of sales going up is rejected. The joint effect of all the variables in the model gives an R^2 of 27% for the LPM estimates, and an R^2 of 34% in the logit model, while the R^2 for probit model is 33%. The p -values of all models suggest that the null hypothesis that owner attributes, business characteristics and the places where MSEs are located jointly have no effect on the probability of sales going up is rejected.

CONCLUSION AND RECOMMENDATIONS

The results of this study show the use of mobile phones in the informal sector increases sales of the MSEs. The characteristics of the owner managers and the locations where the MSEs are located have no impact on sales in this sector; however, having a business plan has an effect on the sales. Due to their accessibility, mobile phones are able to reduce physical and social marginalization of the MSEs by facilitating communication that is not restricted by distance, volume, medium and time, thereby overcoming barriers of space and social standing. At the same time, there is a risk that the proliferation of sophisticated mobile phones could deepen the 'digital divide' among the MSEs given that access to ICTs depends on various factors, such as education and income. Thus, the MSEs who cannot afford and use the advanced mobile phones will be less competitive in the market. In this view, it is important to stress that connectivity alone (e.g. signal coverage) is not sufficient to ensure that the MSEs can benefit from mobile phones. Equally important are the ability to buy modern mobile phones and m-

services. They may also lack the skills to use the modern phones efficiently and effectively in their businesses.

The study recommends further analysis on how mobile phone services could best be used to address multiple constraints, either by providing several complementary functions or by integrating these services with other support activities. Moreover, just as successful mobile phone usage is related to the MSE's performance, suitability and effectiveness of the various mobile phone services will be best fitted in the business context offered. These dynamics remain under-researched. Further studies are needed to address the services of the particular needs of the MSEs and develop business models that can lead to better performance of MSEs. Such research will need to be based on an interdisciplinary approach that takes into account the economic, social, political, and legal dimensions of the mobile phone users. This study did not investigate the type of mobile phones and their services as used in the Kenyan informal economy. Therefore, it is recommended that a study addressing the effects of the types of phones and services on MSE performance be carried out.

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