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EFFECT OF MOBILE TELEPHONY UTILIZATION ON THE BUSINESS ENVIRONMENT OF FISHERS IN LAKE VICTORIA, KISUMU WEST SUB COUNTY KENYA

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Abstract

In today's techno savvy world, people are increasingly enjoying mobility, connectivity, revolution, and particularly a mobile revolution. The unprecedented penetration of mobile devices, wireless networks and mobile communication services has allowed the Kenyan medium and small enterprises to enjoy efficient communication, payments and marketing systems only available to the huge organizations and government corporations in the past. Data was collected through Face to face survey questionnaires which were administered to fishers within the sampled beaches. Key informants, Focused Group Discussion (FGD) and Observation were used. The study used stratified sampling method. This study confirms that indeed mobile phone ownership has grown tremendously over the past decade as over 90% of the respondents owned mobile

phones. There is also strong positive correlation between increased access to information and increase in business network. The opportunity to advance and spread the use of EFMIS had not been capitalized given that 59.2% of respondents did not know about it. The study recommends that fisher communities be sensitized on the need for effective use of mobile telephony resources service providers to increase access to and use of telecommunication facilities especially masts.

Keywords: Mobile telephony, Fishers, Business Environment, Kenya

INTRODUCTION

Background

In today's techno savvy world, people are increasingly enjoying mobility, connectivity, and flexibility of activity in time and space, with access to, cell phones, personal digital assistants and computers. Amongst the technologies in the ICT industry, mobile telephony seems to have penetrated many African countries in a big way. While the telecommunications industry in the United States, Canada and Europe invested in landlines before moving to mobile phone networks, the mobile phone had leapfrogged the landline in Africa (Adogla, 2009). In 1999, for example, the Kenyan-based service provider Safaricom projected that the mobile phone market in Kenya would reach three million subscribers by 2020 (Kalil, 2009). According to (Oteri, Kibet, & Ndung'u, 2015), mobile phone subscribers in Kenya were over 30 million. Like most countries in Sub-Saharan Africa, Kenya had experienced a telecommunications revolution, and particularly a mobile revolution. It had seen an increase in mobile subscriber numbers, and had innovated in mobile telephony in ways that have affected the region and the world.

All businesses function within a system of relevant environment and the extent to which the business thrives depends on the manner in which it interacts with its environment. A business, which continually remains passive to the changes in the environment, is destined to gradually extinction. To be successful business has to not only recognize different elements of the environment but also respect, adapt to or have to manage and influence them. The business must continuously monitor and adapt to the environment if it is to survive and prosper. Disturbances in the environment may be a threat or open up new opportunities for the firm. A successful business has to identify, appraise, and respond to the various opportunities and threats in its environment accordingly. The use of mobile telephony for market information is highly iterative and continually evolves as a function of dynamic market environment. However,

mobile telephony adoption and utilization by fisher communities in Lake Victoria Kenya scenario was not clearly known. .

Townsend, (2004) argued that the use of mobile phones had resulted in a quickening of the pace of urban life and an increase in the metabolism or urban systems. As information availability had sped up, there had been an increase in the pace at which information was consumed. The effect had been that the daily rhythm of the city, which was formerly coordinated by standardized time and place, had become untethered, which had led to city coordination on the fly in real time (Zook et al., 2004). (Jensen, 2007) examined the effect of mobile phones on fisheries sector in Kerala, India and found that expansion of mobile phone coverage lead to a significant reduction in the dispersion of fish prices across markets as well as a decline in waste.

A case study of the commercial fishing industry in Australia indicated that GPS plotters had improved productivity of commercial fishing operations by 12%. Allowing for levels of adoption and limiting this to the fin fishing industry that was estimated to have produced a 4% improvement in total factor productivity in the fishing industry (ACIL Tasman, 2008). A study by (Ifejika et al., 2009) in Kainji Lake, Nigeria revealed that mobile phone technology had contributed to relaying market information between fish producers, processors and fish sellers. The use of mobile telephony was noted by (Ifejika, Nwabeze, Ayanda, & Asadu, 2009), and (Jensen, 2007) as beneficial for various economic activities among the fishing communities. (Ifejika et al., 2009) conducted a study in Kainji Lake, Nigeria and found that mobile phone technology was contributing to relaying market information between fish producers, processors and fish sellers. (Jensen, 2007) examined the effect of mobile phones on fisheries sector in Kerala, India and found that expansion of mobile phone coverage lead to a significant reduction in the dispersion of fish prices across markets as well as a decline in waste. He shows that this lead to important welfare improvements for both fishers and consumers; fishermen's profits increased by 8 percent, consumer prices declined by 4 percents and consumer surplus by increased by 6 percent. In the fisheries sub-sector in Nigeria for example, mobile phones were used to coordinate fishing efforts (Adogla, 2009); product marketing and safety (Vimala & Ravisankar, 2012); as well as linking fishers and wholesalers together for business (Scheen, 2008). Kenya Marine and Fisheries Research Institute (KEMFRI) launched a mobile phone technology to improve fish trade in Turkana County. The new technology gave traders market information through the Electronic Fish Market Information System (EFMIS). The package provides market information, quantity of fish and transportation of various fish species from lake beaches to major markets across the Kenya. According to (Donner, 2004) there had been relatively few studies focusing directly on the way mobile phones were used in enhancing productivity among the users in developing world; a rich body of literature had emerged

examining only the determinants of mobile phone adoption. However, as Donner's survey shows, most of these researches had focused on diffusion rather than individual adoption

According to (Wamuyu & Maharaj, 2011) despite the exponential growth in the use of mobile telephones in East Africa, the literature review had indicated that only one research study by (Donner, 2004)on the impact of using mobile telephones in microenterprises in East Africa had been done; this was a survey conducted in Kigali, Rwanda. The study found that mobile telephones had an impact on microenterprises since entrepreneurs developed new business contacts and expanded their social and business networks. The unprecedented penetration of mobile devices, wireless networks and mobile communication services has allowed the Kenyan medium and small enterprises to enjoy efficient communication, payments and marketing systems only available to the huge organizations and government corporations in the past (Wamuyu & Maharaj, 2011)Most rural areas had mobile telephone networks, which come with a number of development benefits in terms of employment creation, access to services and increased access to information, hence contributed significantly to economic growth (Wamuyu & Maharaj, 2011).

The emergence of M-PESA service, a text messaging (SMS) provided the solution to small businesses' banking needs for the majority of the Kenyan population, because the majority did not hold bank accounts but had the services of mobile phone. They could settle bills by building up credit on the mobile phones and then sending a text message to make payment (Chogi, 2006) M-PESA was an innovative mobile payment solution that enabled customers to complete simple financial transactions by use of mobile phone (Hughes & Lonie, 2007). Some of the uses of M-PESA included payment for trading between businesses; secure money transfer for people journeying between places; sending airtime; send money for various ad hoc reasons; save money. According to (Oteri et al., 2015)), a higher volume of mobile money transaction was recorded in Kenya indicating the increased popularity of mobile money transfer services. According to (J. C. Aker & Mbiti, 2010), an emerging trend was the development of mobile phone-based services and products that go beyond basic voice calls and text messaging.

It was worth noting that the use of mobile telephony did not always have a positive effect, according to (Co-operation & Development, 1998)the rapid development of new technologies in the information age was a source of problems for the old socioeconomic structures until society and social institutions are able to match perfectly with them. If there is technological, advancement without social advancement, there is almost automatically an increase in human misery. According to (Ventura, 1995), many studies had described barriers to technology adoption and implementation of falling under technical, organizational or

institutional. Barriers can be considered as those occurrences that hinder ICT implementation includes infrastructure, finance, and poor data technology, lack of compatibility, leadership styles and attitudes. Inhibitors do not necessarily prevent the implementation of ICT projects but they do prevent advancement and restrict successful implementation and sustainability. Other inhibitors according to Ventura include; mismatched user needs, un-fit technology, poor coordination, lack of ICT policy, transfer of ICT idolisers and donor push. (Beynon-Davies, 2002)identified six types of Information Technology failure as technical, project, organizational, environmental, and developmental and user failure. distract

Due to lack of power supplies and high Kenya's electricity tariffs, recharge of the battery of a mobile phone often becomes a hard task. People use shops with electricity, car batteries, solar panels and generators. For these reasons, in Kenya to charge a full battery costs on average 0.40 USD, but there were no standard costs according to (Adeya, 2005). According to (J. C. Aker & Mbiti, 2010)the effect of mobile phones on changes in GDP and growth especially in sub-Saharan Africa, was still relatively unexamined. Mobile phone-based development projects are often based on the assumption that mobile phones can improve communication, coordination and service delivery. Yet the use of mobile phone technology in these contexts may not always be Pareto improving. Mobile telephony is volatile and new technological trends emerge every day. It was therefore imperative to understand the trend of development that would inform future innovations. When it comes to technology, each environment has a unique experience in adoption and therefore the studies conducted previously may not necessarily apply to the situation of the Beaches in Lake Victoria Kisumu County. It was also worth noting that policy implications may also vary and thus it was necessary to find out the situation of Kenya with reference to the study area.

Despite the significant growth of ICT over the past decade, Africa still lagged behind other regions both in terms of percentage of people with access to the full range of communications services and the amounts and manner in which they were to be used (Sanou, 2012). According to (Sanou, 2012), there had been huge disparities in the geographic rollout of mobile phone coverage, prompting concerns over and intra-African digital divide. According to the (LVFO, 2012)mobile telephone network was available at 320 out of the 324 Beaches in Lake Victoria Kenya while mobile phone networks increased with 93.6% in the said Beaches.

The findings of this report show the effect of mobile telephony utilization on the business environment of fishers in Kisumu West subCounty Kenya. It examines the beach facilities, EFMIS and Business communication. The study makes a discovery on the importance of Mobile phones on the business environment of fishers and gives an indication on whether mobile telephony is transforming the business environment

Study Area

The study was conducted on the six major landing beaches of Lake Victoria Kenya shoreline in Kisumu West constituency of Kisumu County and included Ogal, Usoma, Rota, Paga, Usare and Rare. Lake Victoria waters support one of the world's most productive inland fisheries of commercial fish species that include Nile perch, Dagaa and Tilapia. The contribution of the fishery to the GDP of the riparian countries is: Kenya 2.0%, Tanzania 2.8 and Uganda 3.0% (Kelly et al., 2009). The Lake Victoria is the second largest fresh water body in the world that is endowed with enormous fresh water fishery resource. It has a total surface area of 68870Km2 and a total catchment area of 180950 km2.

METHODOLOGY

For this descriptive study, the data was collected through face to face survey questionnaires which were administered to fishers within the sampled beaches. Key informants were identified through snowballing technique. The study also used Focused Group Discussion (FGD) which involved 2 groups of 10 participants for each of the 6 Landing Site. Observation was used to give an indication of economic activities of fishers and development of Beaches. Secondary data was collected through review of relevant literature material included legal and policy framework documents.

The study used stratified sampling method to sample the fishers from the Beach Management Unit Register in the stratum of beach. Random sampling was used to select the number of subjects from each stratum. The Beaches with Beach Management Unit offices and fisher registers constituted the sampling frame. The six sampled Beaches in Kisumu West Sub-County of Kenya included; Usoma, Ogal, Usare, Paga, Rare and Rota. The target population consisted of 699 fishers registered with the Beach Management Units. The total population of fishers in Kisumu County was 2420. The sample size for the study was established as illustrated below:

Sample size formula for n is:

$$n = \frac{NZ^2pq}{E^2(N-1) + Z^2pq}$$

Where: N (population size = 2420), Z (confidence level=1.96/95%), E (± error= 0.05), p (probability= 0.5), q (=0.5)

$$n = \frac{2420 * 1.96^2 * 0.5 * 0.5}{0.05^2 * (2420-1) + 1.96^2 * 0.5 * 0.5} = 319$$

Required sample size calculated is 319. This sample sizes were allocated proportionately to each beach considering the number of registered fishers. The table below provides the proportion and sample size calculated.

Proportion was calculated using the formula

$$Proportion = \frac{N_i \times 100}{N}$$

Where N_i is the number of registered fishers per beach and N is the total number of the registered fishermen across all six beaches. From the table, the proportion for Paga was calculated using the formula and inserting the values as shown below.

$$Proportion\ (Paga) = \frac{N_i \times 100}{N} = \frac{133\ \times 100}{699} = 19.03\ \%$$

Table 1: Proportional allocation of sample sizes across the beaches.

Beach/Stratum	Registered Fishers	Proportion (%)	Sample size per beach
Paga	133	19.03	61
Ogal	155	22.17	71
Rare	80	11.44	36
Rota	71	10.16	32
Usare	120	17.17	55
Usoma	140	20.03	64
Total	699	100	319

The last column provides the sample size calculated for that beach. The formula used included multiplying the calculated sample size, 319 and the proportion allocated in the fourth column. The sample size for Paga is thus calculated as:

$$Samplesize(Paga) = \frac{P_i}{100} * n = \frac{19.03}{100} * 319 = 61$$

The calculated sample size was 319; all questionnaires were returned. Out of the 319 respondents the proportion of males sampled was 61% while the proportion of females sampled as 39%. This gave the study a fair representation as the respondents of fisher community consisted of both male and female in equal measure. The sampled respondents constituted crew members (27.6%), fish mongers (22.3%), fish processors (21.3%), boat owners (17.6%) and boat builders (10.3%). Crew members dominated in Paga and Ogal beaches. While there were more fish mongers in Rare.

RESULTS AND DISCUSSION

Facilities Supporting Mobile Telephony

Table 2: Facilities Supporting Mobile Telephony

Beach/Facilities	Mpesa shop	Phone Repair store	Network booster	Electricity
Paga	✓	✕	✕	✓
Ogal	✓	✓	✕	✓
Rare	✕	✕	✕	✕
Rota	✕	✕	✕	✕
Usare	✕	✕	✕	✓
Usoma	✓	✕	✓	✓

Table 2 gives a catalogue of the facilities supporting mobile telephony and available in the six beaches where this study was conducted. Only three out of the six Beaches had Mpesa shops within the beach while only on beach had a phone repair store. Network booster was only found in one beach while electricity was lacking in two beaches. Presence of electricity provided opportunities for phone charging and freezers to be used in beaches hence assisted in fishing activities. Four out of the six beaches under study in Kisumu West Sub County had electricity; they included Ogal, Usoma, Paga and Usare. Ogal Beach had electricity and most common means of charging phones was in pay shops, as the fishers did not have electricity in their homes. The potential of mobile telephony to support fishing activities value chain addition has been greatly hampered by lack of the basic facilities essential for mobile telephony utilization. As such, fishers have to look for service of mpesa, phone repairs and charging from other business centres. The status of facilities has not changed in the last 3 years as the data from LVBFFS (2015) confirmed that the facilities mentioned were not in place then. Fishers at Paga Beach were not using EFMIS and were not linked to any Market Information Systems.

Mobile phone Service providers

Safaricom is the most common mobile service providers in Kenya and has also the most widespread network by infrastructure and coverage. Over time they managed to penetrate the inner and rural markets by making their call rates cheaper than the rest. Other service providers mentioned during the study include Airtel, Orange and Yu. Among the respondents, 87.8% of them had subscribed to Safaricom while only 9.4% had subscribed to airtel. Orange and Yu had a cumulative subscription of 2.5%. Fewer respondents, compared to its subscribers, used

Safaricom most often (84.6%). Airtel had 10.7% of the respondents using it most often. A chi-square test of association was conducted to see whether there was a statistically significant association between the common mobile service provider and the most commonly used mobile line. In the test, the null hypothesis stated that there was no association between the most common mobile service provider and the most used mobile line. The test yielded a p-value of 0.000 (<0.05). This is statistical significance. We therefore reject the null hypothesis in favor of the alternative.

Safaricom network boosters were only available in the vicinity of Usoma Beach the rest of the beaches did not have network boosters in the vicinity. According to Richling (2014), Powering masts in remote areas was a challenge since phone companies typically relied on expensive diesel generators that required frequent fueling but solar powered mobile masts could be erected and operated for less than a quarter of the cost of ordinary mast. The respondents felt that Safaricom was a more dependable service provider. Most rated its connectivity to be often good (87.8%) while there was seldom good connection for Airtel (48.9%), Orange (84%) and Yu (84.4%) as shown in Table 3. This may have informed them on the most common line to use. In this case it was Safaricom. The fishers said that there was network coverage at sea, albeit poor. This meant that they could be contacted when at sea by the Beach Management, customers and family. Only Usoma Beach had a network booster within the vicinity of the beach, all the other beaches had no nearby network boosters and it was then expected that the quality of service would be poor.

Table 3: The level of connectivity for different mobile phone service providers

Service provider	Connectivity				
	Often	Sometimes	Seldom	Never	Total
	%	%	%	%	%
Safaricom	87.8	7.8	4.4		100
Airtel	14.7	36.4	48.9		100
Orange	6.6	8.2	84.0	1.3	100
Yu	4.1	5.0	88.4	2.5	100

Electronic Fish Market Information System

EFMIS was to be relayed from individual data collectors to a national data centre set up to synthesize, package and disseminate information in a form that users could access daily by sending an enquiry to the data centre using a mobile phone SMS. The system was to operate

24 hours every day and give automated responses instantly. The system was to be accessible wherever there was a mobile phone network available.

A major constraint on micro and small-scale fish producers and processors was the lack of information on fish prices and the availability of fish at different fish markets. Information gaps allow widespread exploitation of fish producers and processors at Beaches by middlemen offering below market prices. It also results in considerable inefficiencies in market operations and, when fish landings are high combined with rains, leads to substantial losses in fish volumes and value.

Only 12.9% of the respondents said that they use it. Respondents mentioned a number of reasons they used EFMIS. The most common reason was for better communications with partners as mentioned by 44.95%. The members felt that it was easy to access to work with (23.85%) and cheap to acquire and maintain hence improved communication between the different partners. They further added that they used EFMIS according to know more about the fisheries, know how their partners were doing. Those who used EFMIS stated that it benefitted them in communication to potential customers (26%) hence helped them to connect with new. One in ten respondents who used EFMIS stated that they it eased data collection process, aided in faster report writing and increased safety. In summary, EFMIS made communication to partners and stakeholders more efficient reducing travel costs yet cheap. As a result, some respondents reported that there was faster connection hence coordination between them and their customers. This meant that there were more business opportunities for them. EFMIS helped them reduce travel costs and was reliable.

There was no distinct different in the proportion of male or female respondents that used EFMIS. Only 13.5% and 11.9% respectively used EFMIS. This System had the potential to offer a platform through which market information could be exchanged in real time. For instance, Traders' organization of West Africa in partnership with the private sector, developed a platform, www.tradenet.biz, to exchange market information in real time on-line or through cellular phones on market prices, buy and sell offers and trader contact information (Davis and Addom, 2010). In Mozambique, (Vimala & Ravisankar, 2012) and (Scott, Batchelor, Ridley, & Jorgensen, 2004) had shown that farmers with access to market information obtained higher farm prices. Thus, the smart phone holders can use their phones to learn a lot about different markets and government policies through the internet, something they mentioned in small proportions. A four-year study on fishery markets in Kerala India showed that fish was sold in home markets of the fishers where they did not get the good price. However, after phones fishers found better prices in nearby markets to sell their fish at the market with the highest price (Jensen, 2007)). The opportunity to

advance and spread the use of EFMIS had not been capitalized given that 59.2% did not know about it and out of the 40.8% who knew about it, only 31.6% had ever used it.

Mobile phones and Business Communication

The respondents were asked to state the frequency of using mobile phones to contact customers. This was done multiple times to get the true picture of the fishers. There were 66.1% of respondents who said that they use phone calls for business communication daily. 45.8% of the total respondents said that they used SMS for business communication daily. There were eight out of ten respondents who contacted customers using phone calls. This was irrespective of whether the respondent owned a phone or not. This goes to show that the level of mobile phone penetration in business activities is quite high in among the fisher communities. It further implied that the physical interactions had been reduced and that virtual transactions were in effect. The traditional market where transactions involved physical contacts between buys and sellers was no longer the common norm and mobile telephony was playing a key role as a tool for advancing virtual market.

To get a closer look, a cross tabulation was done where the use of mobile phones as the most common means of communication among the different fisher categories. Respondents from all fisher categories all indicated that mobile phone was the most commonly used means of communication with customers. The respondents still preferred mobile phone over Face-to-face yet the latter is cheaper than purchasing credit for a mobile phone and again most customers lived in the neighborhood. The boat owners and boat builders were the ones who most frequently communicated with their customers via face-to-face since only one out of three of them used phones mostly to contact customers. On the other hand at least half of the other respondents from other fisher categories; crewmembers, fishmongers and fish processors used mobile phones more often.

Despite Usoma beach's dominance by boat owners, other fisher categories used mobile phones mostly in great proportions. It has become easier for boat owners to seek crew members whenever there was work to be done; Communication with those in the lake was easier as they could be informed of any danger like too much wind or in case of any emergencies; it was also much easier to mobilize or gather colleagues for a meeting to discuss issues of concern, the fishers stated.

Using mobile phones for money transfers

Mpesa was used to send and receive money from clients and other fishing activities; It assisted in communication: between buyers, sellers; communication between those at the shore and

fishers in the lake to divert route in case of danger. They reported increase in security of money since most transactions are done through Mpesa. They further said that the Mpesa kiosks had created employment for the locals in Usoma Beach.

According to (Oteri et al., 2015)), a higher volume of mobile money transaction was recording in Kenya indicating the increased popularity of mobile money transfer services 76% of the respondents across all the Beaches indicated they used their phones to send or receive money. With the exception of boat builders, at least half of the other fisher categories transferred monies through mobile phones. The least groups of respondents who used the mobile money services came from Usoma and they were mostly boat owners. It could be assumed that boat owners used less of this service due to the nature of their economic activities which may have required less communication compared to other categories of fishers dealing directly with the perishable good.

The fisher category showed that less than half of the boat owners (46.4%) used mobile money transfer services. On the other hand, at least eight in ten of respondents falling under other fisher categories affirmed that they used the mobile money transfers. When considering those who only used it frequently, 39.4% of the boat builders, 29.5% of the crew members and 27.9% of the fish processors frequently used the mobile phones for money transfers. However, there was not much difference in gender using the mobile phone money transfer services. There were 75.1% of male and 82.5% of female respondents who affirmed that they used the mobile money transfer services.

Importance of mobile phones on the Business environment

A study by (Ifejika et al., 2009) in Kainji Lake, Nigeria revealed that mobile phone technology was contributing to relaying market information between fish producers, processors and fish sellers. A similar likert scale was used gauge fishers' views of how they felt mobile phones helped them in utilizing their business environment. More than half of the fishers affirmed that the mobile phones help them get adequate assistance in their business. In particular, they get information on customers through mobile services. Almost half of them (42.3%) said that the mobile phones help them access any service they require. However, only 37.6% reported increase in business networks as a result of sing the mobile phones.

According to the fishers, the level of increased access to information through the mobile phone was proportional to the increase in business network. The Pearson's correlation coefficient of 0.726 suggests strong positive correlation between increased access to information and increase in business network. Despite a low proportion of the fishers having experienced an increased business network as a result of the using mobile phone, I is clear that

as they continue to get more information, it will eventually translate to increased business linkages.

Table 4: Correlation analysis between the respondents' increased access to information and increase in business networks

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	.726	.035	18.024	.000[c]
Ordinal by Ordinal	Spearman Correlation	.739	.035	18.727	.000[c]
N of Valid Cases		294			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

CONCLUSION

The findings confirm that the traditional physical market places where transactions involved contacts between buys and sellers was no longer the common norm as mobile telephony was playing a key role as a tool for advancing virtual market for fishers in Lake Victoria Kisumu West Sub-County of Kenya. This was because over 90% of the respondents owned mobile phones which they were using in various way for information exchange. Given the high rate of ownership of mobile phone we can state that the technology had the potential to transform business operation of the fishers as had been experienced in other areas of the world.

The opportunities available from the use of Electronic Fish Market Information System had not been capitalized given that most respondents did not know about it this is despite the fact that the system had the capability to transform the fishing business environment to a higher level of real time information exchange.

The potentials of mobile telephony as a tool had not been optimized especially due to lack of infrastructural support that included poor mobile phone network services and lack of electricity to aid in phone charging and this had hampered the potential for fishers to fully engage in value chain addition for fish products. Lack of infrastructural support was aiding exploitation of fishers by middlemen and agents whom the Beach Management Units still relied on for ice and cooler boxes and whom in turn dictate the fish price.

The proposed study was limited to fisher in sampled beaches in Kisumu West Sub County of Kisumu County in Kenya and this restricted generalization of findings to other beaches in Lake Victoria Kenya. It focused six beaches with at least 35 fishing boats and had operational

beach management units and therefore findings may not be used to infer to beaches in the region without Beach management units. Fisher communities not within the landing beaches were not included in the study.

RECOMMENDATIONS

There is need for fisher communities to be sensitized on the potential uses of mobile telephony that can enhance their business operations. This sensitization can be carried out by the County Government through the Fisheries Department and engage the mobile service providers technologists to provide demonstrations.

An evaluation on the impact of EFMIS should be carried by Kenya Marine and Fisheries Research Institute (KEMFRI) who were the implementers of the project in 2012. This will enable learning from past experience and improvement on future implementation of similar innovations.

The National and County governments should invest in infrastructure particularly electricity and roads. The Mobile service providers should install more boosters to expand network coverage. The BMU should initiate telecommunication business projects to support fisher communities' economic activities for instance MPESA Shops, Phone Charging and Repairs.

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APPENDIX A

Abbreviations

BMU	Beach Management Unit
CCK	Communications Commission of Kenya
EFMIS	Electronic Fish Market Information System
GDP	Gross Domestic Product
GIS	Geographic Information Systems
GPS	Global Positioning System
GSM	Global System for Mobile Communication
ICT	Information and Communications Technology
KACE	Kenya Agricultural Commodity Exchange
KCA	Kenya Communication Act
KEMFRI	Kenya Marine and Fisheries Research Institute
LVFO	Lake Victoria Fisheries Organization
SITP	Strategic Information Technology Planning
TAM	Technology Acceptance Models
TTF	Task Technology Fit