Journal of Marketing and Consumer Research
ISSN 2422-8451 An International Peer-reviewed Journal
Vol.26, 2016

The Role of Mobile Phones in Marketing Nile Perch Fish: A Case Study of Homa Bay County, Kenya

Ojala Daphen Otieno
Moi University, P.O Box 3900-30100, Eldoret, Kenya

Abstract
The introduction of Nile perch to Lake Victoria in 1950's, while ecologically negative, has stimulated the establishment of large fishing companies in Kenya though away from the lake. It has earned the government and other stakeholders of the industry billions of Kenyan shillings yet the fishermen continue to wallow in poverty. The major objective of this study was to investigate the use of mobile phone technology in marketing Nile perch fish in Homa-Bay County and specifically: to examine the use of mobile phone technology to facilitate Nile perch fish marketing and to identify the determinants of variations in the frequency of mobile phone use for Nile perch fish marketing among agents involved in the marketing chain. A survey was conducted and data gathered through questionnaires where the target population included all fishermen in Homa-Bay County. A multistage sampling technique was used and a sample of two hundred and seventy respondents was selected using systematic random sampling. Descriptive and Poisson regression model were used to analyze the data. The study identified the use of mobile phone along five communication channels used for Nile perch fish marketing. Annual income generated from Nile perch fish business was significant in explaining variations observed in the frequency of mobile phone use. Findings imply that use of mobile phones can assist in the commercialization process of the Nile perch fish marketing and may help to forestall possible market failure. The study recommends the need for policymakers and the private sector to facilitate means of enabling access to mobile use by the fishermen.
Keywords: Nile perch fish, Communication Channels, Market Information, Poisson model

1.0 INTRODUCTION

Despite the ups and downs, aquaculture continues to grow at an increasing rate and it is one of the fastest growing food sectors in the world. In Africa, aquaculture production is less impressive. In 2008, total aquaculture production in Africa was 1.71% of world production out of which Egypt alone accounted for 73% (FAO*, 2008*). Kenya is one of the largest aquaculture producers in Africa with fish farming accounting for approximately 60 percent of its domestic annual fish production (Okello et al., 2010). Over the years, Kenya has witnessed a steady rise in the demand for domestic Nile perch fish. This may be due to rise in average incomes and increasing taste and preferences for white meat. To satisfy this demand, Kenya has become one of the largest exporters of fish in the developing world, taking out some 600,000 metric tonnes (MT) annually (Hempel, 2010). Furthermore, aquaculture and farm-raised Nile perch fish have been identified as a growing source of income for farmers in Kenya. According to (Ominde, 2011), Kenyan fish industry provides approximately US$75 million in revenues at the farm gate and accounts for nearly US$180 million in consumer spending. The sector equally contributes to the employment of over 250,000 people, with some employed as restaurant workers (Hempel, 2010).

Despite these encouragements, Kenyan fish farmers indicate that the marketing of fresh Nile perch fish is among other things fraught with information asymmetry among the major actors in the enterprise (Omollo, 2010). In some cases, primary wholesalers in the enterprise have been noted to shield their sources of supply from secondary wholesalers and retailers. Furthermore, in some locations, retailers feel that they have to pay higher prices than necessary because they are unable to buy direct, or at least need better information about the selling prices at the farm.

However, with the increased subscription to mobile telephony use among Kenyan agricultural households, concerns about the telephony-divide have shifted from physical access to imbalances in its effective use for information and communication particularly within the multi-faceted context of agricultural value chain (Zhang *et al*., 2010). This is relevant because getting the right information, when and where needed, in a language understood and can be easily accessed are recognized as vital to the success of the agricultural sector as the right type of soil, adequate water, sunlight and any other input. Integration into the value chain therefore, poses an increasing challenge to resource-poor producers when asymmetries occur in access to information among stakeholders.

These salient but critical features underscore the rationale for considering the existing role of mobile telephony subscription to Nile perch fish marketing analysis. To empirically account for these, this study examined how the use and access to mobile phone for Nile perch fish farming activities enhances small-scale Nile perch fish actors' marketing activities in Homa- bay county, Kenya.

Specifically this study;

- mapped out the communication linkages available *via* mobile telephony for Nile perch fish marketing; and,
- examined the determinants of frequency of mobile phone use for Nile perch fish marketing activities

This study is important in informing better investment decisions on infrastructure provision to agricultural actors at both ends of the supply chain—the small scale producers and consumers.

2.0 CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

Conceptually, the social network theory could contribute to a better understanding of the role of social networks in the value chain approach: the concept of embeddedness and the development of innovation through networking. The idea of embeddedness argues that the performance of either an individual or an organization depends on how that actor is tied into a larger web of social connections. Hence, it stresses that economic relationships cannot be easily separated from social ties Granovetter (1973). The concept of embeddedness is closely associated with Granovetter's concept of 'weak ties': weak ties are more likely to link members of different small groups than are strong ones, as: *those to whom we are weakly tied are more likely to move in circles different from our own and will thus have access to information different from that which we receive*. (Granovetter 1985).Weak ties are more likely to diffuse information and traverse social distances than strong ones. They can act as a bridge, connecting two points of a network by providing the only path between them (Granovetter 1973).

A lot of studies conducted at different times have corroborated this concept. Better communication via mobile networks leads to a reduction in the frequency of journeys and the time and expense afforded to travel, with an additional key benefit of enhancing the ability of poor communities to respond more quickly to emergencies (Mutu and Yamano, 2009; Aker, 2008; Jensen, 2007; Overa, 2006; Animashaun et al., 2012). Sife *et al* (2010) reports that four fifths of a sample of households in Morogoro, Tanzania experienced improved or greatly improved efficiencies in the conduct of social and productive activities, due to mobile phones, particularly when the costs associated with communication over large geographical distances were reduced. Peer reviewed studies have pointed towards greater efficiencies in information search (De Silva, 2008) and in the coordination of multi level local activities in agricultural value chains that are geographically extensive and organizationally complex (Overa, 2006). This study adopts the approaches of previous studies but differs in the choice of its area of study.

3.0 METHODOLOGY

The study was conducted in Homa-Bay County, Kenya. The study area has established small scale culture Nile perch fish and several outlets exist for Nile perch fish marketing. Homa-Bay was selected for the survey because it is cosmopolitan with higher records of mobile phone subscription. A systematic sampling technique was adopted for this study to identify 165 respondents. The data were collected through personal interviews around the months of March-May, 2012 using a pre-tested questionnaire. Data collected included respondents' socio-economic characteristics, farm-specific characteristics and marketing activities.

3.1 Analytical and Empirical Strategy

This study employed descriptive statistics, flow chart analysis, matrix analysis and the Poisson regression model for analyzing the study objectives.

The frequency of mobile phone use by respondents for Nile perch fish transactions in this study refers to the number of calls made and received by a respondent for Nile perch fish transaction purposes. They include calls made to and those received among producer, retailer, and wholesaler for marketing Nile perch fish purpose. The number of calls made assumes a non-negative integer values of discrete nature and are non normal and hence are well estimated with the Poisson Regression Model (PRM) Winkelmann and Zimmermann, (1995) Greene (2008) Kirui, et al., 2010; Animashaun *et al*., 2012 PRM density function is given by 2008; Wooldridge, 2002):

$$F(yi/xi) = \frac{e^{-\lambda(x)} \lambda i\,(x)^{(y)}}{\Gamma(1+yi)} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

Where $\lambda i = \exp(\alpha + X'\beta)$ and $yi = 0,1,...$, *i* is the number calls made or received with respect to Nile perch fish marketing by the respondents; X = a vector of predictor variables.

Following Wooldridge (2002) and Greene (2003; 2008) the expected number of the events, yi per period is given as:

$$E\,(yi/xi) = \text{var}\,[yi/xi] = \lambda = \exp(\alpha + X'\beta) \quad \ldots\ldots\ldots\ldots(2)$$

for i = 1,2,….,m

The specific implicit functional form of the model estimated to examine the determinants of frequency of use of the mobile phone for Nile perch fish transaction is given as; Number of calls by the *ith* respondent = f (age, literacy, gender, occupation, fare to market, presence of electricity, presence of telephone operator service, log of income from Nile perch fish enterprise literacy, log of farming experience, own phone, group membership, dummy for role of respondent in the channel) + e

4.0 RESULTS AND DISCUSSION

4.1 Respondents' socio-economic characteristics are defined in Table 1.

Table 1: Socio-economic Distribution of Respondents

Respondent's strata	Sex		Membership of registered association		Literacy		Mean Experience (Std error)	Mean Income (Naira)	Mean calls made per week (std error)
	Male (%)	Female (%)	Yes (%)	No (%)	Literate (%)	Non (%)			
Producers (n=70)	94.2	5.8	50	50	100	0	7.8(1.05)	1,660,478	11.2 (0.91)
Wholesaler (n=20)	100	0	70	30	100	0	5.1(0.27)	1,840,000	13.8(1.95)
Fish Processors (n=20)	90	10	30	70	100	0	5(0.74)	1,294,500	13.9(1.86)
Retailer (n=30)	90	10	60	40	66.7	33.3	5.6(0.6)	1,444,330	11.4(1.06)
Hotelier/barbecues (n=25)	80	20	30	70	90	10	5.6(1)	750,873	9.5(1.7)

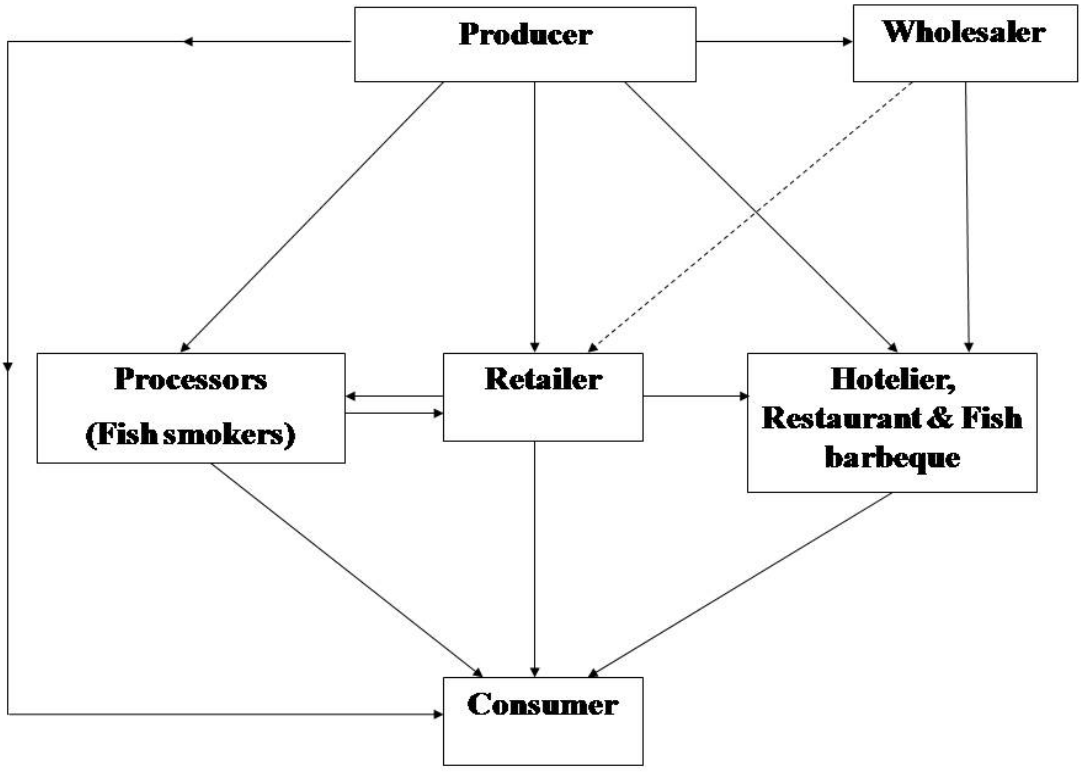
Source: Field survey, 2012

As revealed in Table 1, male appears to be the dominate gender of the actors involved in the Nile perch fish market chain in the study area. This may be specifically due to the nature of the venture or as a result of socio-cultural stereotype that predominate in the study area. The literate level was high for virtually all actors except for the retailers where 33% could not read and write. Average total income from Nile perch fish venture was highest for the wholesalers followed by the producers and the retailers respectively. This may be due to variation in the quantity of sale turnout and as expected, wholesalers may have a higher share of sales given their size of operation. Mean phone call with respect to Nile perch fish marketing was highest fish processors closely followed wholesalers.

4.2 Communication Patterns Established *via* Mobile Telephone among Agents for Nile perch fish marketing

The communication channels via mobile phone used for Nile perch fish marketing is presented in Figure 1.

Figure 1: Schematic chart of the communication channels employed for Nile perch fish marketing in the study area.



Source: Field survey, 2012

The study information identified the communication channels used for Nile perch fish marketing. From these results it was observed that market information flowed from producers to consumers through five different but interconnected linkages.

Specifically, the identified categories can be summarized as follows:

1. Producers ⟶ Consumers (Channel 1)

In this category, the study identified a direct communication linkage between the producers and consumers for the sales of Nile perch fish. Nile perch fish is usually sold at farm gate while in some instances, consumer can make a phone call and request for house delivery of live Nile perch fish from the producers.

2. Producers ⟶ small-scale processors ⟶ local retailers

The study equally observed that a communication linkage exist through the use of mobile phone among the producers, small-scale processors (fish smokers and driers) and the final consumers. In some instances, small-scale processors would request about the availability of Nile perch fish and negotiate on the sizes and quantity requested as well as the location of the fish farm from the producers. The processors may equally be the market retailers or contact, through mobile phone, a market retailer who would eventually sell it to the final consumer.

3. Producers ⟶ Retailers ⟶ Consumers

The third identified channel exists between the retailers and the producers for the purchase of Nile perch fish. The study identified that retailers make negotiation with producers with respect to the availability, sizes and pricing of Nile perch fish before making the eventual contact for purchase.

4. Producers (Retailers) ⟶ Hoteliers, Fish Barbeques Spot ⟶ Consumers

The fourth communication channel used was identified between the agents engaged production and retailing and agents engaged in the food processing sector like hoteliers and fish barbecue spots. Fish barbecue spots are springing up rapidly in the study area. This may be due to the increasing population size, raising income and taste and preference of consumers. The hoteliers and fish barbecues operate on a relatively low but consistent demand for Nile perch fish which they source from producers and on other occasions from the retailers to meet up with consumers demand. The hoteliers in some instances buy large quantities of Nile perch fish stock from the producers and keep them in a make-shift pond to be killed as the need arises. The hotel and restaurant operators expressed that during dry season when Nile perch fish supply is relatively low; they usually buy at retail prices from the retail outlets across the study area.

5. Producers ⟶ Wholesalers ⟶ Retailers ⟶ consumers

Finally, the study observed a communication channel via mobile phone for marketing purpose between the wholesalers and the producers on one leg and between the retailers and wholesalers on the other hand. The wholesalers buy Nile perch fish in bulk from several small-scale Nile perch fish farmers and distribute within and outside the study area. In other to meet up with the demand, wholesalers make contact with the farmers ahead to fix a time for ascertaining the sizes and quantities of Nile perch fish available. The wholesale usually sell to retailers and processors within and outside the study area.

4.3 Determinants of Frequency of Mobile Phone use for Nile perch fish Marketing

The result of the determinants of variation in the number of phone calls made and received per week with respect to Nile perch fish marketing is presented in Table 2

Table 2: Socio-economic Determinants of Frequency of Phone Calls

Independent variables	Coef.	Std. Err.	Z	P>z	[95% Conf.	Interval]
Sex	-0.0471593	0.2223803	-0.21	0.832	-0.4830166	0.388698
Experience	0.0088267	0.0073771	1.2	0.232	-0.0056322	0.0232856
Marital status	0.0785888	0.1032566	0.76	0.447	-0.1237904	0.2809681
Nile perch fish as major Income source	0.0289579	0.1001942	0.29	0.773	-0.1674191	0.2253348
Nile perch fish Annual Income	3.34E-08	1.64E-08	2.04	0.042**	1.23E-09	6.55E-08
Membership of association	0.0000275	0.0000381	0.72	0.47	-0.0000472	0.0001022
Constant	2.185537	0.2608302	8.38	0.00***	1.674319	2.696755
Goodness-of- fit (Chi^2)=161.8 Prob>chi2(40)=0.00 Log-likelihood=-189.28525						

Source: Field survey, 2012

The results of the Poisson regression model parameters indicate the goodness of fit of the model

(Chi^2=161.8 df(40); p=0.00) in explaining the variations in the number of phone calls made by the respondents. Furthermore, the Poisson regression model estimated identified that of all the hypothesized factors, only the annual income gotten from Nile perch fish marketing was the only significant variable responsible for the variations ($p<0.05$), all other factors held constant. These findings indicate that agents with higher revenue from Nile perch fish enterprise make more phone calls.

The significance of these findings is that mobile phone use is required for facilitating commercialization of Nile perch fish industries enterprise in the study area.

5.0 CONCLUSION AND RECOMMENDATION

This study examined the communication channels employed for Nile perch fish marketing and the determinants of variations in the frequency of mobile phone use for Nile perch fish marketing among the agents involved in the marketing chain. Descriptive and Poisson regression model were used to analyze the data.

The study identified five communication channels used for Nile perch fish marketing and underscored the importance of high income generated from Nile perch fish farming activity as a significant determinant responsible for the variations in the frequency of mobile phone use for Nile perch fish marketing in the study area. The implication of these findings is that use of mobile phones can assist in the commercialization process of the Nile perch fish marketing and will help to forestall possible market failure as a result of the perishability nature of the Nile perch fish products.

In view of these, this study recommends the need for policymakers and the private sector to facilitate means of enabling access to mobile use. Furthermore, similar study can be conducted in other rural areas to ascertain specific determinants of mobile phone uses for agricultural marketing in the less urban areas.

REFERENCES

Aker, J.C. (2008) Does digital divide or provide? The impact of cell phones on grain markets in Niger, BREAD Working Paper No 177, University of California, Berkeley. www.cgdev.org/doc/events/2.12.08/Aker_Job_Market_Paper_15jan08_2.pdf

Animashaun, J.O., Fakayode, S.B., Idris, K.A., and Adedokun K.F (2012) Patterns and Drivers of Mobile Telephony for Sustainable Livelihood among Rural Farming Households in Kwara State, Nigeria. Paper presented at the 21st Annual Congress of the Kenyan Rural Sociological Association held at University of Nairobi between 7th-11th October, 2012

Nile perch fish Supply Chain Programme (2008) Final Report by Aquaculture Production Technology(APT) Consortium submitted to Micro, Medium and Small-scale Enterprise (MSME) Kenya June, 2008

De Silva, H. (2008) Scoping Study: ICT and Rural Livelihoods – South Asia Component (Draft), International Development Research Centre, New Delhi. http://www.enrap.org/research/icts-for-livelihoods-research/Scoping%20Study%20

FAO *Fishstat* (2008) Publications of the Food and Agriculture Organization of the United Nations

Granovetter, M. S. (1973) 'The strength of weak ties.' American Journal of Sociology 78(6): 1360-1380.

Granovetter, M. S. (1985) 'Economic Action and social structure: the problem of embeddedness.' American Journal of Sociology 91(3): 481-510.

Greene,W., (2008). Econometric Analysis, 6th ed. Prentice Hall, Englewood Cliffs.

Hempel, E., (2010) Value Chain Analysis of the Fisheries Sub-sector on Africa. A report carried out with collaboration with INFOSA and funded by the Trade Working Group of the PARTNERSHIP FOR AFRICAN FISHERIES, an AU/NEPAD Programme

Jensen, R. (2007) The digital provide: information (technology), market performance, and welfare in the South Indian fisheries sector, The Quarterly Journal of Economics, Vol.CXX11, Aug 2007, Issue 3: 879-924

Kirui, O.K., Okello, J.J. and Nyikal, R.A. (2010). Awareness, use and effect of mobile phone-based money transfer in Kenyan agriculture. A paper presented at African Association of Agricultural Economics Conference, Cape Town, South Africa, 20-23 September, 2010

Muto, M. and Yamano, T. (2009) The Impact of Mobile Phone Coverage Expansion on Market Participation: Panel Data Evidence from Uganda, Working Paper, Japan International Cooperation Agency Research Institute, Tokyo. www.jica.go.jp/jicari/publication/archives/jbic/report/review/pdf/37_05.pdf

Overa, R. (2006) Networks, distance and trust: telecommunications development and changing trading practices in Ghana, World Development, 34(7):1301-1315.

Omollo, K. (2010) Socio-economic effects of the evolution of Nile perch fisheries in Lake Victoria. Journal of Economic Surveys 13 (5), 1–36.

Ominde, S.M. (2011) Value Chain Analysis of the Fisheries in Kenya. World Development, 31(4):1301-1315.

Sife, A.S., Kiondo, E. and Lyimo-Macha, J.G. (2010) Contribution of Mobile Phones to Rural Livelihoods and Poverty Reduction in Morogoro Region, Tanzania, Electronic Journal of Information Systems in Developing Countries, 42(3): 1-15.

Winkelmann, R., Zimmermann, K., (1995*).* Recent developments in count data modeling: theory and application. Journal of Economic Surveys 9 (1), 1–36.

Zhang, G., Wang, Q., and Kolodinsky, J. (2010). The digital divide in Internet information searching: A double–hurdle model analysis of household data from Vermont. *First Monday*, Vol. 15,Number11-1 http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/rt/printerFriendly/3118/2649