WEB BASED APPROACH TO OVERCOME THE MARKET INFORMATION GAP BETWEEN POULTRY FARMERS AND POTENTIAL BUYERS IN TANZANIA.

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Abstract: *Poultry farming is very important sector in Tanzania because it improves the human health and when sold provides income, it supports the livelihoods of 3.7 million households in Tanzania. Poultry farming sector is facing a challenge of lack of market information, also absence of well-coordinated system which is harmonized between stakeholders. Both poultry farmers and buyers rely on informal market information. The findings form this study shows that key market information required by poultry farmers and buyers are price, buyer or farmer location, Poultry kilograms, amount of poultry needed by buyers, amount of poultry products needed by buyers, types of poultry needed by buyers and kind of poultry products needed by buyers. This paper discusses this key market information required by poultry farmers and buyers, also the challenges faced due to lack of market information. In order to disseminate the identified market information requirements and to overcome the mentioned challenges the web based platform has been proposed as a solution to overcome the market information gap.*

Keywords: *Market information, Web based Application, Poultry and poultry products, Poultry Farmers and Buyers.*

INTRODUCTION

Agriculture has an important role to both food security improvement and advancing human development in the African continent (Conceição, Levine, Lipton, & Warren-Rodríguez, 2016; Temba, Kajuna, Pango, & Benard, 2016). Livestock farming is one of the major agricultural activities in the country that contributes towards achieving development goals of the National Growth and Reduction of Poverty (NGRP) (Tanzanian Policy Document, 2010). The term livestock is normally defined as animals rose to produce milk, meat, eggs and wool. Livestock includes beef and dairy cattle, swine, sheep, horses, goats, and poultry. The livestock sector contributes 18% of Agricultural GDP and 4.7% of National GDP. Chickens contribute 16% of livestock GDP, 3% of agricultural GDP and 1% of National GDP. It is hypothesized that poultry farming support the livelihoods of 3.7 million households in Tanzania (Goromela, 2009; Msami, 2007). Thus, indicating high significant contribution of chicken to the national economy and social status (MoHSW, 2007).

Currently, poultry is a large commercial industry compared to few years ago due to

increased consumption of meat and eggs in recent years(International, 2010; Mohammad Khairu Islam, Mohammed Forhad Uddin, 2014). Despite the fact that there has been a larger demand of poultry products which emphasize farmers to produce more the current market infrastructure does not support the linkage between consumer and producer(Hurrissa and Eshetu, 2003; Lwoga, 2010; Njombe, Msanga, Mbwambo, & Nemes, 2011) as a result producers get loss because products don't reach customers in time.

In Tanzania, it has been a challenge for poultry farmers and buyers to obtain market information since there is no marketing tool which will update poultry farmers and buyers on the market information, also the absence of a well-coordinated system of data collection, analysis and dissemination which is harmonized between farmers, buyers and other important stockholders (Njombe et al., 2011). Most of Poultry farmers and buyers rely on informal sources of market information, mainly from family, friends, and neighbour's (Mwakaje, 2010; Msoffe & Ngulube, 2016). Chicken and eggs are sold to neighbours or local markets within the same village or villages nearby. These sales are directly done by the households. There are numerous open village markets in each region. For example, there are weekly markets in different districts in Tanzania (Kisungwe, 2012). Middlemen or traders from regional and urban markets often buy chickens on the local markets. The current poultry markets are dominated by small traders who operate as village vendors, distant wholesalers, and retailers (International W., 2010)The market is ruled by middlemen and small scale processors that act in their own interest by reducing the smallholders share and increasing final prices(El-obeid, 2012; International, 2010; Msami, 2007) The ultimate goal of every poultry farmer is to make great sales at each harvest and unfortunately, a lot of poultry farmers get stuck at this point because they spend months raising and feeding birds, when it's time to sells, they don't achieve much sells (Venture Magazine, 2018). It is a fact there is high demand for their products, but farmers don't have market information in the aspects of their business.

The Internet is the most used marketing channel to link buyers and sellers based on the fact that it has a broader reach, can easily be shared among users through search engine and it is accessible across different platforms e.g. Phones, computer. Websites are very essential applications in our everyday activities including business, communications, education, entertainment etc. "Nowadays, web applications play a significant role in the success of the business, and have grown very fast in the current market"(Panthi & Mohapatra, 2017; Sharma &

Sheth, 2004). The web has a significant impact on all aspects of our life since we look for all the answers on the internet(Chawla, Srivastava, & Bedi, 2017). Web applications spread wide because they are easy to use and maintain (Chawla et al., 2017). The significance of web applications has potential to address the challenge on provision of market information to poultry farmers in Tanzania. Poultry farming is very important sector for economic development and nutrition for both rural and urban livelihoods in Tanzania (Mohammad Khairu Islam, Mohammed Forhad Uddin, 2014; Msoffe & Ngulube, 2016; Temba et al., 2016). Access to the right information is critical to poultry farmers.

This study conducted aimed at establishing the baseline on market information requirements for poultry farmers and buyers in rural and urban areas of Tanzania. The study will then inform on the current methods for attaining market information, the challenges resulting from lack of market information, the analysis of the limitations of existing systems and proposing a solution for improving market linkages for poultry farmers.

The first part of this paper introduces an overview of poultry farming, market information challenges faced by poultry farmers and buyers and the current situation regarding market information also the significance of web applications in our daily lives. Second part of this paper is the methodology used including the study area, research design, sample size and sampling technique. The third part discusses the shortcoming of existing systems. This is followed by results and discussions. The proposed solution for reliable market linkage given in details between poultry farmers and potential buyers. Lastly the conclusion.

METHODOLOGY

The study was qualitative type. This study method was used simply because the research aims to get answers about the ‘what’, ‘how’, and ‘why’ phenomena rather than ‘how many’ or ‘how much’ which are answered by quantitative methods. Qualitative methods are good when you have small number of respondents which may be sufficient for understanding human perceptions, behaviour and altitudes, also is most applicable for ordinary setting and gives the researcher more power to control the process(Bricki & Green, 2007). Structured Questionnaire coded to open data kit was used to collect qualitative data about the current marketing situation, required market information and challenges faced due to the lack of market information in three districts which are Tanga city, Muheza and Korogwe. Also, during the survey qualified information was gathered

through observation. In this section, area of the study, research design, sample size and sampling technique are described as part of the methodology used to conduct the study.

Description of the study area

The study site was Tanga Region, Tanzania, located at -5.07 latitude and 39.10 longitudes and it is situated at elevation 22 meters above sea level. Tanga has a population of 224,876 making it one among the biggest city in Tanzania. This area was selected due to its large numbers of poultry as well as its market potential (International, 2010). The region is administratively divided into eight districts: Handeni, Kilindi, Korogwe, Lushoto, Pangani, Mkinga, Tanga and Muheza. [Figure 1] Description of the study area, 2018

Research design

Data were collected from the study area in the period of one month from January to February 2018, The period of one month was enough since the research was non-experimental which was carried out at single point in time and data was collected once, furthermore the research was time sensitive which means that the respondent will be required to adopt the technology in next 12 months.

During the study, interview was conducted to poultry farmers and buyers to find out market information needs through a structured questionnaire which was administered to them to obtain market information they need to have. Interview was used to provide information through verbal exchange and was a good tool for overall understanding of what users do, how and why?(Law et al., 2011; Sadiq, 2010) Coding was done to Open Data Kit. Open Data Kit (ODK) is a free and open source set of tools which help organizations author, field, to manage mobile data collection solutions, it involves three steps which are design a form, setup a server, and connect the device to that server (opendatakit.org, 2015). ODK automate data collection and it is easy to use. Also uses Android platform to take advantage of GPS and camera capabilities which enables the collection of reach data for later off line analysis(Washington, 2010).

Observation as a data collection method is a mode of inquiry to systematically collect information about different settings of a certain group and the objective is to better understand the phenomena of interest situated in context(Fry, Curtis, Considine, & Shaban, 2017; Walshe, Ewing, & Griffiths, 2012). Based on this definition, the observations technique was also used in this study where by the researcher went to the real environment of real users and observe the selling and buying processes without direct interference. During the study significant amount of the time was

spent visiting the farmers and buyers of the selected district and observe the whole process of selling or buying poultry or poultry products. The process was done for fourteen days, two hours each day within a period of January and February 2018, at Magandini and Muheza markets located within Tanga Region. This approach provides the opportunity to discover how do they sell their products and how do them get market information. It was observed that poultry farmers get market information through customers, friends and family. The information is not reliable which leads to poultry of the same type and kilogram be sold at different price at the same place. Also it was discovered that poultry farmers use a lot of time and energy to shout when a person pass nearby their poultry thinking that the person is a customer. They only focus to the people who pass there or who come to the market. Failure to reach more customers leads to deficit of some of the products such as eggs.

Sample size and sampling technique

The sample size of this study included 101 poultry farmers and 103 buyers, respondents from three districts of Tanga Region namely, Tanga City, Muheza and Korogwe. Simple random sampling method was used as sampling strategy to select poultry farmers and buyers so as to get the representative sample of selected respondent. Simple random sampling means that every participant of the sample is nominated from the group of population in such a manner that likelihood of being selected for all members in the study is the study group of population is equal(Kanpur Shalabh, 2010). The strength of simple random sampling lie in its advantages of being representative of the population, simple to use, free from bias and prejudice, furthermore it needs only a minimum knowledge of the study group of the population(DePersio, 2015). All respondents was given an equal chance of being involved in the study. For population that are large and unknown Cochran (1963), developed the equation mentioned below to yield a representative sample for proportions. This formula was used to estimate the poultry buyers and farmers sample size since the population was not only large but also was unknown(Israel, 1992).

$$n_0 = \frac{Z^2 pq}{e^2}$$

Where by

no = is required sample size

Z = the value on Z table at 95% confidence level is 1.96

p = is proportion of the population having the characteristics

q = is 1-p

e = is margin of error that is acceptable.

In this case

Z = 1.96

p=0.5 because the population was unknown

e is 0.1.

The sample size was 100 for poultry farmer and 100 for buyers.

SHORTCOMINGS OF EXISTING SYSTEM

There have been efforts played by the government and private organization to enhance market accessibility to livestock farmers. There are several applications for livestock but they do not provide market linkage between Poultry farmers and potential buyers.

Livestock market monitoring system is one among the application is accessible electronically in Tanzania through LINKS (http://www.lmistz.net). This application is available for the whole Africa. Livestock market monitoring system is a mechanism through which collection; analysis and dissemination of information needed to help producers, middle men and traders are organized and systematized. The limitation of this system are, the market information is available only by a request via SMS (text) message system or email, Or sometimes via worlds pace radio systems and very rare on the internet, also the updates of information on LINKS is not real time. ("LINKS(Version: LINKSV3.042409_testBuild)," 2017).

Tanzania Livestock Identification and Traceability System (TANLITS). This system is for Tanzania only it is available at http://41.59.254.106:8080. This system was developed to operationalize the Livestock Identification, Registration and Traceability, and to promote access to market and other related matters. The limitation of this system is the information provided here is not relevant to poultry farmers and not updated on time also difficult to access. ("Livestock Traceability System (TANLITS) — Ministry of Agriculture Livestock and Fisheries," 2017).

The Poultry site is an application accessible through http://www.thepoultrysite.com. The application is accessible throughout the world and provides information about poultry and poultry feeders and poultry health. The limitation of this system is that the information available here is much more about poultry health and treatment does not link poultry buyers and farmers in a market way.

Rating system (Green planet Livestock) available at http://www.greenplanetlivestock.com.au/rating-system is accessible worldwide. The limitation of this system is, it is specialises in breeding Red Angus bulls and dams that are highly marketable for increasing genetic diversity in studs and for outcross purposes in regular herds. This system does not provide any market information.

Direct livestock marketing system available at http://www.dlms.ca/default.aspx. The limitation of this system is that it only deals with cows not poultry business.

All these limitations show that "The marketing system is not well developed to enhance efficient marketing, grading and standardization, market information system, promotional activities and planned marketing which are all the attributes of efficient marketing are not adequately developed to enhance efficiency in the continuous flow of livestock from production areas to chain of markets through livestock routes"(Hurrissa and Eshetu, 2003).

RESULTS AND DISCUSSION

The analysis of the collected data was done using Radar Chart Visualization together with the support of descriptive statistics. Radar Charts are used to compare two or more items or groups on various features or characteristics (Media, 2012). Using Radar chart we have been able to understand, compare and get a clear meaning of all the collected data from two groups (farmers and buyers), furthermore it has been a useful tool to simplify comparisons between results obtained (Chaumillon et al., 2017). Radar chart is good method if you have less than three groups and less than ten factors (Media, 2012).

Profile of the respondent

The table 1 below shows detailed distribution of poultry farmers and buyers in selected districts. Most of the respondents were aged between 20 and 66 years with a mean age of 39 years. The distribution by gender of all respondents was 54% women and 46% men. [Table 1]: Selected Poultry Farmers and Buyers Tanga Region

Poultry farmer market information requirement

As explained previously in this study that poultry farmers don't achieve much sales, not because there is a shortage of demand for their products; but because they don't have market information in the aspects of their business, this has also been established by previously studies.(Abate, T., Berhanu, T., Bogale, S., Worku, 2003; International, 2010; Msoffe & Ngulube,

2016) Poultry farmers need continuous information about the market outlook and spot prices (El-obeid, 2012). Apart from lack of poultry market information, there are other factors which also contributes to low sales such as lack of quality chicks, poor market infrastructure, low quality feeds, poultry diseases and middleman (Hmad, 2005; Hurrissa and Eshetu, 2003; Mohammad Khairu Islam, Mohammed Forhad Uddin, 2014). The traditional market is ruled by middlemen and small scale processors that act in their own interest by reducing the smallholders share and increasing final prices(El-obeid, 2012). According to Msami (2007), the small-scale farmers usually depend on itinerant middlemen to sell their produce and often end up being denied fair prices.

Figure 2 below shows results on a survey on what are the market information requirements needed by poultry farmers and buyers. The figure below of market information requirements against selected districts was created during data analysis and visualize the six market information requirements needed by poultry farmers. The figure visualize what market information requirements was mentioned most in which district. These requirements were the only requirements mentioned by poultry farmer. Poultry farmer in Muheza mentioned more information about price while poultry farmer in Tanga city mentioned more information about customer location and kinds of poultry products needed. Poultry farmers in Tanga city mentioned more information about amount of poultry customer wants and types of poultry customer wants than korogwe. One of the poultry farmer in Tanga city said *"I don't have any information about price, and when I want to sell my chicken I just decide the price based on my own experience".* From data analysis it was noted that, due to unreliable market farmers get loss because they sell at a cheaper price. Furthermore they fear to scale up their business. In addition they get loss in feeds since poultry will stay long until they are sold. Due to these problems there is a need to develop a system (marketing tool) which will provide a reliable market linkage between farmers and buyers.

This market information is very important to both poultry farmers and buyers. This information will help them to make an informed decision, and give them right direction onto where they can go. Thus, a market information system is required that allows stakeholders to get information on quantity and price etc.(Hurrissa and Eshetu, 2003). [Figure 2]: Description of poultry farmer's market information requirements, 2018

Poultry farmer's current way of advertising and getting market information

Figure 3 below shows result on a survey on description of current way of advertising and getting market information by poultry farmers and buyers from a survey. From data analysis it was discovered that, the most medium used by farmers to advertise and to get market information of their poultry and poultry products is friends (neighbours), followed by internet. Getting market information from neighbours was also discussed by other studies such as (Msoffe & Ngulube, 2016; Mwakaje 2010). It was also discovered by other studies that the "existing markets are loosely integrated due to lack of market information"(Hurrissa and Eshetu, 2003). Although they also use other medium such as radio, TV, and brochures but this were least mentioned. This means that Poultry farmers mostly advertise their products through a word of mouth to friends. Poultry marketing situation analysis was done during the survey so that to discover the current way of advertising and getting market information. It was discovered that 69% of farmers advertise their poultry and poultry products, while 31% do not advertise their products. However these farmers who advertise their products they just do it in local ways, for example many of them they just tell a friend by a word of mouth. In order for this poultry farmers to build more strong business and to have a large customer base they need to change the way of marketing their products. Modern marketing requires effective promotional activities designed to acquaint products with potential buyers(Hurrissa and Eshetu, 2003). Even if we provide and improve the poultry feeds and poultry medicine to farmers and improve productivity, we cannot transform farmers unless we secure market for them, So linking farmers to markets it's not a luxury it's a must (Mammo, 2015). [Figure 3]: Description of current way of advertising and getting market information by poultry farmers and buyers, 2018

Challenges faced by poultry buyers due to lack of market information

Figure 4 below shows result on a survey on description of challenges faced by poultry buyers due to lack of market information. It was discovered that due to lack of market information poultry buyers are facing a lot of challenges including marking uninformed decision, "buyers are not able to communicate more proactively"(Tiago & Veríssimo, 2014). One of the buyers at Muheza district said this "*many times I decide to buy any kind of chicken appeared in front of me, at any price just because there is no any other choice*". If poultry buyers will have online access to marketing information then they will avoid the challenge of buying low quality products at higher price, since they will have a variety of choice and they can seek others opinion about a specific

product and its price(Stephen, 2016; Tiago & Veríssimo, 2014). And thus failure to achieve customer satisfaction will be avoided since the buyer has get the value which is more than promotion. [Figure 4]: Description of challenges faced by poultry buyers due to lack of market information, 2018

Challenges faced by poultry farmers due to lack of market information

Figure 5 below shows result on survey on description of challenges faced by poultry farmers due to lack of market information. Most of the poultry farmers are selling at a cheaper price only because of the absence of market information. Also it was discovered that poultry farmers fail to grow into their business because they only focus to the friends around them. They also get loss, if the eggs will stay longer without being sold they will get spoiled. Poultry farmers fail to decide on how much chicken to keep and thus making uninformed decision. Lwoga,(2010) said that "quick access to relevant knowledge and information enable farmers to make informed decision regarding their agricultural production activities, marketing of their agricultural produce for better profit, and benefitting from health and diseases prevention" Failure to get market information leads to arise of middleman which buy the poultry at cheaper price and sell them at higher price. Poultry farmer spend a lot of time to find the customers and fail to perform other activities [Figure 5]: Description of challenges faced by poultry farmers due to lack of market information, 2018

PROPOSED SOLUTION

Doing business through internet is a flexible and cost effective way(Biswas & Krishnan, 2004), which it will be good to poultry farmers. In Tanzania a lot has been done to enhance livestock marketing information but little has been done in poultry (Njombe et al., 2011). Therefore this study is taking the advantage of the Internet and its multimedia front-end, the World-Wide-Web (www), to propose the development interactive Web based platform for market linkage between poultry farmers and buyers. Web marketing is an important medium of marketing communication especially for business persons who seeks to build and maintain closer relationships with customers(Doherty, 2012; Lwoga, 2010). Web based forum will bridge the market information gap by ensuring farmers and buyers have access to market information by allowing farmers to be able to place marketing material (images, text, icons, video etc.) of poultry and poultry products on the website ranging from simple advertising to comprehensive virtual brochures. Furthermore, orders will be taken via Website. If firms seek to establish mutually

satisfying long-term relationships with critical customers web-based strategy is needed (Tiago & Veríssimo, 2014).

From a buyer's point of view, the use of web platform for getting market information offers a wider number of benefits, comprising efficiency, convenience, richer and participative information, a broader selection of products, competitive pricing, cost reduction, and product diversity(Tiago & Veríssimo, 2014).Though the proposed system buyers will be able to provoke the seller or to broadcast by advertising their needs and provide the specification including amount, type, price etc. The aim of web forum is to ensure both seller and buyer offer the precise information needed by themselves during conversation between the farmer and the buyer.

Byme et al., 2010 noted that web-based simulation has many benefits in comparison to classical systems and other system. Web based platform will help farmers to acquire buyers and build customer preferences, promote brands, retain customers and increase sales(Kannan & Li, 2017). A number of advantages of Web-based simulation over classical systems have been identified and can be classified as follows: Collaboration, cross-platform capabilities, wider availability, Integration and interoperability, Versioning, customization and maintenance, Controlled access and ease of use (Byrne, Heavey, & Byrne, 2010).

Framework of the proposed solution

This framework was derived from data analysis, that poultry farmers and buyers will use the web based platform to access the required market information and overcome the mentioned challenges caused by lack of market information. Poultry farmers and buyers will use smartphone, tablets or computers to access the web based platform, it will depend since nowadays the advancement of technology has brought low cost smartphone which are affordable to majority of poultry farmers in Tanzania (Mussa, Kipanyula, Angello, & Sanga, 2016).

As the framework shows, the web based platform will remove their locational dependence and, instead of relying on a geographical or locational sales force, they will also focus faraway since the World Wide Web makes the world as a single village. In the agricultural era and, recently, even in developing countries, buyers and businesses bought products close to their physical location and had them adapted toward their needs (Sharma & Sheth, 2004), and the good way of achieving this is through Web systems. Using the this proposed solution, farmers are able to place marketing material on Web servers ranging from simple advertising to comprehensive virtual brochures (O'Keefe & McEachern, 1998).

The web based platform will allow farmers and buyers to more readily engage in the poultry network and other important stakeholders like poultry feeds companies. The web based forum will solve the problem of fixed time, the time has been central to both poultry farmers and buyers. Buyers' needs access to information 24 hours a day without any limitation. Surveys show that most customers desire 24-h access to information, communications, transactions and basic customer service (Sharma &Sheth 2004).Web based forum will allow farmers and buyers to get more rapid and access to information. This framework which was derived from data analysis shows how the web based platform will work and hence achieve the aim of Improving information gathering and feedback, since web based platform will be user friendly tool and will increase knowledge to both poultry farmers and buyers, it will promote internal and external relationship, and supports decision making process. It will increase productivity and there after better outcome measure and business branding (Lim, 2017; Stephen, 2016; Tiago & Veríssimo, 2014). [Figure 6]: Framework of the proposed solution, 2017

CONCLUSION

Information is key to any business and is a major input to boost sales(Lwoga, 2010; Temba et al., 2016). Poultry farmers need to obtain correct and appropriate market information because is an important aspect to them in maximizing productivity and sales. We cannot transform farmers unless we secure market for them, so linking farmers to the market is not a luxury, it is a must(Mammo, 2015). It is obvious that people don't buy what they don't know, do you? People mostly buy products they know or have heard about and when poultry farmer advertise their products, it helps to increase awareness and subsequently, demand of products.

In solving the poultry market information challenge, variety of actions could be taken to improve access to poultry market information (Msoffe & Ngulube, 2016; Temba et al., 2016) but web application has so many advantages. The web technology offers convenience and a high speed of communication in the computer world as well as global market coverage (universal access from any machine connected to the internet) compared to other marketing channels furthermore it offers collaboration, cross-platform capabilities, Integration and interoperability, Versioning, customization and maintenance, controlled access and ease of use. Web application needs no installation costs, and always have automatic upgrade with new future for all users, and it is independent of the type of the browser in the client machine(Byrne et al., 2010; Panthi &

Mohapatra, 2017). In the agricultural era, businesses bought products close to buyers physical location and had them adapted toward their needs (Sharma and Sheth 2004), and the good way of achieving this is through Web systems. Using the Web, companies and individuals are able to place marketing material on web servers ranging from simple advertising to comprehensive virtual brochures (O'Keefe & McEachern 1998).

As we are solving the problem of poultry market information, the following factors also need to be taken into consideration, because they also hinder farmers and buyers to have access to market information, such as "lack of knowledge, lack of awareness, ignorance and poverty. Also personal and economic aspects might also prevent farmers form accessing market information"(Lwoga, 2010; Msoffe & Ngulube, 2016). Lack of the market infrastructure also hinder access to market information(Hurrissa and Eshetu, 2003; Msoffe & Ngulube, 2016).

Reliable, timely and consistent livestock marketing information is essential for efficient, effective and transparent marketing operations. Unavailability of timely information constrain poultry farmers from generating maximum profit from their poultry and poultry products as they get little return on what they sell, consequently they hesitate to improve the quality of the poultry and poultry products. Poultry farmers require adequate information in order to improve their knowledge about poultry farming activities.

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