

Impacts of the Distribution Process on Onion Supply Chain Management in Singida Urban District

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ABSTRACT: *The objectives of the study is to identify the impacts of the distribution process on onion Supply chain management in Singida Urban District. This study was carried out in Singida Urban District which is one of the famous places in Tanzania practicing onions farming however, there are other regions such as Arusha, Mbeya, Kilimanjaro, Manyara, and Njombe where the onions are produced. Population is set of a wide group from which, the sample is drawn for the purpose of generalized opinions of many by small numbers of representatives. This study targeted warehouse operators, farmers, retailers, distributors, consumers and key informative personnel involved in onions produces within the study area of Singida Urban District. The study used a sample size of 100 respondents less than the targeted sample size of 138 obtained from the estimated population large than 1000. Based on studies in Ethiopia, the onion supply chain took about 0.44% of the entire agriculture participant's dominant crop for commercial purposes. The results suggest that the distribution channels used by majority of onion farmers were whole sellers. onion SC influence by the distribution process of onions, such as number of market locations and distribution channels used to use a two-way ANOVA study revealed that different distribution channels have different variability in the onion supply chain the types of distribution channel used were statistically significant [$F(1, 86) = 1.25, p = 0.01$].*

KEYWORDS: supply chain, supply chain management, distribution process

INTRODUCTION

Horticultural crops are natural plants; they are important for producing human security, by providing essential nutrients and enhance the economy of people (Sumari, 2017). Some of these products have high water contents such as leafy green to save its freshness life which when shrinks it detriment the crops life, while others are not, such as marrow, roots and allium plants (Kader, 1992). These 2 vegetables are perishable in nature and its complexity starts after being harvested. Fresh vegetables cannot live longer without the necessity technology to prolong their shelf life in supply chain from farmer to final consumers, (Imahori, 2014). Other challenges affecting the

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supply chain of fresh vegetables (FV) in developed countries is lack of awareness to unknown technological, and accessibility of market information (Maity and Sharangi, 2013). Fragments of supply chain (SC) activities, of which a large part of the chain is dominated by local farmers themselves, unequal balance of financial status between actors, which are most benefiting the middlemen who manipulate prices from farmers to the final consumer, deficit of cold supplies to regulate the freshness of the produces during storage and transportation as proposed by Negi and Anand (2015). Kumar et al, (2017) justified that, there are challenges due to water stress to drought regions in India, which many vegetables reduce nutrients quality of the fresh vegetables produced United State Agency for International Developments (USAID) (2013) re-counted that, most of vegetables have short shelf life to maintain its quality in Supply chain. However, Kilimo Trust (2017), advocated that, onions from western regions of Tanzania are proposed to be of more quality and long-life span than those of neighborly countries. Nonetheless, still needing effective and efficient SC to reduce losses and costs along the supply journey. In other studies (of Bray et al., 2000 and Kader 1992) justified that it is inevitable to stop losses of fresh vegetables in supply chain due to the uncontrollable environment where plants grow, but gradually organizations and individuals are struggling to minimize losses to some extent. Kader (1992) proposed 6 that, if the supply chain needs to be improved the loss of onions can be reduced when farmers possess biological knowledge and learn to be careful on handling onion crops practices. Gustavsson et al., (2011), argued that, normally the losses of fresh vegetables obtained from post harvesting activities such as, at the time of harvest, storing, and moving the crops to distant areas. Also, many studies conducted in Tanzania, revealed that, SC affected by transaction costs from production stage to transportation activities (Mkenda and Campenhout, 2011; and Mwashia and Leijdens, 2013). There is insufficient storage capacity, most supply chain actors fail to own it and to hire it is costly. Due to costs appearing high, storage of onions done traditionally and causes moisture and shrinkage (Agri Pro Focus, 2016). Supply chain activities lack collaterals to support financial accessibility, disorganized chain activities, poor road and market infrastructures, (HODECT, 2010). Based on the above stated statement of problems, this shows there is a need for further study on supply chain practices such as processes of harvesting, operational of warehouses, and distribution activities for the purpose of explore more information on the issues affecting the effectiveness of supply chain managements of fresh vegetables on onions in Singida urban District. The information will assist on to improve horticultural productivity, reduce costs, post harvesting losses, and improve quality level of onions crops in supply chain and livelihoods. The objectives of the study is to identify the impacts of the distribution process on onion Supply chain management in Singida Urban District

LITERATURE/THEORETICAL UNDERPINNING

Definition of the Key Terms

Supply Chain Lysons and Farrington (2006), defined supply chain as a network of organizations which performs various processes and activities to produce value, in the form of products, and services for the end customer. Also, Christopher (2011) defined SC as the organizational networks

Publication of the European Centre for Research Training and Development-UK that comprise downstream and upstream relationship, in the several processes and functions that create value in either products or services to the final customers. Hugo (2016), defined that supply chain as the organization and business functions that required preparing, creating and utilizing goods or services. Lambert et al. (1998) explained that SC is the configuration of the companies that provide goods or services to the customers. Chopra and Meindl (2007), noted that supply chain involves a well-defined process in meeting customer's demands through direct or indirect role played by the all supply chain partners such as manufacturer, traders, customers, retailers, warehouses and transporters. In any organization, such as wholesaler or Distribution Company, the supply chain is important to undertake all the functions of ensuring the customer's orders are promptly met as demanded at low cost and high service value. In relation to the study, the supply chain is an incorporation of all actors from the instant point of farming process to the final user of the onion produces. Hence supply chain involves the exchange of information and materials within the intra organizations upward or downward from the inception point of the need to end point to meet customer demands in effective ways (CSCMP, 2010).

Distribution Process

Distribution means the moving of goods or materials from supplier to final consumer through the distributor's office, retailers or sales offices. Distribution activities are such as maintaining information and order processing, packing, handling, storing, distribute and transporting requisitions to ultimate user, (Arnold et al, 2008). Moving the onion crops can be through the means of different transportation such as road, air, and rail; by using trucks, aircrafts or ship containers for the aim of reaching the market demands and retailer market premises. Rawat and Ansari (2009) suggested some precautions on handling onions when transported in order to reduce the losses, handling with care the packages, avoid higher height arrangement to avoid higher temperatures to the goods, use appropriate special equipment in related transportation weather changes.

Transaction Cost Theory

Transaction cost theory had been proposed by Ronald Coase (1937). He advocated on the transaction activities which associates to the cost such as searching information of whom to deal with and sourcing, negotiation and decisions, contract enforcement and policy making. Williamson (1970) came up more scientific results of his empirical research focused on proposed best contractual arrangements in favors of problem of interrelationship between contractual parties, determinants for transaction cost and specificity assets, which needs governance structure to reduce the costs associated with transaction between integrated business firms or institutions. In relation with the study, the supply chain actors should be aware of the costs associated by each one as decided to play individual roles as independent or plays in integrated roles of the chain. Independently means that, farmers should take into account all costs in harvesting process such as the cost of harvesting (root up the crops), drying the onions, storage facilities and equipment's, transportation (searching, arranging and expediting) of the produces

Publication of the European Centre for Research Training and Development-UK until it reach the targeted market and over all losses costs to the produces or an asset. All the costs are bearable by the farmer, seen as overburdened with the cost, as most growers are smallholders (Williamson, 1970).

Shepherd (2007) argued that, farmer-buyer dyad is common marketing network used by small farmers. Every chain starts with a farmer and the relationship sustains when created reward and risk levels to share for themselves as dyad, (Lee 2004, Narayanan and Raman, 2004). When farmers decide to enter into contractual relationship with other actors in a supply chain, they should be aware of the determinants associated to the interrelationship costs, such as uncertainties, rational bonded, specificity assets, frequency, and complexity (Williamson, 1981; Jaffee, 1995; Poulton and Lyne,2009).

Conceptual Framework Model

This section described the conceptual framework on supply chain of fresh vegetables that guided the study. This framework guided the present study in the assessment the factors influencing supply chain of onions in Singida urban area. The ideas in this framework have been borrowed from the Resources based theory and transaction based theory. Figure 2.1 is a graphic presentation of proposition.

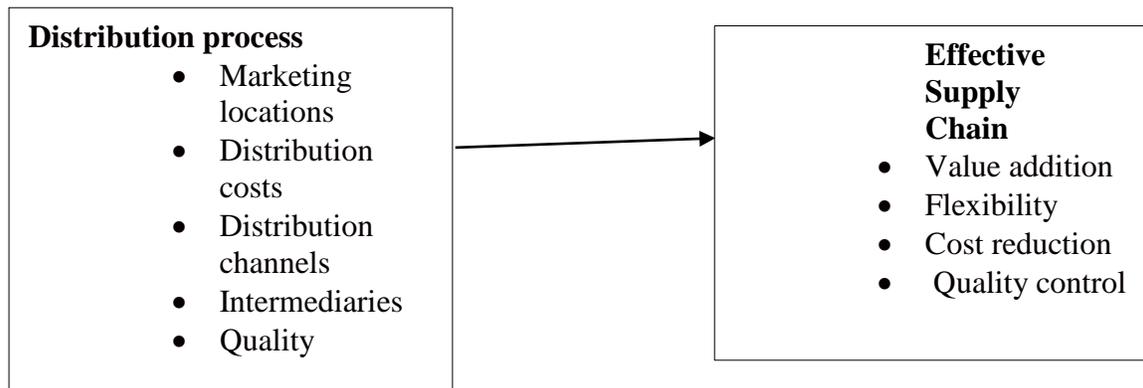


Figure 1 Conceptual Framework

RESEARCH METHODOLOGY

Research Design and Approach

The researcher used a cross-section survey design to collect all data from one point at the same time in April 2019 from farmers and onion's traders in Singida Urban District. A cross-sectional research design is the technique which involves looking at data from a population at one specific

Publication of the European Centre for Research Training and Development-UK point in time (Mazengo and Mwaifyusi, 2021). The study utilized both quantitative and qualitative research approaches. Both approaches were used because so as to increase reliability of the findings, moreover, the researcher applied interview and questionnaire to obtain clusters of different data. The data was collected from wholesalers, farmers, retailers, customers and key informants such as cooperative union officer, agricultural officer and trade officer.

Study Area

This study was carried out in Singida Urban District which is one of the famous places in Tanzania practicing onions farming however, there are other regions such as Arusha, Mbeya, Kilimanjaro, Manyara, and Njombe where the onions are produced.

Targeted Population

Population is a set of all members who are existing or a set of objects that needs to be studied by a researcher. A population can be of finite or infinite (Kothari, 2014). 27 Population is set of a wide group from which, the sample is drawn for the purpose of generalized opinions of many by small numbers of representatives. This study targeted warehouse operators, farmers, retailers, distributors, consumers and key informative personnel involved in onions produces within the study area of Singida Urban District

Sample and Sample Size

A sample is a group of few participants selected to represent the whole population. The sampling methods can be categorized as probability or non-probability sampling, whereby within probability sampling every member within an identified population may be selected to represent others while in non-probability sampling a certain member have the possibility of being selected to represent others while others are not due to various factors such as costs, availability and willingness. Sekaran (2006) said that sample size is defined as the subset contains number of members or objects which drawn from population for the purpose of concluding the universe. The sample size calculation was based on proportion of stakeholders engaged in onion's faming within the agriculture sector in Singida Urban District.

The study used a sample size of 100 respondents less than the targeted sample size of 138 obtained from the estimated population large than 1000. Based on studies in Ethiopia, the onion supply chain took about 0.44% of the entire agriculture participant's dominant crop for commercial purposes. The sample size of respondents was determined by the application of the formula by Israel (1992).

$$n = \left\lceil \frac{Z^2 p(1-p)}{e^2} \right\rceil$$

Where Z is the confidence level at 95%

p is the proportional of population involved in the onions supply chain in agricultural 0.44.

ϵ is the margin of error, of which 6% was chosen.

n is the sample size

Sampling Techniques

The technique used to select the study respondents is probability sampling. The Probability technique provides each member, an object, or item, an equal chance to be selected to be a sample to represent the entire population, (Kothari 2004). This study used probability technique which gave each members of supply chain stakeholders an equal chance to be chosen to represent the population of Singida Urban District cluster. The study selected a probability method to draw the number of respondents to answer the study objectives from study area. Due to the large sample size of the study researcher divided the respondents into their relatively cluster groups of farmers, distributors, retailer's wholesaler's customers and informative personnel. By using simple random sampling selection, the researcher selected samples from the stated clusters.

RESULTS/FINDINGS

This chapter gives comprehensive details of the data collected in the study, together with the analysis performed in order to answer the research questions. Most of all it discussed the findings from the analysis and interpretation from the data obtained to provide a meaningful justification of the study objectives conceived earlier in the study. The study involved the examination of how harvest, distribution and storage processes impact onions supply chain in Singida Urban District. The data was to be collected from a sample of 138 respondent who are stakeholders, on onions business however, due to different reasons such as time limit, schedule conflicts and financial constraints data collected from 100 respondents. The respondents included famers, sellers (retailers and whole sellers) consumers of onions within the region, and key informative personnel in supply chain activities. Therefore, 100 respondents were considered as 100% of the sample size. Data analysis for both descriptive statistics and inferential statistics made it possible with the help of Statistical Package for Social Science (SPSS-21 version) software.

Distribution Process Impacts on Onions Supply Chain

As part of supply chain, distribution of onions produce also was investigated in this study to see if it is really affected by the supply chain. Results suggested that about 42% of all the respondents use whole sellers as their distribution channel while about 25% use retail markets by selling on their own, and lastly 33% used middlemen. This result suggested that the wholesalers are still the choice among many farmers for selling their harvests. In addition, since the wholesalers are almost always available within the area, it is also easy for the farmers to sell their crops as it guarantees them quick money after harvest. This similar case also applies for middleman. Results are shown in a table 1

Table 1: Distribution Channels Used by Farmers

Age	Frequency	Percentage
Whole sellers	42	42
Retail markets	25	25
Middle man	33	33
Total	100	100

Source: Researcher, (2019)

Onions Quality during Distribution Process

Onion quality deteriorated with time and during distribution after harvest, the way deterioration occurs it affected the price of onions. In this study, it was revealed that 61% of respondents disagreed that the onions quality was not maintained during the distribution process. In addition, only 39% of respondents agreed with the statement. Results are shown in a Table 2. Since the large percentage of onion farmers disagreed that the onion quality is not maintained during distribution process, this finding suggest that the supply chain is poor and the process of onions is vulnerable to state at which produce arrive at customer for the selling which indicates faults in the supply chain altogether.

Table 2: Onions Quality Maintained during Distribution Process

	Frequency	Percentage
Yes	39	39
No	61	61
Total	100	100

Source: Researcher (2019).

Marketing Location and Distribution Process

For farmers, the market location is an important aspect of supply chain as it determined which option is the best for the farmer in relation to type of distribution process to be used such that to use wholesalers, retail markets or middlemen. The number of market location(s) which includes local municipal markets and distribution centers as well as in storage facilities where

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 there is also selling and buying agreements made and a farmer has options helping making the supply chain effective or not taking into account the distribution channel that is the most convenient to that farmer. Results suggested that, 47.4% of farmers have two market locations while only 24.6% have a single market location and only 28.1% have 3 locations respectively. Results are shown in a Table 4.3

Table 3: Marketing Locations among Farmers

Number of market locations	Frequency	Percentage
1	21	24.6
2	41	47.4
3	24	28.1
Total	86	100

Source: Researcher (2019).

Distribution Process Impacts on Onions Supply Chain

The two-way ANOVA between groups was conducted to check how the variability of onion supply chain is influenced by the distribution process of onions, such as number of market locations and distribution channels used. Prior to analysis, the total score for the indicators of supply chain in onion farming was obtained from the respondents with regards to supply chain indicators. This includes the value addition, flexibility, cost reduction and quality control. Prior to analysis the internal consistency of the variables used to obtain scores was investigated using Cronbach alpha test to see how well the variables hang on together. Results where 0.77 value for Cronbach alpha which is above or equal the threshold 0.7 which suggest we can proceed with the analysis since the variables does agree with one another (Pallant, 2003).

Table 4: Results from Two -Way Anova

	Df	Sum of squares	Mean squares	F	p-value
Number of market locations	1	43.63	67.23	0.65	0.86
Type of distribution channel used	1	54.32	43.21	1.25	0.01

(Source: Researcher, 2019)

Results suggested that, the types of distribution channel used were statistically significant [F (1, 86) =1.25, p=0.01]. The main effect that different distribution channels have different variability in the onion supply chain. Furthermore, the post hoc analysis suggest that on average there was a statistical significant difference between the retailers and wholesalers [F (2, 84) =2.23, p=0.00] in terms of how their variability in supply chain, while between the wholesalers and the middlemen and between sellers middleman and wholesalers no.

Distribution Processes and it is Influence on Supply Chain

The results suggest that the distribution channels used by majority of onion farmers were whole sellers. Although, these people are considered as the middle men by some farmers such that they are the one who provide immediate cash to farmers after harvesting and farmers do need to go to retail markets but still in the supply chain whole sellers gain the most benefits than farmers in the whole SC. As a result, this study is different from other studies of supply chain of vegetables conducted in China by Stringer & Croppenstedt, (2009) where they revealed that the famers are the one who obtain the most profit out of the vegetable farming. The key notable component of the farmers is their farming is scientifically aided by proper infrastructures supply which assures the supply chain to have impact in coordination among its different components. Since distribution depends on financial capital amongst the middle person which in most cases have the final decision on to whom to buy and where end up profitable than farmers as they can adjust their business strategy depending on quality, availability, supply and demand compared to famers. This practice in one way or another reduces the morale of farmers with low financial capital on onion farming all together.

Conversely, the study done by Daniels, H. and Fors, S. (2015) of onion supply and the value chain in Ethiopia suggest similar finds that the whole sellers are the most profitable and the farmers are really affected by the distribution channels of supply chain. The main reason is that these stakeholders do no pay taxes and do not have official markets to sell their product such that they depend more on convenience and negation skills as they go to buy for farmers during harvesting

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time for cheaper prices. Poor supply chain and logistical inefficiencies hamper the distribution of onions as the onion's travels through the supply chain which ultimately affects the margins in terms of prices of onions to farmers. This presents a challenge to government in having a well enabled system for famers produce which can guarantee a distribution that adds value to supply chain such that profitable margins are realized for both farmers and distributors.

DISCUSSION OF THE FINDINGS

China by Stringer & Croppenstedt, (2009) where they revealed that the famers are the one who obtain the most profit out of the vegetable farming. The key notable component of the farmers is their farming is scientifically aided by proper infrastructures supply which assures the supply chain to have impact in coordination among its different components. Since distribution depends on financial capital amongst the middle person which in most cases have the final decision on to whom to buy and where end up profitable than farmers as they can adjust their business strategy depending on quality, availability, supply and demand compared to famers. This practice in one way or another reduces the morale of farmers with low financial capital on onion farming all together. Conversely, the study done by Daniels, H. and Fors, S. (2015) of onion supply and the value chain in Ethiopia suggest similar finds that the whole sellers are the most profitable and the farmers are really affected by the distribution channels of supply chain. The main reason is that these stakeholders do no pay taxes and do not have official markets to sell their product such that they depend more on convenience and negation skills as they go to buy for farmers during harvesting time for cheaper prices. Poor supply chain and logistical inefficiencies hamper the distribution of onions as the onion's travels through the supply chain which ultimately affects the margins in terms of prices of onions to farmers. This presents a challenge to government in having a well enabled system for famers produce which can guarantee a distribution that adds value to supply chain such that profitable margins are realized for both farmers and distributors.

CONCLUSION

Results suggest that 42% of all the respondents use whole sellers as their distribution channel while 25% use retail markets by selling on their own and lastly about 33% use middle men. This suggested that the wholesalers who are sometimes called middle men are the choice among many farmers for selling their harvests. Also, in the study, it was revealed that 61.4% of respondents agreed that onion quality is not maintained during the distribution process. In addition, only 38.6% of respondents agreed with the statement. For marketing locations, results suggest that 47.4% of farmers have two market locations while only 24.6% have a single market location and 28.1% have 3 locations respectively. Finally, the results from two-way ANOVA suggested that only type of market location is the one influenced variability of supply chain supported by statistical evidence.

Recommendations

To Identify the Impacts of the Distribution Process of Onions in Supply Chain This study recommends that the local municipals locate the market location at the center, where are easily accessible and can be navigated by farmers themselves. This include mapping of farmer's geographical location and see which location will provide the quickest and easy access to farmers for selling their crops. Also, the local municipal of Singida should encourage farmers, on what the best way to enhance distribution process of onions that involve other stakeholders to avoid or reduce farmers experiencing loss due to quality deterioration. It is recommended that wholesalers be registered by municipal and engage with farmers through authorization from municipals. This will enforce adherence to regulations and also promote fair competition and business strategies for both farmers and wholesalers who are considered as middle men in the business.

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