



Supply Chain Management and Challenges Facing the Food Industry Sector in Tanzania

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Abstract

The complexities of food supply chain impose enormous challenges to the processors. As compared to multinational food companies operating in Tanzania, local firms have been performing inefficiently or going out of the business because they could hardly withstand the competition. SCM in the food industry sector was studied in a qualitative survey covered 23 food processing firms in Tanzania, with the purposes of identifying the existing supply chain operation, knowledge of SCM concept and challenges facing the sector. The findings of this study suggest that a lot of efforts need to be addressed to ensure that food processors benefit from SCM concept. The understanding of SCM concept among the processors seems to be low, thus, hindering them from tapping up the advantages that SCM concept offer. The sector still faces a number of factors which impede the firms to grow fast and compete in the global market. Such factors include technical know-how, research and development, capital, managerial and physical infrastructures.

Keywords: Supply chain management, Inventory management, Customer perceived value, Food industry

1. Introduction

Food industry is one of the largest branches of industries in Tanzania which is made up of micro, small, medium and large processors. Micro and small food processors operate in an informal sector and use labour intensive and poor technologies, while medium and large scale industries use improved and modern technologies with large capacity output. Small and medium industries are the majority of local manufacturers of consumer goods. The largest production sectors of food industry are brewing, milling, baking, confectionery, animal and vegetable oils, sugar, dairy products, fruits and vegetables, soft drinks, fish and meat processing, ethyl alcohol distillation, spirit blending, wines, bottling of natural spring and mineral waters, among others.

The current economic environment in Tanzania has provided opportunities for the private sector to participate actively in investment activities as opposed to the previous socialist policies which put investment activities under state control. The new economic environment has created significant incentives for local and multinational investors to invest in different sectors of the economy. From the early 1990s the government launched a deliberate programme to restructure and privatise public owned enterprises. Government withdrawal of state control brought a big challenge to the industry sector. Since then the country has witnessed a number of firms which were run by local investors performing inefficiently or going out of the business because they could hardly withstand competition from local multinational invested companies and importers.

As the country experiences more pressure from globalization, the food industry sector is also subjected to the increased competition in the domestic market. The processors have to meet those challenges by responding very fast to avoid delays which can take them out of the business. The main objective of this paper is to ascertain the existing supply chain, knowledge of supply chain management (SCM) concept and the challenges facing the food processing industry sector in Tanzania. The understanding is intended to provide background information which may help to design appropriate supply chain strategies that can be adopted for circumstances suitable for the current global challenges prevailing in the country.

2. Literature Review

The food industry sector is vast and diversified, categorized by different segments such as fresh food industry, organic food industry, processed food industry and livestock food industry. Each segment need different supply chain strategies such as procurement and sourcing, inventory management, warehouse management, packaging and labeling system, and distribution management, thus, the uniqueness characteristics of food supply chain (Georgiadis et al. 2005). Despite the

wide acceptance of SCM as a tool which provides opportunity for the firm to have competitive advantage, the concept of SCM in many developing countries including Tanzania reported by different researchers and academicians have been mainly focusing in agricultural products and related problems such as lack of appropriate information, post-harvest losses, lack of electricity among others. Eskola (2005) addressed the marketing of agricultural produces and SCM in Tanzania, analysis of the constraints for the development of banana industry in Indonesia and Australia is reported by Singgih and Wood (2004), trust and power dependence into an analysis of agribusiness supply chain is reported in Batt (2004). Akyoo (2005) described a supply chain structure of spices in Zanzibar. Most of these papers present the complexity supply chain of raw agricultural products. They addressed issues on product perishability, marketing structure, transportation, product quality, post-harvest losses among others. However, investigation into cognitive and affects of SCM concept in food processing industries have been surprisingly understudied making relevant literature in the sector to be limited. Cox and Chicksand, (2005) discussed the strength and weakness of lean management thinking in the food and farming supply chains. Based on a case study of red meat supply they argued that the adoption of lean practices internally may be appropriate for all participants in the industry, but the inter-organizational aspects of lean may not be easy to apply in practices, nor appropriate, for many participants. For multiple retailers adoption of lean principles may lead to increasing profitability. On the other hand for the majority of participants, adopting lean principles may result in a high level of dependency on buyers and to low or declining levels of profitability.

Perishability of agricultural produces creates uncertainties within the supply chain in respect to product quality, safety and reliability. Since supply chain partners are aware of deterioration problems, to avoid losses, the partners tend to stock less quantities. To ensure product quality of agricultural raw materials for a long time requires efficient designed storage facilities (Georgiadis et al. 2005) that many firms can not afford to buy and install. Similarly, the challenge happens on processed food products because of limited shelf lives. The firm may opt to produce and stock less quantities to avoid losses resulting from expired products, but it is quite clear that if the demand turn to be high other customers willing to buy will turn away without the product because of stock out and vice versa.

SCM encompasses a set of interdependent companies that work closely together to manage the flow of goods and services along with the value-added chain of agricultural and food products, in order to realize superior customer value at the lowest possible costs (Wood, 2004) as well as the associated information flow (Byrne 2006). The supply chain includes not only the processor and the suppliers but also the transporters, warehouses, retailers, and even the customers themselves (Chopra and Meindl, 2008). Exploring seriously the potential of SCM concept, a firm may realize a significant revenue growth (Gunasekaran, et al. 2008). Simchi-Levi et al. (2003) have shown that using more supply chain strategies, the firm can save about 10 percent of its annual operation. Application of SCM strategies have been widely pronounced in other manufacturing and service providing sectors such as in auto-mobiles, electronics, books, hotels, telephone companies among others. For details and more literature on SCM few to mention, the reader is referred to Chopra and Meindl (2008), Gunasekaran et al. (2008), Bellantuono et al. (2007), Fawcett et al. (2007), Bowersox (2006), Reina and Trck (2004), Wheatley et al. (2004), Woods (2004) and Simchi-Levi et al. (2003).

Wood (2004) identified several reasons for rising interest in SCM in agribusiness industry. The reasons at suppliers' level include:

- Greater differentiation of food products.
- The competition for consumer expenditure.
- Changing in the operating environment.
- Improvement of product quality.
- Ability to ship products in cost-effective ways provides consumers with flexibility from which to choose.

While at consumer level the following reasons have been put forward:

- Consumers' sensitivity to quality, safety, health and nutritional factors of food products.
- Interest in place of origin and means of production, including non-food values such as environmental sustainability and animal welfare.

These reasons identified, similarly raise interest for the food processing sector to review the operation of their supply chain. Consumers' ability to choose from alternative suppliers exerts greater pressure than ever before over the food production and distribution systems. In turn it becomes clear to food processors that business success depend on responsiveness to consumer demands.

Moreover, Wood (2004) presented the understanding of the concept and implications of SCM in developing countries focused on its application in planning, developing and managing agri-business. In developing countries supply chain are long and fragmented with multiple small holders not only in agricultural products (Wheatley et al. 2004) but also in the food processing sector. It is quite clear that the driving force of developing interest in SCM is its advantage towards competitiveness; a critical factor is how effectively the chain addresses customers' wants and needs. Porter's argument

presented in Wood's (2004) is that, the difficult in developing a strategy, is to do something different that is hard for competitors to copy. He proposed human capabilities and relationships lead to a sustainable advantage, because these approaches are intrinsically hard to copy.

3. Research Methodology

Detailed structured questionnaires were designed to identify the way in which food processors in Tanzania manage their supply chain. For places where internet and emails were not accessible or available, questionnaires were delivered physically and filled out on spot. Before distribution, preliminary trial was conducted to ensure that all questions were comprehensible and no difficulties in answering. Managers and individuals with decision making power within the firm were eligible to respond to the survey questionnaires. The survey research method was chosen because it offers opportunity to study a phenomenon in its own natural settings where complex links and underlying meanings can be explored. It is also appropriate because the knowledge of SCM in the food industry in Tanzania is limited. The method helps to generate in-depth contextual information which may result in a superior level of understanding that allows the researcher to draw a reasonable conclusion. Furthermore, it avoids the bias of asking different questions from different processors by using the same formulation for all of the respondents; and it can be designed in advance to cover the desired areas of interest.

The respondents were required to respond to the questions which were grouped into several sections addressing the research objectives. The questions focused on the processors' knowledge towards SCM concept, inventory management, customer service, marketing, order processing, application of information technology and the challenges facing the food processing sector.

The survey was only designed to cover different food processors i.e. large scale processors, small and medium food processors while excluding other major players in the food supply chain such as primary and secondary raw material suppliers, distributors, wholesalers, retailers and ultimate consumers. The survey intended to capture detailed information from brewers and beverage producers, millers, fruits and vegetable processors, dairy industries and water bottling companies. The data were collected as part of a larger research project focusing on supply chain contracts in the food industry sector. The sample was therefore chosen from different regions in Tanzania to reflect the large area in which food products are produced and distributed.

The survey managed to cover a total of 23 food processors, 3 from brewing industries, 3 dairy industries, 4 millers, 5 fruits and vegetable processors, 4 beverage industries, 3 water treatment and bottling companies, and 1 confectionery processor. The data collected was all qualitative.

4. Results and Discussion

The overall results of the study described in the next sections below suggest that, the current situation in which the food industry sector in Tanzania operates is still far away to realize and tap the advantages that SCM concept offer in the business. The purpose of this study was, however, to identify the existing supply chain operation, knowledge of SCM concept and challenges facing the food industry sector.

4.1 Processors' Knowledge on SCM Concept

The understanding of the concept of SCM differed significantly when compared to respondents from multinational food processors and local invested food processors. Multinational invested companies which are in the category of large scale processors had a clear understanding of the concept. However, most of them referred the term SCM as similar to *operation management*, the current existing system of operation in their business. "*Multinational invested companies referred to are those companies which are also operating in other countries around the global*". The understanding and implementation of some of the SCM concept in large scale firms has led them to have large market share in the local and international market. The multinational food processors have managed to identify and establish some sort of coordination and relationship among the supply chain partners in which information flows from down to upstream. Such information has been useful in production planning and distribution. Moreover, demand uncertainty has been reduced significantly leading to customer satisfaction as well as low or no returns of their products. Buy-sell is the only relationship which exists in local invested food processors. Supply chain literature (Simchi-Levi, et al.2003; Chung-Chi and Cheng-Han, 2008) suggests that in such operations where coordination does not exist, it is inevitable to have inefficient supply and dissatisfied customers. Uncoordinated information from downstream to upstream of the supply chain has created a lot of wastages and losses for most of food processors. This can be justified by the recall of expired products from the market as the result of excessive supply. The distorted information implies that the processors work on unreliable amplified (bullwhip effect) demand data and this has serious cost implication (Lee, 2004; Ouyang and Daganzo, 2008). For example one of the fruits and vegetables processing factory visited had a recall product of about 10 *tones* of tomato sauce; this was a huge loss for the company to recover. Due to the nature of the food industry products, products are subjected to the constraints of limited shelf life (Minegish and Thiel, 2000); it is not easy to recover any materials whenever expiry date is due. Therefore the company has to incur loss on costs such as labor costs,

transportation costs, destruction costs, primary and secondary raw materials etc. Several researchers (Wee and Yang, 2004; Hunt, et al. 2005; Ketikidis, et al. 2008) have shown that such kind of losses resulted from uncoordinated channel can be minimized through close coordination between partners within the supply chain including customers by forming alliances or sharing information and knowledge to create a collaborative competitive and cost effective supply chain.

Huge financial capital accessible by larger multi-national companies has provided them with an opportunity to employ skilled and competitive employees, and at the same time acquiring modern technologies required in the current business environment. As an argument put forward by Porter in Wood (2004), human capabilities and relationships lead to a sustainable advantage because it is an approach that can not be easily copied by competitors. These companies have been able to establish research and development (R&D) departments to develop products or brands which meet consumers' demand and thus increasing their competitiveness in the market. For small and medium food processors, financial capital remain to be one of the obstacles hindering them to come up with substantial supply chain strategies which may help to exert huge pressure in the market's competition.

4.2 Inventory Management

Inventory exists at every stage of the supply chain as raw materials, semi-finished or finished goods. They can also be in process between different locations. Holding of inventories can cost a company about 25% to 40% of their value. Lost sales and customer dissatisfaction can occur as the cause of inventory; therefore efficient inventory management is very important in supply chain operation and it helps the firm to maintain competitive advantage (Stock and Lambert, 2001; Axsäter, 2006). In this area only large scale multi-national companies have set a number of strategies to ensure that costs arising from inventory are minimized. Such strategies include; setting up optimal and minimum of raw and finished products, employment of first in-first out (FIFO) policy, minimum stock reorder for each item and periodic stock evaluation. One of the respondents from the brewing industry reported to incur inventory cost of about 2 to 3 % of their value i.e. from rental, interest foregone, obsolescence/damage/expire, insurance, handling, security and stock valuation.

On the other hand, most of the processors payless attention on inventories available at their downstream partners' (wholesalers and retailers) stores. Processors' productions are based on *produce-to-stock* strategy to avoid dissatisfaction of customers if the demand turns to be high. Ignorance of inventory at wholesalers' and retailers' stores had the following impacts to the processors:

- Piling up of the stocks in the processors' warehouses
- Spoiled products due to obsolescence (food products are short cycle shelf life items). Expired products can not be reprocessed for human consumption
- Increased distribution and recall costs
- Increased inventory cost
- Significant decrease in profit margin resulted from spoiled products

Almost all of the processors responded to this study admitted to receive returns from the market as an expired products or products with quality defects. However, the magnitude of return differed from one processor to another but with the range of 0.05 to 20 percent of the product delivered to the market.

4.3 Pricing Strategy

Pricing is a significant attribute through which a firm executes its competitive strategy and therefore, price is identified as one of the most sensitive factor among the relationship between suppliers and the customers (Li and Liu, 2006). Suppliers have been using discounts as a tool to entice customers to buy (Lau et al. 2008, Schotanus et al. 2009). The processors admitted to use quantity discount (up to the maximum of 5%) at different times of the product's life cycle, and customers enjoy huge discount when the product is near to the expiry date or during the season in which product's demand is low. In addition to discounts, large scale food processors e.g. brewers offer price differentiation for premium brands and also promotion prices when introducing a new product into the market. Interestingly all processors set their suitable wholesale prices while leaving the retailer with the mandate to determine retail price. Nevertheless the processors experience decrease in sales volume if retailers set high retail prices because most of customers may not afford or opt to use alternative product if not to buy the product from other competitors who offer an affordable price, thus the weakness of uncontrolled retail price.

The production technology used may have a significant cost implication on the product. Most of small and medium food processors use batch production system, changeovers in batch wise production make small production runs more expensive per unit than continuous production systems employed in large scale food processing industries. In each case, the processor has to decide how to price the product to reflect economies of scale. Availability of a wide range of products and suppliers from which customers can choose, limit the processors to set the price that optimize his own profit, selling above the market price it means the processor will lose customers to the competitor. Most of the time

customers look for the cheapest supplier when making decision for purchase (Batt, 2004). This is one of the challenges facing small and medium processors because selling price is determined by market forces and they are obliged to sell at available market prices otherwise few or no customers will buy, hence the loss due to obsolescence.

4.4 Customer Service and Customer Perceived Value

Generally, customer service and customer perceived value in Tanzania differ significantly from one factory to another. The relationship which exist between customers and small and medium food processors is *buy-sell* relationship. Few food processing companies have demonstrated abilities in customer satisfaction, some with higher degree of satisfaction than others. This has been achieved by allowing customers to participate in some stages of their business operations. The companies include Bonite bottlers, Coca-Cola Kwanza, Tanzania Breweries, Serengeti Breweries, Azam Industries, Mulzah Oil industries, BIDCO, Dabaga fruits and vegetable processing company, Ivory fruits and vegetable processing company, Azania millers, Power Food Company. Personal observations and experience show that different level of individual income and education has influenced the perception of products from these firms. Other consumers are willing to pay high for a product from a certain factory even if the functional quality of the product does not support the price paid. This situation helps the processor to create the market or consumer segmentation. The use of professional sellers, good customer service and community support for some of these companies has increased their reputation to customers. Satisfied customers are always reluctant to look information from alternative suppliers. Word-of-mouth referral is the most effective form of promotion which has helped some of the manufacturers to increase their market share. It costs nothing and carries a lot of credibility as it is based on personal experience which is easily perceived as the voice of the market (Nasution and Mavondo, 2008).

Companies which use responsive market approach have been performing well in the business as compared to those companies which are using proactive market orientation approach. In responsive approach as described by Berghman, et al. (2006) companies are focusing to satisfy customer needs achieved by listening from customers contrary to proactive approach which aims towards the satisfaction of latent needs.

4.5 Marketing and Distribution Strategies

The majority of food processors in Tanzania operates from Dar-es-Salaam, the commercial city and distributes their products to different geographical areas within the country and neighboring countries. The availability and easy access to infrastructure and services such as electricity, water, secondary raw material, good roads, and large number of consumers have attracted many investors to invest and operate their production activities in Dar-es-salaam. Other regions are mostly dependent on finished products from Dar-es-salaam. From processors, products go through distribution centers (*DC*), wholesalers (*WS*) and retailers (*R*).

Distributors serve several wholesalers which in turn serve several retailers; and finally, retailers deliver the products to ultimate consumers. On the other hand, some processors overlap with wholesalers to deliver the products directly to retail stores and in some cases few small enterprises deliver their products to the consumers as depicted in Figure (1) using trained itinerants.

(Insert Figure 1 here)

It is interesting to see that almost all of the food processors in Tanzania use the same marketing strategies but of different magnitude, depending on the economic strength of the company. Advertisement through public and private media (televisions, radios, news-papers, internet etc) is a single and expensive component of marketing process which is used by large food processors to promote and deliver relevant information of their products to existing and potential customers.

Promotion through trade shows using mobile vans around large and small cities in Tanzania is becoming popular for processors to promote their products as they consider this strategy to be economical in respect to their economic strength. Exhibitions organized in different times of each year have been playing a big role for processors to display existing and newly developed products to customers. Dar es salaam International trade fair organized at the end of June to July 10th of each year is the largest trade exhibition event which has given an opportunity to local and international companies to display, meet and discuss face to face with their potential customers. Other exhibition includes East African Trade Fair, regional exhibitions organized by Small Industries Development Organization (SIDO) etc.

Large and medium scale food processors e.g. Coca-Cola Company and Tanzania breweries Limited have been successful and consecutively running promotion through sponsorship and competition. This strategy has helped these companies to sustain and increase their market shares significantly. Road side posters and brochures are also used to deliver information to customers.

Besides, market research, customer support, community involvement, media planning and public relation as components of marketing process are rarely implemented or used in the food industries in Tanzania.

4.5.1 Market Structure

The market structure in Tanzania is characterized by many food processors producing identical or relatively identical products being sold to large numbers of buyers (wholesalers and retailers). The buyers deliver these products to the consumers who are well informed about the quality and prices of products from different processors. Any investor in food processing business can freely enter or exit the industry subjected to the market forces. Difference in production capacities, processing technologies, and expertise influence the quality of products produced by these industries. Therefore, factories with large capacity and advanced technologies to some extent tend to have power on dictating the market price. Since the government does not impose or control the market price of products, small and medium food processors are forced to sell their products at an available market price. By doing so, the majorities are running their businesses at low marginal profit. Those who do not have any properly defined objectives and visions are going out of the business because they hardly withstand the competition.

4.6 Order Processing

Since most of the processors use *produce-to-stock* and *push-based* supply chain strategies, few orders are received from downstream partners especially for export markets or for specific market segment such as supermarkets and large wholesalers. An order comes in through emails, faxes and telephone, hard copy, and text messages from reputable customers. Customers are guaranteed to receive their orders within two to seven days depending on order quantity placed.

4.6.1 Production Planning and Scheduling

The production planning and scheduling process complexity differ from one processor to another. Some processors produce in batch while others planning and scheduling are based on continuous production process. Additionally, among these processors, some produce only a single product or related products e.g. flour, baked products, liquor, soft drinks etc, while others produce multiple items e.g. confectionery, tomato sauces, jams, juices, etc. However, the aim remain to be the same, that is, to minimize production time, costs, efficiently organized use of resources and maximize efficiency in work place so as to satisfy customer requirements.

Production planning and scheduling for some of the plants visited (e.g. fruits and vegetable, dairy, milling, water treatment and bottling, soft drinks etc), demonstrated a number of production elements, ranging from the every day activities of staff to the ability to realize accurate delivery times for consumers with an effective production operation and its nucleus, though they are hardly meeting these goals. Production department work closely with marketing department to ensure smooth business operation as summarized in Figure 2. The majority of small and medium food processors in the country, production planning and scheduling are not systematic and strategically implemented as they result into over stocking when the demand becomes low or shortages when the demand turns to be high. Any planning problem starts with a specification of customer demand that is to be met by the production planning and scheduling. In most contexts, future demand is at best only partially known, and often is not known at all. Consequently, one relies on forecast for the future demand. To extend that any forecast is inevitably inaccurate, one must decide how to account for or react to demand uncertainty. Forecast is one of the major weaknesses found in these industries. For example, market share of bottled water, local brew and soft drinks increases during hot season of each year starting late August up to late April. Some processors of these products do not respond quickly towards market demand, the main reason of this is because of poor coordination in their supply chain and forecast. Information rarely flow from down to up stream or do not exist at all, processors continue to produce for stocking and distribution without matching with the market demand. The situation is worse in industries with multiple items with independent demand.

(Insert Figure 2 here)

Without collaboration, each partner in the supply chain individually tries to plan the quantity, demand and time of delivery to customers. These results, into a never ending cycle of inventory excesses or out of stocks when the demand exceeds the anticipated forecast (Bowersox, et al. 2006). Soman et al. (2007) observed that producing large quantity of products on pure *produce-to-stock* basis is not a viable strategy because demand is uncertainty and products have limited shelf lives.

4.7 Application of Information Technology

Tanzania is one of the countries in Africa with large number of companies investing in information and communication technologies. Currently, the country has more than four mobile telephone service providers covering large areas of the country and neighboring countries. In addition, almost every district is connected with internet network where customers access different information of their interests. Though not all processors have fully been utilizing these opportunities, some have established reliable mechanisms of information exchange between partners either through mobile communication or internet and related services. Thus, orders, sales data, forecasts, customers' complains and any kind of messages are immediately exchanged across the supply chain at low costs.

4.8 Challenges and Impediments Facing the Food Industry Sector

Tanzania's food industry which has lagged behind for many years in terms of technology and equipment is still facing enormous, diverse and demanding challenges which hinder the sector from growing at a noticeable pace to significantly contribute to the country's economic development. In addition to technology and equipments, other challenges identified by processors include; technical know how, research and development, capital, managerial and physical infrastructure. Foreign investors have grabbed a bigger market share by using their advanced technologies and huge capital resources posing great pressure to small and medium entrepreneurs as they are still not able to generate sufficient value added products. Small scale of production due to low investment capital and irrationally structured firms make them less competitive.

4.8.1 Technology and Technical Know How

Food production at all levels around the world has been growing and evolving at a remarkable rate to meet the basic requirements of an increasing world population. On the other hand the number of people working in farms in recent years has been decreasing most of them shifting to other economic sectors as a result of industrialization and urbanization. To meet the challenge, food scientists and technologists in collaboration with food processing equipment manufacturers have been working closely to developed cost-effective ways of processing, storage and distribution of food to reach the growing population of consumers in sound and safe product. In spite of available advanced technologies around the world, most of food processors (especially small and medium enterprises) in the country still use poor and labor intensive technologies with low production capacities accompanied with low skilled and inexperienced personnel. Lack of enough capital to acquire these technologies remains to be one of the major obstacles that food processors face in their business.

As the supply chain of food products includes wholesalers and retailers, performance of these members have direct impact on the processors. It is always positive to the processor when the business of wholesalers and retailers grow. Although most of wholesaler and retailers have been doing business for many years, the level of knowledge in basic business skills are low and their business rarely grows. Some businessmen are unable to distinguish between revenue and profit and sometimes end up spending their own working capital while thinking that they are running a profitable business. However, the government institutions and non government organizations (NGOs) deliberately have started to offer educational programs to develop their skills.

Apart from the lack of processing equipments, food processors also have been facing difficulties in securing primary and secondary raw materials. Referring to secondary raw material means availability of appropriate packaging materials, food additives and preservatives, label printers etc. The problem is much accelerated by lack of well established packaging materials manufacturers and printers. Good quality packaging materials and food additives all need to be imported from abroad, which many of the processors hardly manage or afford. Nevertheless, outsourcing of raw materials and spare parts from overseas, results into a long lead times and high stock levels. Additionally, consistent product quality depends on raw materials consistency accompanied by appropriate processing technology and conditions. Since agricultural activities are not modernized, to get consistent raw materials for example, tomatoes, oranges, mangoes, pineapples among others from one farm to another or from season to season is not easy. Therefore many processors fail to offer consistent quality products to their respective consumers as they find difficulties in getting consistent quality raw materials from their suppliers.

4.8.2 Research and Development

Research and development (*R & D*), is a term that means different things in different applications. In business, *R & D* is an investment in a company's future existence as it enables the company to offer new product to replace the one with decreasing profit or competitiveness. Presently in Tanzania, the organizations addressing the educational and *R & D* requirements are very few and are not fully utilized for the purpose of innovation. In the global market, food professionals need to develop sufficient awareness and other relevant food processing principles including a wide variety of knowledge such as waste management and disposal, SCM, food regulations etc. The professional needs to develop an appreciation of *R & D* and innovation in critical technology areas such as novel process development in preservation and storage techniques, packaging, process control, rheology, colloids among others as it is very important in the food industry for sustainable growth.

4.8.3 Capital Investment and Managerial Skills

Lack of financial institutions to offer substantial amount of loans to the food industry sector in the country still remains as one of the big challenges. Advanced technologies to support production processes require huge capital investment which can be obtained through financial institution such as banks. It is surprising to learn that most of local financial institutions provide small loans at high interest rate between 20% and 30% for banks and sometime high in savings and credit cooperative societies (SACCOS) which can not be feasible for food processors. Management of large working capital to allow expansion and growth of the business requires discipline and managerial skills. Lack of individuals with

relevant skills in the local factories also act as a barrier for obtaining big loans from different financial institutions despite difficult criteria and collateral required before releasing the loan. Banks and other loaning institutions become confident to offer loans to companies with strong and sound managerial skills.

4.8.4 Road Infrastructure and Power Supply

Main trunk roads joining major cities of the country are in good condition according to National Transport policy 2003, only 5% of the road net works are bituminized. Bad road to reach different districts in the country allocated away from the main regional roads contributes much on poor delivery of products to these areas. The situation becomes worse during rainy season; transportation cost goes up if the processor wishes to deliver the products to these areas, other-wise great scarcity of the products occurs. Recent study done (TANROADS 2003a) in Tanzania has shown that improving road condition would significantly lower vehicle operating cost thus increasing the manufacturers' margin profit.

In addition to high transportation costs, poor infrastructure also limits the size of the market and blocks inter-regional trade between the districts, which might provide a viable opportunity for the processors to open up a new market segments.

Reliable electricity and water supply have been a long time problem facing the country as such, processors opt to use generators during power rationing as the result production cost increases along with decreasing profit margin. Water as an import resource in the food industry activities, consistent availability from municipal supply system has not been guaranteed. Companies with stable financial flow, drilling boreholes and installation of purification plants have been their best solutions.

4.8.5 Storage Facilities

Electricity plays a major role in the country's economic development. Though there are deliberate efforts on increasing electrification, still electricity is not a reliable commodity in Tanzania. It does not only affects production processes but also products that depend on cold chain distribution and storage for example, pasteurized and fermented dairy products, meat and meat products, fish etc. Prolonged electricity black out accompanied with favorable tropical condition for microbial growth result into a great loss to the processors, wholesalers, retailers, consumers or the entire supply chain system.

Poor storage facilities do not only lead to product spoilage but also may present health risks to traders as well as to the consumers. Most of traders have small storage areas and facilities which force them to pile up their products resulting into poor ventilation, dusty, and uncomfortable working environment which may affect their health.

5. Conclusions

The result of the study suggests that a lot of efforts need to be addressed to ensure that processors benefits from the concept of SCM. The majority of food processors operate individually without any strong relationship with their downstream partners apart from sell-buy relationship. Each member within the network seeks to optimize individual profit rather than the entire supply network. In the situation where coordination does not exist inefficient supply chain is inevitable this is why local processors are less competitive.

The food industry sector in collaboration with government institutions need to address seriously all of the challenges which are impeding the sector from catching up with the fast growing competitive market. Technology, professionalism, capital investment, managerial skills, and physical infrastructure are playing a major role in hindering the growth and contribution of the food industry sector towards the country's economic growth. Processors in collaboration with the government should work closely to developed good policies, strategies and operational planning which will enable the sector to exert its influence in the competitive global market.

It should be noted that customers needs to be given its deserved weight. In today's competition, firms with a superior ability to provide services that customers perceive as valuable incur an important competitive advantage. The food processors need to make commitments to learn what customers need and set strategies that implement customer friendly process relationship rather than the existing one buy-sell relationship. In most cases customers base their purchasing decisions on the service they receive, not just price, quality and availability of the product that provide superior customer service for the firm is very important.

Our observation also revealed a low level of understanding of food SCM concept among the majority of small and medium food processors. This observation brings out the signals for scientists to extend their researches to cover food processing sector rather than focusing on SCM in agricultural products. This will help processors to reach at a best choice when deciding to implement the concept into the complex processed food supply network.

The method used in this study is primarily qualitative exploratory and not based on probabilistic statistics so it is the researchers' interpretation that is most relevant. Incorporating questions in the questionnaire intended to collect quantitative data for statistical analysis would be a viable direction for further research.

A longitudinal research should be undertaken to include:

- The entire supply chain network i.e. primary and secondary raw material suppliers, processor, distribution centers/wholesalers, retailers and consumers.
- Which strategy to be implemented where and why. It should be clear understood that, food products have different limited shelf lives, different technologies (batch or continuous) can be used to produce the same product, and some requires specific distribution system e.g. cold chain network. All of these have different cost implication of the product.
- Which type of relationship among the supply chain partners should be implemented and the associated incentives to ensure win-win situation
- How to integrate and coordinate among the supply chain partners.

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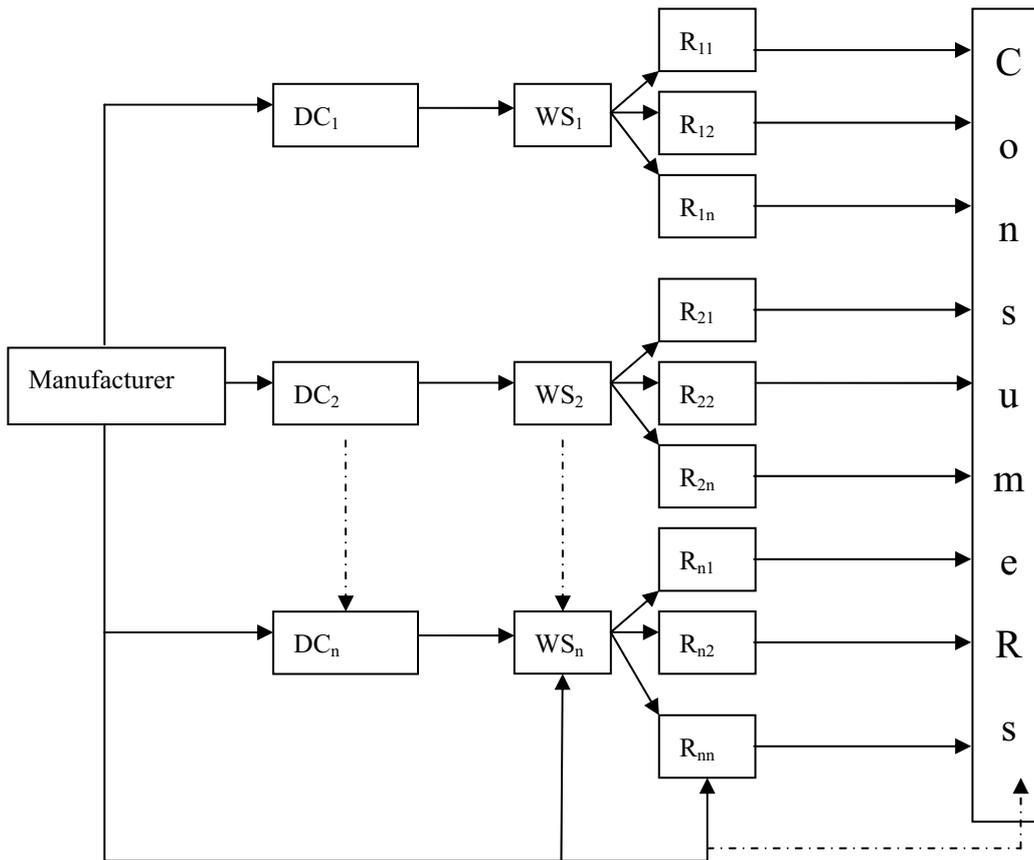


Figure 1. Distribution network

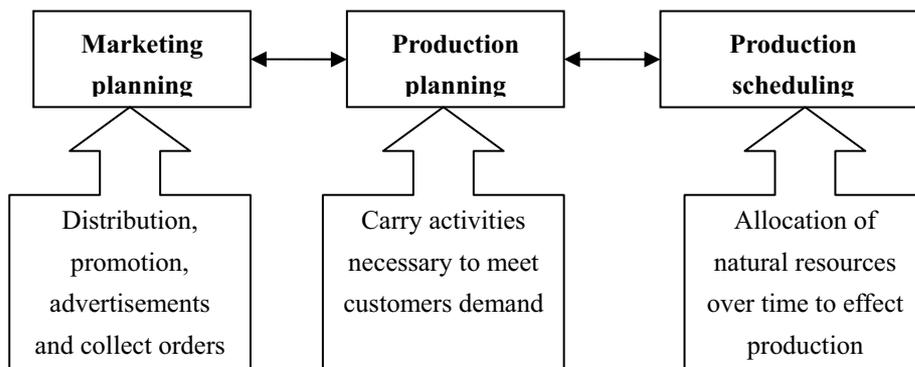


Figure 2. Planning and scheduling in the food industry in Tanzania