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SUPPLY CHAIN PERFORMANCE WITHIN AGRI FOOD SECTOR

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Summary

By setting the goals of this scientific paper has been outlined the research methodology. Thus were developed conclusion, and by using the methods, procedures, techniques, rules and tools and know-how has been demonstrated the central hypothesis: "Inside the agri-food supply chain is created value through operations and logistics activities." The value created leads to competitive advantages in order to identify companies within market, gaining loyal consumers.

The article presents the components of agri-food supply chain, the main Key Performance Indicators measuring its performance, the difference between a traditional supply chain and sustainable supply chain by analyzing the waste management component. In order to get professional expertise referring to Key Performance Indicators a quantitative research has been organized.

In closing the article present the development strategies of agri-food supply chain.

Key words: *agri-food supply chain, logistics activities and operations, performance, sustainability, development strategies*

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Introduction

The development of the feed and food industry is facing new logistical challenges, like the supply and delivery routes, dynamic of the demand or investments. Therefore, the necessity of the logistics has been revised in this important industry. Because of the evolution of social, economic and political trends, the food industry continuously innovates in properly and efficiently managing actual demand, but taking into account sustainability and food sources. While the supply chain components will be continuously analyzed due to population growth, comparing with the available resources, the management of the agri –food supply chain manages, through its activities and processes, the entire flow of food products from "farm" to "fork".

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Agri-food supply chain

The concept of logistics was exposed over time in various forms and terminologies, as part of the supply chain and sales standalone or as part of a business. Oliver and Webber (1982) analyzed for the first time the activities and logistic operations as belonging to a stream through which a company can increase the efficiency of their own stocks but also those of their partner companies'.

Subsequently, the logistics were seen by Ramsay (1990), New and Payne (1995), Ellram and Edis (1996) as a partnership between buyer and supplier, while Lamming (1997) and Hines (1995) forth as a commercial relationship which a company develops with its suppliers. Lee and Billington (1993), Jones et al. (1997) deal with logistics as a stream where it creates value, while Wisner et al., (2011) comes with a new approach to activities and logistics operations by including them in redesigning business processes, thereby reducing the quantities of waste, reducing or eliminating losses and increasing performance of economic activity.

Lee and Dale (1998), Lambert (2008) include logistics in the refurbishment processes and Harland (1997) in management of the internal operations of a company.

The impact of integrated logistics in the quality management process and in the purchasing management of auxiliary materials and raw materials was reviewed by Chen and Paulraj (2004) and Jonsson (2008). Wisner et al. (2011) wrote about logistics from outside the company, and Cooper et al. (1997) and Lambert (2008) characterized the activities and operations of logistics as a way to provide either products or services of better quality the all customers, while Mangini and Vlachos (2012) expose the competitive advantage possible to be obtained within supply chain.

The analysis of logistics in terms of sustainability emerged in the last 15 years. Thus, Murphy and Poist (2000) emphasize the effect of sustainable transport, Chen (2005) exposes the importance of purchasing "green", Foerstl et al. (2010), have shown the importance of the support in the logistic operations and activities provided by suppliers and their role in the sustainable development of a business.

Through activities and logistics operations, as part of the agri-food supply chain and distribution, added value can be created by competitiveness and a more effective flow of information. There are basic logistic activities such as: procurement, transport management and inventory management, order processing and distribution, providing quality standards and offering services to the end customers and and support activities, such as storage, handling packaging, information flows related activities (Istudor, 2011).

The difference of the analyzed results between the two supply chains belonging to different companies, but with the same activity and manufacturing of the same item with the same technical characteristics may arise from the instability of the company's environment (Wu, 2006), information technology, communication and planning tools used (Flynn et al., 2010), the way in which they built and managed strategic relations with suppliers and customers (Reuter et al., 2010), added value in the manufacturing process, the performance of supply chain management and distribution, type of management and customer care satisfaction (Shin et al., 2000; Lehtinen, Ahola, 2010).

The performance of any agri-food supply chain is determined by its own efficiency. Chain efficiency can be achieved throughout the entire chain, and each of its components, activities or processes or operations as quality control, packaging and labelling, traceability, using information technologies and communication or purchase and use cold storage facilities etc. (Hyde, 2000). Each activity of agri-food supply chain can be realized differently compared to the same activity of existing competitors on the market, resulting from the fact that its effectiveness can be achieved for less or be better. Thus, it's possible to say that there is no competition between companies, but there is competition among purchasing and retail supply chains of the companies, including logistic activities and operations (Shin et al., 2000). Chain efficiency can be achieved throughout the chain, and each of its components

Sustainable agri-food supply chain

A sustainable agri-food supply chain has the same components as a traditional agri-food supply chain, namely: transport, storage, warehousing, handling, information flow (Istudor, 2011), the difference between the two supply chains beeing the waste management, the reduction or elimination thereof. Besides the component "waste management" throughout the value chain, it is worth mentioning, the specific activities for each component, activities that reduce environmental impact, such as management of rational and efficient use of land, reducing deforestation, pollution reduction (Sungchul Choi et al., 2011), better hygiene throughout the production, education and continuous information of employees and consumers (Colby et al., 1995), green label of the finished product (Clarke, 1994), using a safe and sustainable pack, reduction of non-compliances in the product delivery, increasing the consumer's confidence in the final product, its preferences and choice in selecting products etc.

Correct and efficient waste management requires activities, both at the start of the supply chain and retail, for example: use in farming of biological nutrients as fertilizer, but also nutrients that come from recycling, as well activities at the end of the chain: biological degradation including waste separation (organic and non-organic) and making compost for fertilizing (Beachy Roger N., 2010). To analyze the life cycle of the agri-food product from the point of view of sustainability means the possibility of measuring the environmental impact of the manufacturing of the product, and the possibility of improving the activities and processes in all phases of the production cycle, such as: raw material extraction, processing of raw materials, manufacturing, assembly, product usage, management and administration of End-of-Life (EOL) for each item.

While the strategy of investment in agriculture and food industry is focused on emissions, food safety inputs (raw materials, packaging materials, auxiliary materials), outputs (finished goods), and tangible components within technological flows, the strategy for sustainable development of the agri-food chain aims availability of finished products through activities and processes with low or zero impact on natural conditions. Thus, the performance of sustainable economic activity will be measured by the company's ability to meet the needs of consumers by decreasing or eliminating risk (Hartmann et al., 2010).

A sustainable agri-food supply chain implies accepting the innovation and not denying its importance, by adopting innovative technologies (Marquer, 2010). Thus, innovation will provide companies, farmers or livestock farmers, an effective long-term economic activity.

Key Performance Indicators used to measure the agri-food supply chain performance

Performance of the agri-food supply chain indicates the potential of the entire chain to meet the needs of end customers, the availability of products on the shelves, on time delivery, maintain permanently under control the limits of minimum and maximum inventory of the manufacturing company (Bowersox et al., 2007).

In order to quantify the performance of agri-food supply chain is needed to permanently update information regarding the performance of suppliers and customers (Burgess et al., 2006), knowledge of their market, and continuous analysis and updating component costs logistics, such as domestic and international transport, customs, storage, packaging or repackaging and special physical distribution of finished products (Istudor, 2011).

In order to identify the Key Performance Indicators (KPIs) which are able to quantify the performance of the agri-food supply chain it has been organized a quantitative research by addressing a questionnaire on line to two groups of professionals belonging to LinkedIn network: "Agri Jobs - Agricultural Professionals Group - Dairy Foods - Milk Production - Crops "(Above 57 900 members) and" Food & Beverage Industry Professionals Group "(Above 41 700 members). By interviewing tool it has been obtained 750 responses in a period of 3 months. The questionnaire included only open-ended questions, namely: *Mention at least three Key Performance Indicators used to quantify performance of your supply chain components: transport, storage and default inventory management, purchasing.*

After analyzing the responses, the following specific KPI's Key Performance Indicators were identified:

- referring to ***the transport of raw materials, packaging and finished products*** can be used the indicator "Charging time" (On Time Loading, OTL), meaning how many purchase orders were loaded on time compared to total deliveries made or one or more of the following: "on-time delivery "(On time Delivery, OTD)," truckload "by measuring the ability of loaded truck versus total capacity," distance empty "indicator that measures the distance that a vehicle runs empty, not transporting goods," time of use " indicator that reflects the period in which a truck is idle, maintenance, repair etc, "deviation from a truck schedule", "fuel consumption", etc.

- with regards ***to the storage space and thus the inventory management***, in addition to establishing minimum and maximum levels of stock in accordance with the technical characteristics of article managed and the actual production plan and forecast, both indicators are used "days in stock" (Days on stock, DOS) meaning covering the stock in days, and the indicator "breaking stock" (Out of stock, OOS), meaning whenever broke the stock of an item within the analyzed time. It can also be used: "the speed of inventory turnover", "value products damaged "," number of damaged goods "," quantitative and

value differences referring to warehouse inventory " indicator which reflects the inventory accuracy. Also, the storage space or the warehouse is quantified by using the following indicators: total cost of storage, processing time of orders, the value of damaged goods, the percentage of space dedicated to handling the total space utilization of the deposit, the annual percentage of accidents, quantity or possible delivery units moved in an hour by a person and so on. All categories stored in the reception point are using the indicator "accurate invoice" (Invoice Accuracy, IA), calculated as the number of invoices issued correctly reported to the total number of invoices issued;

- for purchasing it is used the indicator "reduced costs for each category of product" (Cost saving per each category, CS), indicating how much is reduced the acquisition cost per each category, discounts that can be recorded by the purchase price renegotiated, function volume times by streamlining transportation (truckload ordered truckload roundtrip) or new items cheaper which can substitute the old one, with the same technical characteristics etc., "the performance of suppliers" in terms of price delivered products, quality of services that accompany a product supplied, deliveries made in a certain period of time, "supplier management" indicator which seeks to ensure that 80% of the amount spent to correspond to maximum 20% of the total portfolio of suppliers, " variation of price purchased" or" contracted price change "," total amount of purchases "," procurement portfolio structure "etc. The synthetic indicator "performance per each provider" shall be calculated according to other analytical indicators, such as the annual percentage of orders outstanding in total orders, the annual percentage of complaints quantitative and qualitative total orders delivered , variation deadline versus delivery time agreed by contract , the percentage of deliveries made on due time, accuracy of commercial documents as a share of total issued documents, delivery rate within total contracted deliveries, etc.

The agri-food Supply Chain's development strategies

Practice shows that the strategy chosen by agri-food companies expresses the desire of financial involvement of the holders of business into customer satisfaction (Clifton, Amran, 2011; Freeman, 2005), and the adaptability of the business and the strategy chosen to market developments.

Strategies refer to the evolution of companies on long term (Grayson, Ambler, 1999) and due to the time horizon it may be argued that the change of direction of the strategy is requested by the owners of the business, given the large number of factors which influence direct day by day activity of the company.

Analysing the real possibilities of organising the agri-food companies could be adopted as development strategies one of the below development strategies presented:

Negotiating with several suppliers when it comes to fungible goods as commodities for which demand has a qualitative market (eg cereals), their purchase based on price (Guinipiero et al., 1999). Greater competition between providers it empowers them on the technology used, accumulated expertise, planning, accomplished cost, goods quality produced and delivered, delivery services offered to the client referring to Business to

Business trades or to the final customer referring to Business to Consumer trades;

A long-term partnership with a small number of suppliers which create value through economies of scale, suppliers delivering on time using JIT, Just in Time method and thus minimizing inventories. A strategic relationship with suppliers (Li et al., 2005) implies transparency into the whole supply chain and sales, and up to date information (Carter and Jennings, 2004). Besides the minimum commercial information stipulated within commercial contract, such as: delivery time, payment terms, different ways or instruments of payment agreed, transport conditions, who assumes the risk during transportation, minimum order quantity, minimum quantity delivered, security stocks to vendor, unit price discounts quantitative (Carter, Stevens, 2007), or value thresholds of profitability, the negotiating process with supplier will involve specific technical information given very specific activity technological flow, it contributes to design of new products or product approved to be shipped with its own technical and technological expertise. In such a strategy, strategic change of provider cost will be high. For example, when a recipe for a sausage is established using a particular type of spices, this means determining a stationary source of an approved supplier;

Vertical integration. A model of vertical integration may be: agriculture - livestock or livestock - factory meat processing (Green, 2004), a model which, in addition to benefits through continuous improvement of quality, streamline inventory and cost effective management requires capital fixed and mobile organizational and managerial skills, and permanent application. A vertical integration can be carried downstream or upstream production capacity, to customers or to suppliers, and is not recommended in industries with rapid technological change. Activity optimization and streamlining inventory results will be pursued only after a process of continuous monitoring and analysis of stocks required by current plant capacity or used in analysis. In this regard are commonly used mainly two modern methods of tracking and analysing the current situation and movement of stocks: the "max – min" which sets maximum and minimum stock for each product supplied, any oversize or under dimension of stocks representing a common response of purchasing, warehouse, manufacturing departments and "ABC method" by which stock required production is divided into three categories A, B and C depending on the weight that has the value of stock of each item purchased in the total value of stocks total required production . Group A comprising 15% of the stock structure and 70% of their total value will control and optimize daily or several times a month. Group B comprising approximately 25% of total reserves and 20% of the total amount of them has a frequency of monthly analysis, while stocks in Group C with approximately 60% of total reserves and 10% of their value requires quarterly or annual analysis (Ilieş and Crisan, 2008; Voicu and Radulescu, 2003).

Integrated agri-food supply chain, which means standardization, collaborative planning, forecasting, management contracts or orders, long-term (Buckley, Mithie, 1996). This strategy is consistent with the method of production "lean" (lean manufacturing) that add value, while minimizing or eliminating losses in each component of the business process, production (Benetto, Becker, Welfring, 2009). This strategy is consistent with

those companies that develop sustainable because they require the same quality standards throughout the value chain, flows of energy, materials, waste, emissions process of production intended to be reduced or eliminated and environmental impacts Standing quantified and reduced (Murray et al., 2010).

Regardless of the chosen strategy, the future belongs to those who keep pace with the social, economic and natural prerequisite for business developing in a sustainable way (Rozar et al., 2014), adapting to technological developments by investing into hardware and software, which can bring huge benefits for safety and food security, energy security, environmental management (González-Benito, González-Benito, 2008), community welfare, nutrition (Defee et al., 2009; Lindgreen, Hingley, 2003).

Conclusion

An efficient agri-food supply chain calls for the involvement of all participants: suppliers of raw materials and packaging, transporters, warehouses, clients. There are specific standards referring to feed and food quality trough a the status of "fit for sale". Therefore, correct communication in the supply chain between chain partners, but also within the participating companies and the accuracy of the information circulating on both the vertical and the horizontal line are key factors with major influence in the performance of this flow information, goods and services.

The aim of any agri-food supply chain is to achieve a full and effective flow of goods, services and information, transferring capital to create and provide maximum customer value.

An agri-food supply chain is considered efficient if the activities, operations and its processes reduce overproduction, removes stocks that are no longer needed, minimizing stocks operational, it streamlines the movement of the chain, eliminating downtime or detours are reduce waiting time, reducing till eliminating waste and non-compliant items.

Regardless of the organizational form each agri-food supply chain the companies could choose one of the following way as a developing strategy: strategic planning of acquisitions, labour productivity growth, increased financial result, improving the efficiency of distribution.

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