Abstract

While agro-industrial studies are influenced by economics theories researches on supply chain addresses questions of operational efficiency and effectiveness.

This research aims to verify if there is any established system to evaluate supply chain performance in Brazil. The unit of analysis is a poultry meat supply chain that has a significant production volume driven to exportation.

KEY WORDS: Performance Measurement; Supply Chain Management; Agribusiness.
1. Introduction

Among all economics activities, agribusiness is developing with great force in the world, stimulated mainly for the increase of the population and in the demand for food. Agribusiness studies have been the focus of academic research for quite a long time. However, those studies usually have used a theoretical background, connotations, frames of reference and methodologies slightly different of those used in the research on Supply Chain Management (SCM).

Most agro-industrial studies are influenced by economics theories. They usually address questions of public policy, structures of governance and competitiveness of the industry. On the other hand, researches on SCM have a managerial concern addressing questions of operational efficiency, effectiveness, customers’ needs and so on. Notwithstanding differences on the research focus and theoretical frameworks, the systemic vision of the process — since the production of raw materials until the delivery of the product to the end consumer — is common to SCM and agro-industrial studies.

The main purpose of this research is to advance in the studies of agro-industrial chains, using a management approach usually presented in the literature of supply chain management. The unit of analysis of the research is an agro-industrial chain, more specifically a food chain. The main approach will be the questions of evaluation and measurement of supply chain performance.

The research problem is: “Is there any established system to evaluate and measure the performance of poultry meat supply chains in Brazil? The unit of analysis of this study is a whole supply chain of poultry meat. The supply chain of study was mapped based on one of the leading food companies in Brazil that has most of its production driven to exportation. This company is called the focal company (Möller e Halinen, 1999).

It was developed a qualitative research, by means of an exploratory method (Malhotra, 2001). Several in depth interviews had been conducted with managers of the focal company from October 2002 till January 2003.

A qualitative analysis was carried out using the data collected in the interviews and the results have been compared to the finds of previous research shown in the reviewed literature.

2. Agro-industrial activity in Brazil

The great importance of the agribusiness to Brazilian economy is incontestable (Toledo et al., 2000). Brazilian agribusiness is become highly competitive and reaching leading position mainly as a result of major investments in technology, animal and vegetal sanitary and healthy conditions and in the modernization of trading instruments. (Global 21)

The total Value of Brazilian Agroindustrial Production (VAP) in 2001 was US 38,6 billions, where US 22,5 billions come from the agriculture and US 16,1 billions from the animal breeding. Considering previous year VAP results there were a growth of 4,7%. (Equipe Técnica, 2002)
The importance of the agro-industrial sector in any country is reflected in its participation in the GIP and the results of the trade balance. The commercial balance results of agribusiness in Brazil were US$ 20.3 billion in 2002, representing an addition of 7% in relation to the surplus reached in 2001. The total exportations of this sector reached US$ 24.8 billion, 4.1% more than previous year results. In the same period, importations had fallen 7.3% (Avicultura Industrial, 2003).

Another important aspect to be considered is the generation of job promoted by this sector. In Brazil 22% of the economically active population is directly or indirectly linked to the agro-industrial sector (Embrapa, 2001).

In the new economy in which we live, productivity, competitiveness and growth are highly dependant on application of technology, quality of information, management and coordination of the processes of production, distribution, circulation and consumption (Farina e Zylbersztajn, 1998).

There are few researches that deal with managerial aspects in the food industry. Most studies are either directed towards economic questions (macroscopic vision) or to automation of the manufacturing processes (microscopical vision) (Minegishi e Thiel, 2000).

Amongst the management capabilities necessary to the development of agribusiness in Brazil, one of the points that deserve attention is the capacity to monitor and evaluate the performance of the chains that compose the agro-industrial systems. The evaluation of the chain performance and not only of the individual companies is presented as a possibility to promote a vision of the whole as a way to assure a harmonic result.

3. Supply Chain Performance Measurement

A trend that is already taken place in the business and management world is the integration of the organization to all other levels of suppliers and customers. In this context the main concern is with the supply chain efficiency as a whole. (Snow et al, 1992; Lamming and Cox, 1997). As a result, distribution strategies are becoming one of the main sources of competitive advantage.

The electronic data interchange makes it possible the transport and integration of thousand of information proceeding from a variety of places. Although Information Technology allows a more effective process change and improvement (Rockart et al, 1996), the success of the partnership between companies of a supply chain depend on other factors.

There are an increasing number of studies and researches that define supply chain management as the management of relationships. According to Harland (1996), managers and authors of different disciplines and functions describe an increasing dependence of the companies in the relationships with their suppliers. Another aspect considered in the study of chains is the level of power among chain actors. Accordingly to Nohria and Eccles (1992) the perspective of the organization as a part of a network made possible a more systematic way for understanding the influence of power in organizations.

Some questions on strategy, technology, relationship (Harland, 1996) and power (Nohria and Eccles, 1992) are presented in many researches as factor of success to supply chain
management (SCM). However, another subject that is growing out in importance in many management researches is supply chain performance measurement.

A research developed by the Council of Logistics Management in 1989 identified that amongst the main characteristics of the companies with better performance was the measurement of performance (Council of Logistic Management, 1995).

Although studies about performance measurement are many in the management literature and have been developed and improved for quite a long time, most of them are directed towards the efficiency of the organization individually (Chakravarthy, 1986; Venkatraman and Ramanujan, 1986; Eccles, 1991; Kaplan and Norton, 1992; Brown and Leverick, 1994). However, the new perspective of SCM that focus in the integration and interaction between companies brings a new light on the subject and requires the development of new studies.

The environments in which the chains operate are facing fast change and to answer to these changes managers need precise and flexible performance metrics (Caplice e Sheffi in McIntyre, 1998).

Beamon (1999) affirms that although literature presents an increasing number of supply chain (SC) models, few studies defines systems of supply chain performance evaluation. Moreover, she also concludes that the few existing models use inadequate performance metrics, limited in scope.

One of the greatest challenges presented for companies nowadays is to develop and implement new performance measurement systems that may be able to drive the improvement actions and efforts accordingly to this new and modern organizational and operational format, the supply chain (Van Hoek, 1998 and Beamon, 1999).

4. The case study

4.1 Brazilian chicken meat market

Brazil is one of the major food producers worldwide, mainly in grains and animal protein. Apart from having a potential internal market — the Brazilian consumer of chicken meat has grown from 12,73 Kg per capita in 1989 to 31.82 Kg per capita in 2001 (ABEF, 2003) — most companies are consistently focusing on exportation as a way of gaining better margins mainly due to the dollar exchange quotation rates. In 2002, this consumption reached 33,8 Kg per capita, 6,2% more than in 2001 (Avicultura Industrial, 2003)

The Brazilian chicken meat production has grown considerably in the last twelve years, ranging from a total of 2.055.287 tons in 1989 to a total of 6.735.696 tons in 2001, with 5.486.408 directed to the internal market and 1.249.288 to exportation (see figure 1). Almost 82% of the chicken slaughter in Brazil in 2001 was done under "SIF" - Federal Inspection and this number tends to be even greater in 2002 and 2003. (ABEF, 2003)
In the first semester of 2002 Brazil total exportation volume reached 116.994 tons of chicken meat. The greater importers of Brazilian special cuts as boneless breast are United Kingdom, Holland, and Germany (Avilcultura Industrial, 2003)

The raising in Brazilian chicken meat exportation is due to the increasing competitiveness of Brazilian products, which are already commercialized to 100 countries. In 2002 Brazilian chicken meat Sales accounted for 31% of the whole international chicken meat trade. This is in great part a result of a rigorous sanitary control of Brazilian product and efforts to advertise and promote the competitiveness of Brazilian product in the foreign market. (Avicultura Industrial, 21/01/2003). However, exportation is neither a straightforward nor an ease way of doing business, as it has a great dependency on the support of Brazilian government; especially to establish sanitary agreement with the prospected markets, as the importer markets rigorously control the meat imported.

Some of the largest poultry breeders countrywide, as Sadia, Perdigão, Frangosul and Seara, are already internationally acknowledged. Those companies accounts for 40% of a total of 3,448,852.195 slaughtered heads in the Brazilian chicken meat production in 2001 (See figure 2) (ABEF, 2003).
In 2002, Sadia was the leading exportation company of poultry meat in Brazil and its total exportation volume was 367 thousand tons, 22.94% of the whole poultry meat Brazilian exportation. In the second place was Perdigão with 315.5 thousand tons of chicken meat, 19.72% of the total exportation volume. Following them was Frangosul, with 265.4 thousand tons (16.59% of the total volume) and Seara Alimentos, with 264.1 thousand tons (16.51% of the total volume). (Avicultura Industrial, 2003)

4.2 The Supply Chain of study

The unit of analysis of this study is a supply chain of poultry meat in Brazil that has its mains operations in the south of Brazil. The supply chain of study was mapped based on one of the leading food companies in Brazil that is focused on the production and industrialization of poultry and pork. In order to preserve the company identity, thereafter it will be called the focal company.

The focal company is one of the largest poultry breeders countrywide and is among the leading producers of industrialized meats in the Brazilian market. It is also internationally acknowledged. The company has strengthening this position in foreign markets and in the last years has consolidated its production and exports to almost all continents, reaching more than 60 countries. The sales to other countries increased almost 40% in volume between 2000 and 2001. The revenue had an increment of nearly 46% from 2001 to 2002. The company offers a varied and quality mix of products including raw and processed meats.

The focal company has a vertically integrated supply chain, it operates as an integrated producer, owning the majority of all breeding, feed, slaughtering and processing facilities (see figure 3). It uses state of the art technology and a strict hygiene control in all its processes. The company operation counts with rural producers as integrants and direct collaborators. It
operates with a wide variety of distribution channels, ranging from supermarkets to distributors and groceries. It also delivers its products directly to restaurants.

The company believes its favorable position in the national and foreign markets is the result of a long-term work that the whole team has been developing along with the strategy of the company in granting service and personalized products.

Figure 3 – The vertically integrated Focal Company Poultry Production Chain

- **Critical Factors of Success**

There are several objectives or factors of success directing actions at the chain. Most procedures adopted in the chain production process are directed by a set of rules and practices as a way of reach the following objectives:

- Healthy and Sanitary control: the focal company was one of the first Brazilian company to adopt the principles of the United Kingdom Federal Animal Welfare Council, that has its rules accepted all over Europe, and applied them to the production systems of eggs, one-day chicks and poultry for slaughter. The main motivation was to attend external customers’ requirements and the requirements of protection to the animals. This system has already showed results, with healthier, more calm and productive cockerels.
- Ambience: temperature and humidity controlled;
- Hygiene of the breeding-grounds and standardized breeding procedures: with qualification of the teams and the integrated;
- Selection of breeder hens: the selection of breeder hens reflects in the quality of the final product;
- Feedstock formulation: accounts for 70% of the broilers total cost;
- Strategic location: access to the grain belt; availability of extensive, arable land; favorable climate; two harvest of corn per year; alternative supply of corn and soy meal from neighboring countries.

Accordingly to the management personnel, those factors are decisive for product competitiveness in the external market. The focal company that is also responsible for action evaluation and control sets every decision.

- **Performance measurement system**

There are a number of operational indicators of performance established to monitor every step of the chain operational process. Those indicators are established and controlled for each stage of the production process such as:
- Breeding: amount of eggs per breeders hens
- Hatchering: number of chicks per eggs
- Raising farmers: chicken mortality index

Notwithstanding the existence of a great number of operational performance indicators, accordingly to the managers interviewed — in spite of having a clearly formally established performance measurement system within the company — there are no formally established systems for evaluating the performance of the whole chain. However, there is a tracking system, where controls are maintained to ensure that information about the product during the stages of animal breeding, feed production, slaughtering and processing is obtained.

Managers believe that the main indicators of performance for the whole chain could be the same used for evaluating the company: rentability; market receptivity to new products; and market share.

### 5. Conclusion

Brazilian agriculture is facing a revolution that had begun in the decade of 90 when agricultural producers needed to invest in competitiveness as a way of surviving. This revolution can be divided in three parts: technological; managerial and the greater of all, of model that demands value to be added to the primary production (Pinazza e Alimandro, 1999, p. ix e x).

The chicken meat market is an increasingly competitive and complex market. It is continually requiring technical knowledge and management competence to attend consumers greater concern with diseases, contamination, antibiotic use and destination of production residues. Besides this, there is the difficulty of competing in highly subsidized markets as the North American and the European. This subsidy tax gives them an advantage to compete. For poultry, Brazilian main competitors are from United States, France, Thailand, and China.

Those hard market requirements are allowing Brazilian poultry meat producers to improve considerably the quality of their product and increase competitiveness of their chains. Brazil
has become one of the most important worldwide suppliers of poultry meat with a very competitive industry.

Another important aspect that may be considered is the business management model adopted by the main poultry meat supply chain in Brazil: vertically integrated. Chains are highly coordinated allowing for better control of the whole production process: quality and sanitary control and for cost reduction.

The main advantages, presented in the literature, for adopting a supply chain management perspective is to reduce stock, reduce cost and gain in process efficiency throughout the chain. The results of this research shows that the poultry meat chain studied barely have any stock and has already reached the objectives of increasing productivity and reducing cost.

However, there are still some questions to be answered as concerned to supply chain performance evaluation. Are such results due to the specifically nature of the product processed, live animal, or to the business model adopted? Is this vertically integrated supply chain that operates as an integrated producer, highly coordinated, setting a model for supply chain management and evaluation?

Referências Bibliográficas

Sherman, 1998).


