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Title: A Transaction Cost approach to Cooperatives Companies' Supply Chain: case study in a Brazilian Dairy Cooperative

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Abstract

This article aims to analyze the supply chain (SC) of a Brazilian cooperative company, focusing on cooperative members based on the transaction cost approach (TC). Thus was developed a case study in the cooperative company: Cooperativa Agropecuária Petrópolis Ltda. (COAPEL), collecting data about relationships and transactions of its critical cooperative members. In this research was considered, mainly, the cooperative's principles and business structure and, the segment in which the company operates: agribusiness. The main findings of this analyze concludes that is preferential a vertical integration of the SC's members because of a combination of some observed TC attributes. Also was demonstrated a degree of inefficiency in the cooperative business model for the control of its SC's members, as well as the model itself. And lastly, was suggested that the model should have a better governance structure in pursuit of lower costs and better control of its transactions.

Keywords: Supply Chain, Cooperative, Transaction Cost

Introduction

Supply chain (SC) studies are important because of a good management system and governance between its members can generate systematic earnings and competitive advantages for an entire SC. Therefore, understand the way that a supply chain is structured and witch are the main relations and transactions between its members are essential to make a critical analyze for systemic optimizations.

This article presents a research about a supply chain of a Brazilian cooperative company: *Cooperativa Agropecuária Petrópolis Ltda. (COAPEL)* that operates in the dairy industry. The analyses were based in notions of supply chain, cooperative and transactions cost approach, focusing mainly in the cooperative members relations, transactions and economics efforts to play the main activity of COAPEL's SC. So, was mapped the company's supply chain, identified its main cooperatives members and the way that this chain is structured. The findings were based in the transactions costs approach (TC) attributes and in how the management and the cooperative business model can influence it.

Literature Review

Supply Chain

Supply chain (SC) involves all stages, either direct or indirect; to ultimately provide a product or a service for a final client (Chopra and Meidl, 2003). In this process is not only considered manufactures and suppliers, but all external members that can influence or are involved in the process to generate a specific output (products or services) to a final client.

A SC is dynamic, where products, information and capital flow between different members that do different tasks to deliver an output, occurring for these interactions among these members (Chopra and Meidl, 2003). These interactions are important and necessary for the function of the SC, since it is indispensable raw materials and information to tasks subsequent that are needed in an output production process.

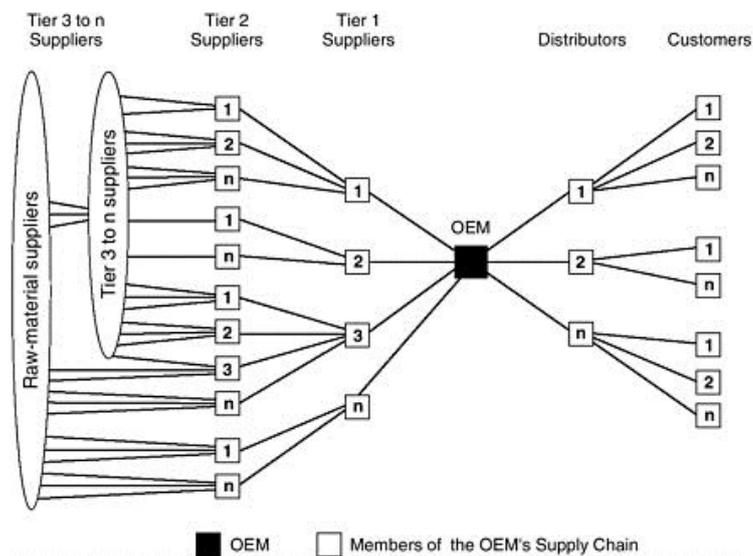


Figure 1: Typical structure of a SC
Source: Lambert and Cooper, 2000

A typical SC revolves around a major player; seeking support in other companies to obtain its process outputs, consequently not all members share same benefits. Thereby a SC must be measured in terms of final results for the whole SC, not in isolated tiers, thus assessing its degree of success. This major player is important for the process guidelines and

to facilitated junctions between SC members, supporting exchanges among them and allowing the SC to operate under better conditions, not only financial, but also economic and technological through these interactions and exchanges.

Once the SC coordination is established it needs to be managed in a way to address issues such as opportunities to expand market share, adopt new marketing strategies, create new distribution channels or new ways to configure the chain, considering participation of new members, product differentiation and degree of SC's vertical integration (Farina, 2000). One of these forms that can be undertaken is the cooperative business model.

Cooperative

Cooperative can be defined as:

A co-operative is an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise (International Cooperative Alliance, 2010).

This business model has its own values and principles based on the cooperatives understanding. Cooperative is also defined as a voluntary association of people, joining their production force, expenditures and, savings capacity for develop an economic and social business, generating to all members systematic gains (OCERGS, 2010). ICA had set the seven cooperative's principles that are: voluntary and open membership; democratic member control; members economic participation; autonomy and independence, education, training and information; co-operation among different co-operatives; and, concern for community.

Cooperative relationships are based on cooperative's principles, giving emphasis on long-term in a philosophy where everybody wins (Christopherson and Coath, 2002). As a final point, some cooperative's doctrines are important to understand the relationships between its

members, such as democracy, related to the manner in which a cooperative should be structured (administrative and management); the free membership adhesion as well as free leaving; and return of surplus capital, after deductions.

Transaction Costs Approach

The transaction cost approach (TC), first studied by Ronald Coase in 1937 and further developed by Oliver Williamson in 1985, is the study of economics organizations focusing on transactions and economic efforts to accomplish their activities. These transactions, according to Williamson (1985), occurs when goods or services are transferred between different interfaces, having inherent characteristics of this processes that determinates the way that outputs are generated and how it is delivered to a customer. From this process incurs costs for involved members to effect transaction and also internal costs for each member. These relations and transactions are influenced by several factors, categorized by Williamson (1985) as behavioral and dimensional assumptions.

The behavioral assumption focused on understanding the way that human nature works and also how the institutions work, such as laws and society, that shaped these behaviors. Transaction costs related to behavioral factors are: bounded rationality and opportunism of agents. The first is related to cognitive limits of competence to formulate and solve complex problems where the knowledge of all variables is limited in a decision process making difficult to an agent to choose between different alternatives presented to him. Organizations try to avoid it with governance structures predicting and anticipating transactions in-house and also is suggested as a way to increase rationality interactions between different agents as guidelines based on groups that can generate more efficient results than individual actions (Simon, 1971, *apud* Gusmão, 2004). While the second is related to pursuit self-interest in detriment of others interests seeking own benefits.

The dimensional assumptions are related to the way in which transactions are realized, with peculiarities of each organization. The main dimensions that describe a transaction are asset specificity that are characteristics of an asset that express its specific value and usefulness; uncertainty that are the future risks of a transaction related to its flows, difficult to be predicted and covered by contracts; and, frequency which a transaction recurs between two agents.

Methodology, Procedure and Model

This research deploys a single case study in order to try to deeply comprehend the main factors in the study context, chosen for this a qualitative research that is a way to examine events where behaviors cannot be manipulated (Yin, 2011). Hence, was made in-person interviews with employees and cooperative members, observations through visits to the factory and farms, collected others data and then made analyzes. These analyzes were limited only to transactions between cooperative agents in the SC.

Case Study

COAPEL was established on October 29th of 1967 in the city of Nova Petrópolis in Rio Grande do Sul, Brazil. Currently the company operates in over 80 counties and, has about one thousand employees and fifteen thousand associates. The company operates in dairy industry, also in retail (consumer and agriculture/inputs) and, in production of animal feed. COAPEL's market attendance for its products distribution is concentrated in the three states of southern region of Brazil.

From the research was designed COAPEL's SC structure, as shown in the figure below:

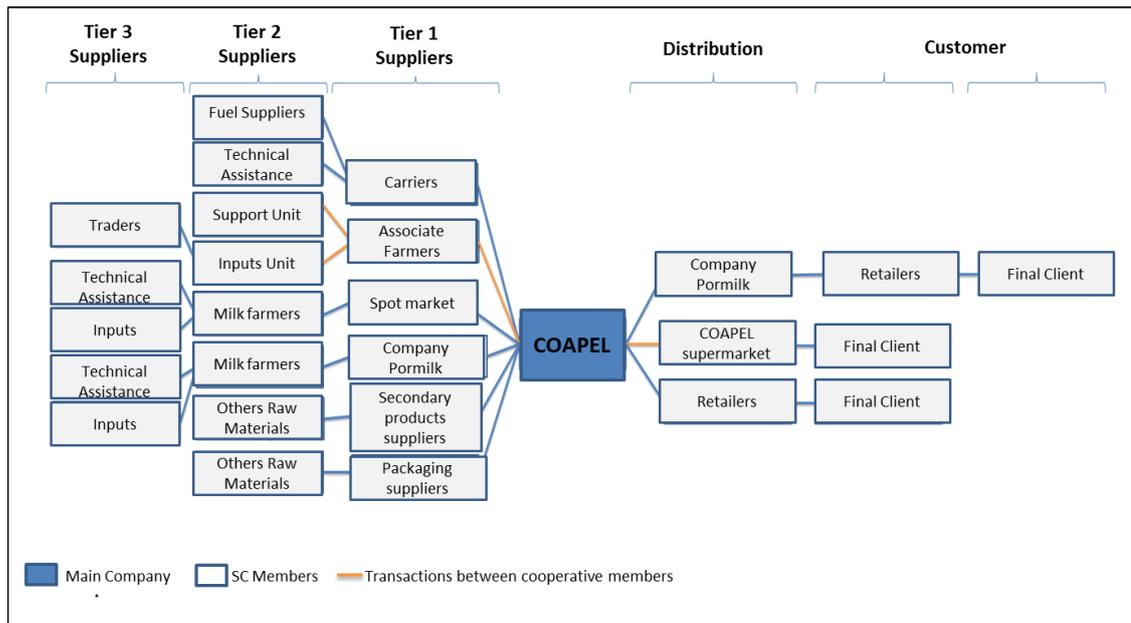


Figure 2: COAPEL Supply Chain
Source: The Authors (2011)

After a restructuring process at COAPEL over the past few years its activities were subdivided into two units to a better development of activities: main unit and support unit. The main unit is composed by the dairy industry, inputs factory and distribution centers/agriculture retail; and consumer retail/supermarkets. The support unit includes technical assistance; controllership, marketing, human resources, etc.

The company management is professional, but with permanent interactions of cooperative's members, through cooperative's councils. In addition, COAPEL has a strategic guideline to management, related to matters such as transparency, promotion of cooperatives actions and cooperatives principles, maximization of members' benefits, self-sufficiency, among some others, based on the company's bylaws. Also, the company is mainly run according to the cooperative's principles, discussed in the literature review, exposed in some COAPEL's practices, such as programs and benefits offered to its members.

In this SC the main transaction are the frequent interactions between COAPEL and its cooperative associates, since they are key members of the SC. In these transactions there are

exchanges for both sides, farmers provide raw materials - fresh fruit and milk - and the company buys their production and supports them with some benefits for this production and development of their lands. To better manage the range of associates COAPEL had mapped them and subdivided into five areas. However, this management has some limits, since there is no strict control of production receipt. Besides, there is no association or supply contract with the company and its associates. However, to join the cooperative the associates accept norms and rules of the organization that includes some liabilities.

In conclusion, the company is social efficient with strong performance by members in management, especially the farmers. In this SC process flows are controlled by the main company, COAPEL, but the SC management is shared among professionals and cooperative members through councils, with big farmers associates acting more actively.

These farmers are also consumers of the company's retail (supermarkets and inputs). In the retail business the company also has urban members, and these associates are managed according to their purchases, obtaining at the end of a year profits shares of this business.

Focal Supply Chain Analyze

In this research analyzes were limited to a focal SC where the main company is the dairy industry of COAPEL and transactions are done between cooperative members. Below is presented the focal SC:

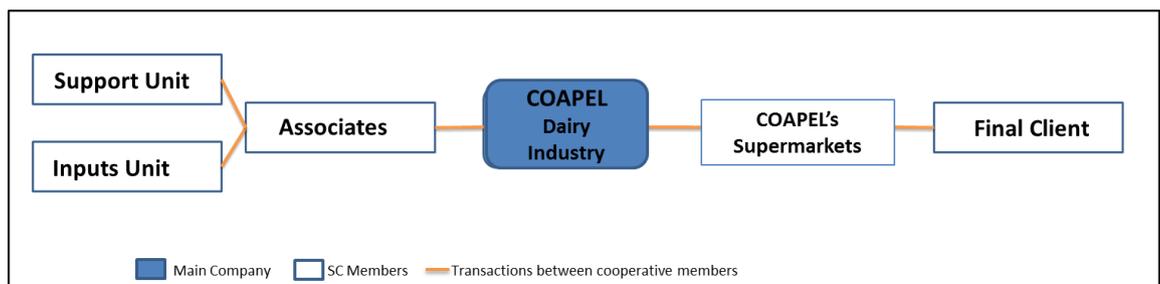


Figure 3: Focal supply chain
Source: The Authors (2011)

Some requirements to join COAPEL are to be a person dedicated to agricultural activity in self land, selling all production to the company, the limitations are related to practices that can harm or conflict with cooperative's activities. Also, can join the company individuals and entities not dedicate to agricultural activities, interested in the retail consumption.

COAPEL do not have a maximum number of members, but this number cannot be less than 20. The association process is done by filling a membership proposal, having no contracts in this relation. The entrance of a new member must be approved by COAPEL Board of Directors and, if there are no restrictions the candidate will subscribe shares turning a cooperative associate. Everybody is free to join and leave the association, and COAPEL also have the right to dismiss a member that is violating some company's bylaws. Associates shares are transferable to heirs, aiming maintenance of farmers as company suppliers, but in some cases is more financial attractive disassociation due the appreciation of shares. It was noted that the company has little control of associates leave, and that some of them become inactive or no longer company's suppliers, but still being associates.

Members participation is done through the General Assembly, the main company council, where big decisions are made and Board of Directors and Audit Committee members are elected. All members, except the ones with employment relation can be elected and voted in COAPEL councils. Council representatives are elected every three years and allowed reelection of $\frac{1}{3}$ of them. In the Board of Directors at least two thirds of members need to be engaged in agricultural activities, in order to keep focus on the cooperative's core business and generating more understanding of associates needs and feelings such as prices changes of raw materials. The main members of this SC are milk farmers, that is a prerequisite for the cooperative only buy raw materials direct from producers that are associates. COAPEL undertakes to buy all associates production and is not allowed them to

sell this production to other companies, although the company has little control over this. The associates have a huge range of benefits given by the company and if they divert production the company can charge them the amount of investments made in their lands. Most of these farmers have small lands, producing less than 18 thousand liters of milk every day, as showed the distribution in the table below:

Production Range (daily thousand liters)	# of suppliers (in %)	Total Production (in %)
0 – 18	55%	19%
18-100	36%	48%
<100	9%	33%
Total	100%	100%

Table 1: Associates bulk production
Source: COAPEL (2010)

Supply Chain Analyze based on Transaction Cost Approach

After explained the relationships and management among COAPEL’s SC, their transactions were analyzed based on TC, divided into two phases: behavioral assumptions and dimensional assumptions.

Behavioral assumptions

Bounded Rationality	- Different cognitive capacity between big and small/medium farmers.
Opportunism	- Pursuit of self-interest and economic gains by farmers; - Use of the benefits provided by the company; - Free membership and leave principle; - Different treatment of members seeking economic gains for the company; - Lack of division between ownership and control; - Prices paid to raw material and paid by consumers in retail.

In bounded rationality were founded differences in cognitive abilities between different size farmers: large vs. small. Larger farmers have their rationality expended, due greater access to education and information, and better relationship with the company,

community and other farmers. These factors generate more subsidies to them in decision making and, consequently results in further development of their properties. Small farmers tend to have less access to education and information and, restricted relation with other members and community, as well as range of cultural and social barriers.

These cognitive capacity differences were visible in members council participation, where small farmers are minority because of a lack of awareness and organizational capacity, due to a bigger bounded rationality to make strategic decisions. But also was noted bounded rationality of all members, big and small farmers, in performance of administrative functions.

Members opportunism were once more related with farmers size. Bigger farmers are less loyal and have weaker ties in relations with the company due a greater independence that they have from the company to development their activities and larger focus in self-interests. This factor was evidenced in dairy farming competition, when associates choose no longer provide for COAPEL seeking more profits offered by competitors companies.

This opportunism was also evidenced in the use of cooperative's benefits. Members can improve their lands and improve their production through subsidies and access to low-cost loans given by the company and are free to join and leave at any time the association, which is a cooperative principle, without COAPEL receiving returns on those investments.

Another opportunism factor was evidenced in the dependence of small farmers with COAPEL to turn their activities economically viable. In this relations were evidenced some dissatisfaction, as production bonuses are given, in general, to large farmers who have greater ability to modernize and invest in their lands, impacting directly in volumes and quality of milk. The cooperative tries to solve part of this problem through an actively approach to small producers, seeking growth and development of their productions. Besides, COAPEL face a dilemma in this issue: maintenance of small farmers, even being under an optical cost

economically unviable vs. the need to retain large farmers, less representative in membership, but more economic profitable for the company.

Were also founded, as previously referenced by Batalha (2001), a lack of division between ownership and control of the company. Although the company is managed by professionals, trying to mitigate this risk, the associates have an actively manifestation on the COAPEL's councils, affecting directly the management. Thus, there are trends in pursuit of self-interest and seek greater benefits for farmers. To finish, is visible evidenced that there are huge differences between the price paid to producers and those paid by consumers.

Dimensional assumptions

Frequency	<ul style="list-style-type: none"> - Milk is collect every two days in farmers lands; - Daily is produced and distributed final products; - Inputs are sold to farmers depending on their needs; - Technical visits are done sporadically and by associates ask.
Asset Specify	<ul style="list-style-type: none"> - Assets in the industrialized process are little adaptable to other production process; - Assets related to farmers care to the animals are highly specific to this activity.
Uncertainty	<ul style="list-style-type: none"> - No contractual relations between associates and cooperative; - Price volatility and seasonality of productions, influenced by external factors; - Investments vs. returns.

Mostly assets used in dairy industry to the industrialization process are high specific and have high monetary value. Also, equipment and machinery used to animals husbandry, as well as the animals themselves, have high value-added to production and are too specific. A dairy cow, for example, has no value or quality in its meat because their genetics is specific for milk production and meat is not noble.

Transactions frequency between members of the SC occurs on recurring basis: (1) every two days milk is collected in the farmers' lands, (2) daily are manufactured end products, (3) daily these products are distributed to final clients, (4) products sales also occurs depending on stocks and needs of consumers, and (5) technical visits occur more sporadic, depending on ask of farmers.

Uncertainties of transactions are also strongly related to lack of contracts for members milk supply. The only contract between COAPEL and its associates are related to financing, which guarantee payments and remain of an associated during the contract period. Thus, there is no certainty of permanence of associates or return on investments made by subsidies given.

Another uncertainty factor is related to the dairy sector that have high volatility of prices and other external factors such seasonality of production and clients demand, which directly affects the SC activities. The cooperative seeks to mitigate these risks through products reserves, maintaining stability of prices paid to its members.

Findings

After analyze COAPEL's SC based on TC was evidenced a preference for a SC's vertical integration of its main activities, controlling the main process and activities for the development of the company's core business, from the production of raw materials till the commercialization and distribution of end products. Because of the cooperative business model, some of these controls are uncertain, like the ones related to the principle of free membership and leave. Even if the company has control of raw material production is not guaranteed retention of farmers as suppliers.

Vertical integration is also desirable because of the high asset specificity, frequency of transactions between SC members, seeking to mitigate risks and uncertainties related to dairy segment and members relationship. COAPEL also seeks to reduce other costs related to

behavioral assumptions, in compliance with cooperatives principles, such as information and education, developing several programs and giving a range of benefits to its members, seeking expansion of their rationality and less opportunism risks for the company through a closer relationship with the associates.

Due to some TC elements influences, addressed in this research, particularly related to high asset specificity, opportunism and bounded rationality of agents, is possible to determine the need of a governance structure model. This governance structure can generate greater efficiency to COAPEL's SC setting the importance of each member to the process, ensuring better organization, stability and, security for the SC transactions.

Also, the cooperative business model itself is not fully efficient based on TC analyzes, evidenced in findings about bounded rationality, such as the principle of education and information. Even with the company giving to its members access to programs and other benefits it does not guarantee a rationality expansion of SC members. This model also have some critical lakes to opportunism actions, particularly because the non-existence of contracts and no defining division between ownership and control.

Conclusion

This research had focused on efforts to increase knowledge of cooperative actions in a SC of an agribusiness company, analyzing those relations and transactions based on TC. Thus, it was evidenced in the analysis some particularities of the cooperative business model, based in cooperatives' principles and doctrines that have important impact in relations and transactions between the SC members.

The findings based on TC presented several critical factors, like high assets specificity of COAPEL business, and huge frequency of transactions among the company and its members. So, the company should monitor closely and in a more efficiently way the SC

transactions, trying to minimize costs related to uncertainty relations. These uncertainties were related to the fact that the company does not have formal contracts to guarantee members raw materials supplies, intensified by lacks in associates' management. In addition, the company is affected by other factors inherent to its activity but influenced by external factors, such as seasonal production and consumers demand, price volatility of raw materials, etc. Thus, inferences were made to these results, since the combination of some factors can lead to a SC better structure and to optimizations in its process and transactions.

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