

# THE APPLICABILITY OF TRANSACTION COSTS ECONOMICS TO VERTICAL INTEGRATION DECISION: EVIDENCES FROM A BRAZILIAN BEEF PROCESSOR

## A aplicabilidade da economia dos custos de transação na decisão de integração vertical: evidências de um frigorífico brasileiro

### RESUMO

Este artigo tem como objetivo explorar a decisão de integração vertical de uma empresa processadora de carne, usando uma abordagem que integra a área de estratégia de operações e a teoria econômica dos custos de transação. Nesse estudo, a integração vertical é considerada uma decisão estrutural da estratégia de operações determinada pela existência de custos de transações. O estudo de caso de uma empresa processadora de carne brasileira ilustra os principais pressupostos teóricos levantados no estudo. Os resultados sugerem que a teoria dos custos de transação auxilia na identificação dos pontos-chave das decisões estratégicas de integração vertical pelo seu caráter comportamental, reduzindo os efeitos da incerteza e da especificidade dos ativos. Ao final, sugerem-se novas pesquisas.

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### ABSTRACT

This article aims to explore the vertical integration decision of a beef processor from an integrated approach operations strategy and transaction costs economic theory. In this research, vertical integration as a structural decision of operations strategy determined by the occurrence of transaction costs. The paper presents one case study carried out in one beef Processor Company which illustrates the main theoretical assumptions. The results suggest that transaction costs economics helps to identify key points of major strategic decisions on vertical integration due to its behavioural perspective, reducing the effect of uncertainty and asset specificity of this decision. At the end of the paper, future research is suggested.

**Palavras-chave:** integração vertical, estratégia de operações, teoria dos custos de transação

**Keywords:** vertical integration, operations strategy, transaction costs economics

## 1 INTRODUCTION

Operations Strategy involves several decisions that determine how a company will compete on marketplace (WHEELWRIGHT, 1984). Vertical Integration is one of these structural decisions and, commonly, it is defined as the decision of making or buying. A more complete definition states that “vertical integration is the means of co-ordinating the different stages of a supply chain when bilateral trading is not beneficial” (STUCKEY & WHITE, 1993, p. 71). Usually, financial calculus on set-up costs and risks assessment are the main bias for this decision making.

However, there are strategic implications on the vertical integration decision. We agree with Slack et al. (2004) that Operations Management is an area formed by several theories from different backgrounds and Transaction Costs Economics looks promising and it is still under applied. These authors also claim that there is a need to develop theories that are useful for managers when taking decisions. Vertical decision can be assessed from an operation strategy perspective as well as a supply chain framework. The former will be considered in this paper. This paper highlights the discussion bringing data from previous research on beef processing sector. The food processing, and specifically beef, deals with specific

features such as the perishable nature of products, the small contribution margins and commercial transactions occurring by spot market mechanism (STANK et al., 1999). Thus, food processing is a way of identifying safeguards used by firms to reduce risk and uncertainty. The TCE framework provides behavioural and economic descriptions that may be helpful for decision makers. This paper draws the decision of vertically integrate operations or not reviewing the main concepts and research applicability provided by the Transaction Costs Economics (TCE), a New Institutional theory based on Williamson's work (1975, 1985). The discussion of a case study of a Brazilian beef processor that decided to vertically integrate its operations is used as an illustration of the theoretical assumptions. Finally, the paper explores the applicability of TCE to the Operation Strategy research and managerial implications.

## 2 TRANSACTION COSTS ECONOMICS

Transaction Costs Economics states that exchanges between two independent agents involve transaction costs of different degrees. Economic institutions then evolve to lower these transaction costs. Williamson (1971, 1975) defended that transaction costs could be reduced, in certain cases, by substituting spot market exchange for vertical integration. Later, Williamson (1985) recognises that most common transactions occur between the spot market and vertical integration extremes, which are known as hybrid forms (different kinds of co-operation levels between firms).

Behavioural theory has a strong influence on TCE assumptions. Simon (1957) broke-up the economist's belief of full rationality when opportunism and bounded rationality were proposed. These two factors occur when one or more agents know the underlying circumstances relevant to the transaction, although this information cannot be costlessly discussed by or displayed to others. Opportunism is "the self-interest seeking with guile" and has a central role in aggravating resource allocation in TCE framework. Williamson suggests that opportunism can be

attenuated by vertical integration strategy. Alternatively, he suggests the use of contracts to create safeguards against opportunistic behaviour by one agent.

Williamson identified three critical dimensions to characterise a transaction: the uncertainty under which the transaction takes place, the level of transaction specific investment and the frequency that transaction occurs. Uncertainty can be stated as an imperfect knowledge about an event. The uncertainty surrounding a transaction can assume different levels. On one hand, for the buyer, it can be an uncertainty of quality, a reliable supply, timeliness or quantity. On the other hand, it can be the seller searching for a buyer. And for both agents, price can be uncertain (HOBBS & YOUNG, 2000).

The second feature is asset specificity (WILLIAMSON, 1985), that means how specific the investment is for the activity and the costs required reallocating it for another use. It is considered the most important empirical determinant of the transaction (GLOBERMAN & SCHWINDT, 1986; WILLIAMSON, 1975) due to its measurability. Williamson (1979), citado por Menard (1996) e Neves (2003) identified six sources of asset specificity:

1. site or location – it relates to geographical factors.
2. physical – it relates to the characteristics of inputs in use, when reallocation is almost impossible due to the specificity for that activity such as citric juice extractors, sugar cane mills, and beer factory fermentation machines.
3. dedicated – it relates to the choice of investment a firm makes in relation to other's needs. Examples can be the investments made by producers in the distribution channels such as special displays, refrigerators.
4. human – it relates to qualifications developed by labourers making their redeployability on the market difficult. They could be subcontracted or trained in the company, representing a cost in their reallocation for another activity.
5. brand-named specificity – it relates to reputation,

- building of a name or brand in a certain market, the effort of public relations within the community, with the press, development of packages, sales promotions, advertising, etc
6. temporal - the time available to carry out the transaction. It also analyses of the perishability of the product and storage policy. Mechanisms such as just-in-time deliveries and the need for frequent and fast delivery are involved in this specificity.

Williamson proposed that firms emerged to manage investments with a great deal of “asset specificity” because the sunk character of investments exposed their owners to threats of profit expropriation (LAMOUREAUX & RAFF, 1995, p. 3). The presence of higher specificity increases risk for the owner of this asset. If there is no trust or safeguards, it can be too risky for the firm to make such specific investment.

Frequency is the third feature and it states that if a transaction occurs frequently in similar ways, a firm develops routines to manage it efficiently. For example, learning by doing is a natural result of long-term relationships. On the other hand, if the transaction is not frequent, agents need to bargain about its terms, resulting on raises on the costs of carrying out the transaction.

Similarly, Williamson (1985) identified three kinds of transaction costs: first, search or information costs associated with finding information about products, prices, inputs, new partners, buyers and sellers. The second kind, negotiation costs, includes agreements over trade terms (price, delivery, quality, among other), and the costs of writing contracts or paying a commission rate to an intermediary. The last kind of transaction costs, monitoring, are associated with inducing compliance, but may also involve feedback both from the quality of the goods or from the behaviour of a supplier or buyer after the transaction (HOBBS, 1996, 1997; SAKO, 1992).

In sum, TCE is a positive theory that aims at understanding inter-firm relationships and how various forces can cause it to change.

## 2.1 Information and Governance

Casson (1997) emphasizes the influence of collecting information and communicating it over firms on long term relationships. There are different prices in the market, corresponding to different links throughout a supply chain, for example, raw material supplier's price, processor's price, wholesaler's price and retailer's price.

Ideally, the information flow should be clear, transparent and available to each firm, but this is rarely true. There are basically two kinds of information along the chain, market information and technical information. The first one deals with customers, competitors, suppliers, distribution channels, among others, by which the profitability of the investment is directly or indirectly influenced. The second kind, technical information, deals with product and process standards, regulation, certification and all other conditions, which do not consist of plans and actions by other people.

For Richardson (1990), the importance of making a distinction of technical and market information happens because of the difference in the way each is available. He says that the extent to which a manager can obtain market information depends on the structure of the market, while the access to technical information does not. Oligopolies and monopolies, for example, tend to hold market information to barrier the entrance of new companies or to increase bargain power. On the other, technical information is more easily available, for example, stated in code of practices or included in public regulation.

However, information issues can also be distinguished between *ex-ante* and *ex-post* information problems (DOUMA & SCHREUDER, 1998). Hidden information is an *ex-ante* information problem, which arises when one party has private information relevant to a potential transaction but the other does not. It is *ex-ante* when this private information exists before both agree to conclude a transaction. Markets and firms offer different solutions to this kind of information problem (such as contracts, commodities prices, among others). An *ex-post* information problem applies after agents have agreed to carry out a transaction. The information

concerns unobservable behaviour of one of the agents when executing the transaction. For example, a company with environmental concerns can ask its suppliers to be careful in waste processing. However, a supplier may not follow this to avoid extra costs and act opportunistically. This valuable information would affect the transaction if both agents were aware of this.

Douma & Schreuder (1998) point out vertical integration as one possible solution to information problems as firms are more capable of dealing with certain information problems than markets. This means that there is a trade-off between economies of scale and specialisation on the one hand and transaction costs on the other. For example, a less developed food system (based upon personal transactions) would present low transaction costs but higher production costs. In a large and complex system, whilst economies of scale are present, the impersonal exchange gives considerable scope for all kinds of opportunistic behaviour and, consequently, high transactions costs.

It is worth pointing out that an efficient information flow will reduce uncertainty. Relevant and accurate information on prices, locations of effective demand, preferred quality characteristics or alternative marketing channels could improve the bargaining terms of a transaction.

Governance is the term used by Williamson (1985) to characterise the set of institutional arrangements within which the transaction is organised. TCE compares different governance forms, choosing the most efficient in terms of reducing transaction costs.

Governance, according to Williamson, is the vertical organisation of activities searching for efficiency. TCE framework is traditionally characterised by dichotomy between governance through the market (made up of isolated firms using spot market transactions) and, at the other extreme, the vertical integration (exemplified by the large, vertically corporation). Between these two extremes, there are several forms that are known as **hybrid forms**. Governance allows firms to receive, process, diffuse and use information to elaborate competitive strategies, reacting to changes and taking advantage of opportunities.

Although there are different forms of governance of economic activities, there is not a best way to co-ordinate them, a firm can adopt different forms, one for each specific situation or market.

## 2.2 The Vertical Integration Decision

Some authors (FRANK & HENDERSON, 1992) say that vertical integration is often used in situations where it would be better employed to describe the entire process by which the various functions of a system work in harmony. Therefore, large companies internalise those activities that had been or could be carried out by several business units and the transactions that had been or could be carried out between them. However, this study uses the term **vertical integration** implying that one company owns another upstream or downstream the supply chain.

The main advantage of vertical integration, according to TCE, is that the routinisation of transactions would lower transaction costs. This happens because there is a learning process involved in performing an activity frequently. The vertical integration strategy takes dispersed information to a central planner who is expected to solve the resource allocation problems. (MILGROM & ROBERTS, 1992). Table 1 summarises some advantages and disadvantages of using vertical integration strategy.

TCE approach focuses on agents facing a decision among distinct governance forms. The transaction features determine the level of transaction costs, influenced by behavioural assumption, and the perusal of the most cost efficient form. In Operations Management field, the decision to vertically integrate is part of the structural decisions of a company. This decision has trade-offs, regarding extra costs, performing activities out of the core competence but it also assures control over the distribution channel or supply assurance. In sum, when vertical integration strategy is well planed and aligned to the organizational features of a company, it will take it to a competitive advantage

Table 1: Some Advantages and Disadvantages of Vertical Integration

Advantages	Disadvantages
<p><i>Internal benefits</i></p> <p>Integrated economies reduce costs by eliminating steps, reducing duplicate overheads and cutting costs (technology dependent).</p> <p>Improved governance of activities reduces inventory costs.</p> <p>Avoid time-consuming tasks, such as price shopping, communicating design or negotiating contracts (transaction costs).</p>	<p><i>Internal Costs</i></p> <p>Need for overheads to co-ordinate vertical integration increases costs.</p> <p>Burden of excess capacity from unevenly balanced minimum-efficient-scale plants.</p> <p>Poorly organised vertically integrated firms do not enjoy synergies that compensate for higher costs.</p> <p>Lack of specialisation according to core skills.</p>
<p><i>Competitive benefits</i></p> <p>Avoid foreclosure to inputs, services, or markets.</p> <p>Improved marketing or technological intelligence.</p> <p>Increased value-added</p> <p>Market power</p> <p>Create credibility for new products.</p> <p>Synergies could be created by coordinating vertical activities skillfully</p>	<p><i>Competitive dangers</i></p> <p>Obsolete processes may be perpetuated.</p> <p>Creates mobility (or exit) barriers.</p> <p>Links firms to sick adjacent businesses.</p> <p>Loss of access to information from suppliers or distributors.</p> <p>Synergies created through vertical integration may be overrated.</p> <p>Managers integrated before thinking through the most appropriate way to do so.</p>

Source: Adapted from Harrigan (1985).

### 2.2.1 Methods of Studying TCE

This section focuses on methods used to apply the TCE framework. Shelansky & Klein (1995) review empirical research in TCE analysing studies carried out in several industries. In common, these studies use the form of governance as the dependent variable, while asset specificity, uncertainty and frequency are the independent variables. Their review suggests that the probability of observing a more integrated governance structure depends positively on the amount or value of the transaction-specific assets involved in the relationship and, for significant levels of asset specificity, on the degree of uncertainty about the future of the relationship and on the frequency of the transaction. This can exemplified by the risk that a supplier goes through when making a specific investment (for instance, while acquiring new equipments) to comply with one customer's demand. If the duration of this relationship is uncertain and the

equipment has no use for other customers, the costs may be too high. For the customer, it is also risky that the supplier decides to supply a competitor or engage in new activities. In such a case, the vertical integration strategy is suggested. The form of governance was often modeled as a binary variable: "make" or "buy". Studies analysed in these authors review fall into one of three categories:

- 1) Qualitative case studies
- 2) Quantitative case studies
- 3) Cross-sectional econometric analysis

The large part of the empirical literature in TCE consists of case studies. This happens primarily because of the main variables of interest to TCE – asset specificity, uncertainty, frequency – are difficult to measure consistently across firms and industries (SHELANSKY & KLEIN, 1995). Sometimes, the non-measurable character of transaction costs is not easy



to separate from other managerial costs. Typically, these characteristics are estimated based on surveys or interviews (for example, using a Likert scale). Since these measurements are based on ordinal rankings, it is hard to compare them from industry to industry.

Shelansky & Klein (1995) find that asset specificity and uncertainty are the more consistent reasons to explain vertical integration, which is the form of governance more commonly studied within the TCE framework. They conclude that the body of empirical research aligns with the TCE predictions, but they suggest that refining and developing evidence on hybrid forms governance (co-operative strategies) still remains to be done. Although it is easy to agree that there are costs involved with a transaction, they are difficult to measure in financial terms. From this review, it is concluded that the majority of empirical applications of TCE framework have analysed the extent to which transaction costs features affect the form of governance. The advance of studies moves from the assessment of vertical integration to the formation of hybrid (co-operative) forms. The importance of supply chain management may explain the change of the focus of analysis to more co-operation strategies between agents. However, qualitative and exploratory studies are still gathering evidences to refine the TCE framework to include properly hybrid forms governance. The vertical integration decision framework is, so far, better developed for research purposes.

### 3 METHOD OF THIS STUDY

Case study is a method popular in applied social sciences (Sociology, Management and Business) and, recently, agricultural economists have been applying these methods (STERNS et al., 1998; WESTGREN & ZERING, 1998), especially those researching the business management of food companies. Authors think that agribusiness researchers are in a privileged position to be closer to industry than researchers of strategy behaviour in other industries. For example, Westgren & Zering (1998) argue that case studies can illustrate the range of organizational forms and strategies used in an industry,

without attempting to calculate their incidence. In this study, the aim is to explore the different parts of a transactional process and work out how the parts are linked. Researching cases can offer a unique tool to refine or build theory by examining events not suited to traditional statistical approaches (WESTGREN & ZERING, 1998). Compared to surveys, case studies can better answer “hows” and “whys” because the case analysis can address motivations and actions in greater detail. Silverman (2001) suggests that the initial move should be to give attention to “how” agents interact. Then, it is considered “why” questions about institutional and behavioural constraints. This is the procedure used in this study.

The purpose is to test and clarify an existing theory (TCE) and the researcher can select a set of case studies to purposefully challenge *a priori* assumptions and theoretical assertions. Sterns et al. (1998) relate this to Yin’s analogy between case study and a lab scientist conducting experiments. Both are used to determine if the theory holds up under specific conditions and parameters of a given case.

The case study was selected because of the forms of co-ordination used and that they would change according to the features of the marketing channel. The case study was conducted analysing documentation, through semi-structured interviews and direct observation (site visits). The documentation analysed were secondary data (such as theses, dissertations, journals, newspapers and technical magazines) and promotional brochures provided by the companies visited. When available, production costs and annual report were also focus of analysis.

The semi structured interviews took about two hours following a group of questions. The interview was recorded on tape. The session focused particularly on the following issues: activities carried out by the company, interactions with other links (suppliers, customers) and to what degree, input and output features, how this information is collected, how prices are determined and problems perceived in the marketing channels and international food standards and safety measures.

## 4 THE BEEF PROCESSOR DECISION

This section presents a beef processor and its reasons for vertical integration decision through a TCE perspective.

### 4.1 Beef Processor Description

The company studied is beef processor called “A” and located in São Paulo state. This company is a family business and is one of the largest exporters in Brazil, selling 45% of its production to North America, Chile, the Far East, the European Union and the Middle East. The other 55% beef production supplies the domestic market (supermarkets and small retailers). This firm has five processing plants with a total slaughter capacity of 4,500 cattle heads per day.

### 4.2 Vertical Integration

The beef processor “A” has a backward vertical integration, owning seven farms, where it breeds livestock integrating all the stages of the production system (nursing, raising and fattening). The farm manager is a family member and says that the vertical integration strategy acts as a protection against price distortions or lack of supply. It also sources from local farms at auction markets or through cattle merchants. When asked about the possibility to establish alliances with the cattle producers, the beef processor manager tell that there have been three or four attempts to establish closer relationships with some selected cattle suppliers and none of them have been successful. When this issue was raised during the interview with one local cattle producer, he said “*it is better to try to get some profit in each negotiation than to be tied by a long term contract*”. This kind of opinion of the suppliers illustrates the opportunistic behaviour perceived by the agents involved in the beef transaction. As a result, the beef processor justifies the use of a backward vertical integration due to a probable opportunistic behaviour among suppliers, and having an “in-house” alternative. According to him, this strategy reduces the processor’s

information costs in the long-term. In addition, it increases the company’s power when negotiating prices and standards with his suppliers. Thus, this processor uses the two extreme forms of governance: vertical integration and spot market.

### 4.3 Market Information

The findings point that there is a large amount of technical information available to the beef processor but few marketing information (such as trends, consumer behaviour, distribution channels requirements, among others). The beef processor says that it would like to know more about the end consumer in the export market. At present, the sales transactions are carried out based on monthly orders and occasional visit by inspector (representing the importer, which is a wholesaler) to the processing plant. This inspector checks the compliance with Hazard Analysis and Critical Control Point process (HACCP) and cues of the final product (such as leanness, colour, package material, cut, marbling, etc). The beef processor considers that there is little knowledge transfer in this relationship. The manager perceives this lack of information exchange because the transaction happens through a wholesaler, so there is no clear understanding of the end market. Based on this perception, the company is developing its own export brand and has opened up an office in Italy to learn more about this market dynamics and to try to negotiate directly with supermarket chains there and other countries members of the EU. The company plan is to develop commercial alliances downstream (hybrid forms of governance) with local distributors and retailers that value Brazilian beef.

### 4.4 Asset Specificity

Regarding asset specificity, the results of the case study shows that there are some attributes that are necessary to the export market but not required in the Brazilian context. For example, beef has some search attributes (colour, leanness, appearance, etc) and process standards such as traceability (which is enforced by the

Brazilian Ministry of Agriculture – MAPA) that results on a high asset specificity transaction. Therefore, the company perceives that spot market transactions could no longer guarantee regularity of supply to export market. Likewise, the beef processor had problems to develop co-operative relationships with suppliers that could provide the necessary input (in this case, traceable cattle). The processor admits having made previous attempts at selecting preferential suppliers. However, this approach did not create great incentive to encourage beef producers to overcome the sense of inherent mistrust existent. As a consequence, the beef processor complies with process standards through vertical integration between production and processing activities. In export market, so far, the brand used is the wholesaler's and transactions can be considered spot market.

This figure represents the chain configuration, where the processor has to vertically integrate its supply inputs through the ownership of farms. This is a strategy to reduce uncertainty and to comply with asset specificity, specifically, traceable cattle. On the other hand, the European Union importer set the standards, price and brand but there are no contracts or partnership involved in this transaction.

## 5 DISCUSSION AND IMPLICATIONS

The theoretical discussion rises that the form of governance depends on the transaction features of frequency, uncertainty and asset specificity (MENARD, 1996; WILLIAMSON, 1975, 1985). According to TCE, greater governance in the form of vertical integration is necessary to overcome higher transaction costs (information, negotiation and monitoring). For example, the uncertainty of timing of product increases the search costs. Thus, TCE proposes that higher transaction costs increase the need for governance.

The main transaction costs identified in the case study of the beef processor “A” are the costs of finding physical attributes in the livestock (information costs), and finding and negotiating with producers with traceability in order to guarantee the safety of the output (information and negotiation costs). As a consequence, beef processor, in relation to export market, declared that he was incurring high information costs and high negotiation costs to source beef. The need to comply with process standards also led to high monitoring costs. For example, the company studied traditionally sourced using spot market form of governance. However, the EU requirement to only import traceable cattle led the beef

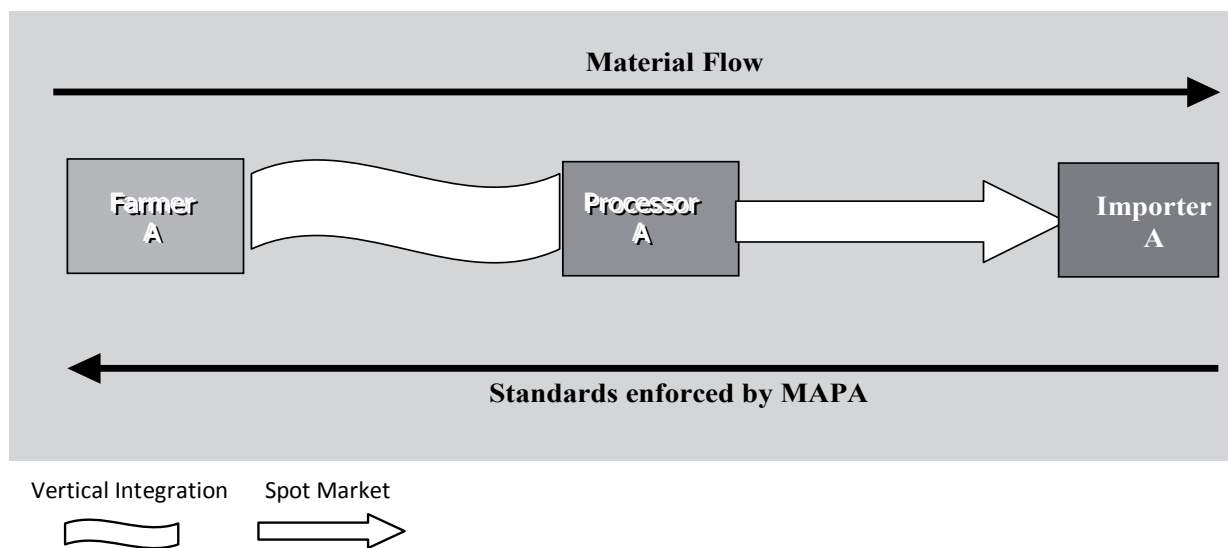


Figure 1: The large vertically integrated exporter company



processor “A” to integrate backwards in order to control product quality and reduce uncertainties in beef supplies. The vertical integration was a strategic response to be able to sustain its sales to the EU market. While vertical integration strategy reduces information and negotiation costs of the processor, it tends to increase the costs of monitoring the producer behaviour and production practices. The findings concur with the TCE framework about the transaction costs leading to greater chain coordination or vertical integration need (FRANK & HENDERSON, 1992; MILGROM & ROBERTS, 1992).

The other assumption that the TCE literature review showed is that companies where there is high asset specificity are more likely to have greater chain governance than those without. Asset specificity is related to two factors: the first is how specific the investment is for the activity and the second factor are the costs of reallocating it for another use. Asset specificity is considered the primary determinant of the form of governance (FRANK & HENDERSON, 1992; WILLIAMSON, 1985) and there are six different sources of specificity (MENARD, 1997). This assumption was confirmed by the case study that highlighted two assets specificities implied in the export transaction: one is related to process (traceability) and other to product (HACCP) standards. According to the interviewees, the HACCP may increase 20% processing costs. This investment is not transferable to the domestic market, where consumer does not value food safety concerns. As a consequence, these investments can be considered high specificity as suggested by Menard (1997) and Neves (2003).

The case study findings are aligned to the general assumptions presented by the TCE theory. The beef processor “A” vertically integrated its operations backwards to be able to comply with export standards. Although there is an argument that TCE is a bad theory for general management when used as a normative theory (GHOSHAL & MORAN, 1996), in this paper we propose TCE as a positive and descriptive theory which provides a framework for decision making.

Regarding the case study, TCE helped identify key points of major strategic decisions on vertical integration, reducing the effect of uncertainty depending on competitive conditions. It is possible to say that if there is no asset specificity and thus there are many potential input suppliers for which future demand is uncertain, it may be cheaper to buy the component or to develop alliances than to make it internally. However, the results also suggest that vertical integration is a costly and difficult strategy. It is also true that the analytical understanding provided by TCE of buyers and sellers behaviour is important to the vertical integration decision and it lacks on the traditional operation strategy framework.

The understanding of trust inherent to the development of alliances or other hybrid forms of governance is a intangible resource that would explain why to vertically integrate or not. The literature review and the case study suggest that the inclusion of behavioural concepts is the most important contribution of TCE to the operations management area. It also supports the idea that the advance of research on operation management should be aligned to the applicability of the theories developed on the real world (SLACK et al., 2004).

Whilst this study has added to the current state of knowledge, it must also be accepted that there are several limitations to the research. The assessment has been exploratory supported by a single case study. Some concepts are difficult to identify and depend very much on the interpretation of the researcher. Further research suggests the generation of hypotheses supported by TCE (asset specificity, frequency, and uncertainty and transaction costs) to be tested aligned to the operations strategy theory.

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