

Outsourcing of logistics transport: A Brazilian leather industry case study

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■ ABSTRACT

This study aims to analyze the transport sector in Brazil and the criteria for outsourcing of business transport through a case study in a Brazilian industry of leather sector, which outsourced its transport distribution process. As a result of this process, this company could save 60% of its transport costs and improved its service level, which generated an additional 3.5% on its revenue. These research findings are relevant in terms of transportation outsourcing decision criteria, being a strategic decision in operations; thus, in managerial terms, this outsourcing process could make the company's distribution transportation capability more flexible and agile.

Keywords: logistics, outsourcing, transportation.

■ RESUMEN

Este estudio tiene como objetivo analizar el sector del transporte en Brasil y los criterios de subcontratación de transporte comercial a través de un estudio de caso, en una empresa brasileña del sector de cuero que subcontrató su proceso de transporte de distribución. Como resultado de este proceso, la empresa pudo ahorrar 60% de sus costes de transporte y mejoró su nivel de servicio, lo que generó un 3.5% adicional en sus ingresos. Estos resultados de la investigación son relevantes en cuanto a los criterios de subcontratación de transporte, como una decisión estratégica en las operaciones; así, en materia de gestión, este proceso de subcontratación podría hacer el transporte de distribución de la empresa más flexible y ágil.

Palabras clave: logística, subcontratación, transportación.

Due to increasing competition being faced currently, companies tend to focus on their core business, and outsource part of their activities with logistics provider suppliers (LSPs), adding value to their operations, which is an even more frequent approach adopted. To gain competitiveness, currently firms do not compete as independent entities, but as components of supply chains; thus, the ultimate enterprise success will depend on its managerial competence to integrate and coordinate its network (Lambert & Cooper, 2000; Seth, Deshmukh, & Vrat, 2006). In this sense, outsourcing of logistics activities aims to increase enterprise competitiveness, reducing fixed operational costs, and improving service level (Fawcett, Calantone, & Smith, 1996; Gadde & Hulthein, 2009).

Logistics outsourcing is a crescent applied approach and is expected to continue to grow significantly in the future (Ashenbaum, Maltz, & Rabinovich, 2005; Langley et al., 2009). Seth et al. (2006) and Stefansson and Russell (2008) state that relationships between customers, companies and their logistics service providers (LSPs) represent an increasingly important integration in supply networks; however, outsourcing criteria selection is pointed by Meixell and Norbis (2008) as one the main critical steps in the whole outsourcing process. Authors also cite that historically outsourcing process is structured in two steps: choice of the transportation mode and the selection of the carrier within that mode, which can be part of the company strategy regarding its logistics operations, to gain competitiveness.

Monczka, Trent, and Handfield (2005) explain that frequent outsourcing selection criteria include identification of relevant transportation performance variables, carrier mode rates, service levels, and carrier performance (also lower transit time). Wilding and Juriado (2004), on the other hand, highlighted that some factors have been to influence companies to outsource logistics services, including: focus on the business objectives, reduced costs, and increased operational flexibility.

For Meixell and Norbis (2008) and Reimann (1989), the transport carrier performance can positively influence the effectiveness of the enterprise logistics function, becoming an asset for

competitive advantage. For this reason, selecting the appropriate transport carrier needs to be carefully conducted.

Outsourcing decision is also affected by production and operations practices, like deregulation of the trucking and rail industries, manufacturing strategies based on innovation (as JIT, lean, RFID-Radio Frequency Identification, and other flexibility approaches), and quality management emphasis, among others (Meixell & Norbis, 2008). In addition, as more and more complex factors are involved on the outsourcing decision, more complex it becomes, leading to several approaches and numerous models (Murphy & Farris, 1993).

Transportation capacity shortage is, according to Byrne (2004), one issue to be handled on transportation logistics management. He argues that in the motor carrier industry, for example, as fuel prices rise, carriers have to raise their transport prices, resulting in increased freight rates with no service level improvements. Byrne (2004) also includes other issues, like tighter regulations of worked hours, driver shortages, and applied technology and tools that modify truck capacity.

Another component of the transportation logistics management that is frequently overlooked on carrier selection is the impact of economies of scope and of scale (Meixell & Norbis, 2008). In this sense, scope economies are concerned with the relative use of transportation equipment and facilities after they are emptied, not only in general context, but also on container-on-barge operations, inter-modal railroad-truck transportation, and retail logistics (Mentzer, 1986; Evers, 1994; Dutton, 2003; Byrne, 2004); thus, economies of scale are related to shipment size, which means that there is a concern to use the full truck capacity in order to minimize costs linked to equipments capital expenditures (Meixell & Norbis, 2008). Authors also explain that economies of scale are affected by inventory handling, being cheaper to ship in pallets or cases, than on individual units.

Meixell and Norbis (2008) point out security on the supply chain as another important issue that logistics managers face; therefore, security in logistics management is invested mainly to comply with

new security transportation measures in place, to reduce terrorist threats and their potential influence on business operations. According to Russel and Saldanha (2003), these new security measures represent an additional \$151 billion annual cost, being \$65 billion only in supply chain logistical changes. For Rinehart, Myers, and Eckert (2004) and Sheffi (2001), these impacts can be minimized by the adoption of the following practices: select carriers that comply with security regulations, ship via more secure ports, meet packaging security and transportation requirements, provide previous information from key personnel involved on the transport, improve synergy with suppliers, and amend inventory management strategies.

Logistics outsourcing relationships are not always successful. Lambert and Cooper (2000), Gadde and Hulthen (2009), and Daugherty (2011) report cases where these relationships became source of failure and disappointment. So, Hartmann and Grahl (2012) and Meixell and Norbis (2008) argue that effective management of logistics outsourcing integrations is fundamental to get corporate competitive advantage.

Additionally, Premeaux (2002) did a comparative analysis, where she surveyed carriers and shippers in 1991 and 2001, and noticed that: (1) there was an increasing concern regarding information access, consistent performance from carriers, solid relationship with customers, and desired services delivery; and (2) carriers are more aware about shipper priorities, and are developing responses to this need. In this context, the objective of this work is to present the benefits of logistics transportation outsourcing into a Brazilian company engaged in the leather sector, which is facing costly maintenance of its truck fleet; thus, the study becomes relevant, as it will influence the organization's leaders to a decision of possible transportation outsourcing.

METHODOLOGY AND RESEARCH DESIGN

The focus of this study is the adoption of outsourcing process for distribution transportation logistics in one Brazilian company of leather industry. To clearly define this paper's objective, the fol-

lowing question is addressed: “What are the main criteria to be considered on the leather distribution transport outsourcing?” The paper adopts the exploratory study as its research method, which converges with the nature of the problem investigated, and the current state of available knowledge, as suggested by McCutcheon and Meredith (1993), Yin (2014), and Eisenhardt (1989).

The following elements justify case study method selection:

- The focus of this study is to adopt a methodology to support a decision to outsource transport in a Brazilian leather industry. The literature on this topic is scarce;
- The available knowledge is in the early stages of the research development; thus, a case study proves to be the most appropriate approach for this survey because, as suggested by McCutcheon and Meredith (1993), Yin (2014), and Eisenhardt (1989), it is typical in the early stages of the development of the theory, whenever events or phenomena research have little, or no cataloged knowledge;
- There is no precise idea of which transportation outsourcing factors will affect the company service level (transit time) and the incurred costs on their distribution processes performance; thus, these elements would become clear during the research process, with continuous comparisons between the case evidences and the available literature. As a result, the problem of this research will be refined during the study (Eisenhart, 1989);
- Research of transportation logistics outsourcing applied to leather company distribution processes requires the researcher to place the events in a chronology, to determine their causal connection. By doing so, the case study becomes the initial basis for such causal references (Yin, 2014).

Additionally, a clear understanding of the performance drivers of logistics outsourcing is critical for the management of the supply network integration, and empirical research is scarce in this area (Deepen, Goldsby, Knemeyer, & Wallenburg, 2008).

This case study involves transportation processes outsourcing into a Brazilian producer of leather goods, considering carrier selected adopted criteria, and the process as a whole. To execute this decision process, firstly a checklist was established (Table 3), considering important items for the leather producer, to be validated on the candidate enterprises. In the sequence an initial survey was applied. The focus of this survey was to select partners that could add value to this leather producer, on its distribution process, based on the selection criteria. After a first evaluation, a second step took place, considering visits on each candidate's site, and on its main customer, in order to check its operational structure, and its delivered service level.

This study is relevant because the subject of transportation choice has been researched by academics for more than 40 years (Meixell & Norbis, 2008). One of the first studies was done by Baumol and Vinod (1970), who investigated shippers' transportation choice and developed a model to define the optimal mode choice, considering trade-offs among: freight rates, agility, dependability, and losses during route. Meixell and Norbis (2008) complemented that many other researchers have contributed to this field, including Grabner, La Londe, and Robeson (1971), Saleh and La Londe (1972); Evans and Southard (1974); and Jerman, Anderson, and Constatin (1978).

LOGISTICS, DISTRIBUTION CHANNELS, AND TRANSPORTS

The Council of Supply Chain Management Professionals (2013) defines logistics management as: "that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverses flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements" (p. 117).

For Bowersox, Closs, and Cooper (2009), logistics goal is to make products and services available at the site where they are needed, when they are desired, which involves the integration of information, transportation, inventory, warehousing, materials handling,

and packaging. In this sense, trends on the customer behavior and preferences for specific products and services have impacted decisions related to distribution channel management (Frazier, 1999).

Bowersox et al. (2009) state that the creation of value for the customer is essential to obtain and maintain a set of loyal customers. In this sense, one of the several necessary skills to create value for customers is the efficient and effective logistics usage, in order to deploy value addition, at competitive costs.

The logistics, under the operations view, assist in the production and marketing processes. From a strategic perspective, logistics executives, through the acquisition and maintenance of a set of key competence skills, intend to achieve value-added products and services to customers; thus, the challenge is to balance the customers' expectations and service requirements, with the "cost to serve" to accomplish stated business objectives (Bowersox et al., 2009); therefore, Bowersox et al. (2009) state that it is possible to achieve good levels of logistics services, but the restrictions are more economic than technological, involving a trade-off between the degree of the service specialization, and the cost of this service; thus, it is crucial that this service level be measured and managed, which can be achieved through the following performance criteria:

- **Stocks availability:** The objective of maintaining stocks is to regulate the flow and volume of demand and consumption. For finished products, this implies to consistently meet customer's needs; however, increased availability of stock requires greater investment, both in the use of technology and people, as in the immobilization of financial resources.
- **Operating performance** can be measured by the elapsed time from the receipt of a customer's order, and to deliver the product to this customer, involving both agility, as the reliability and quality, and the flexibility to meet customer's specificities.

In this sense, logistic partnerships are essential to combine and converge these partners competences applied to products and services distribution processes (Hofer, Knemeyer, & Dresner, 2009).

To Lambert et al. (2004), partnerships are described as “closely integrated, mutually beneficial business relationships” (p. 55). Additionally, several authors have studied logistics outsourcing partnership characteristics (Cooper & Gardner, 1993; Gardner et al., 1994; Ellram & Hendrick, 1995). Hofer et al. (2009) define five relationship behavioral dimensions referred by Lambert et al. (2004) as managerially controllable components: operational information exchange, planning, shared benefits, extendedness, and mutual operating controls.

The American Marketing Association (Michel, 2007) defines a distribution channel as the structure of organizational units within the company, agents and commercial firms outside, wholesalers and retailers, through which a commodity, a product or service is marketed. A channel is a group of stakeholders which takes the product or property, enables its exchange during the marketing process, from the original supplier, to the end buyer (i.e. in the case of products property).

Milan, Dorion, and da Rosa Matos (2012) explain that a distribution is one of the company’s four main strategic decision areas and, in relation to its marketing composition, it includes decision areas of product, service, price, and communication. Kotler and Armstrong (2007) state that changes on the adopted distribution channel are normally more difficult to be done than other strategic decisions, like price and product modifications, for example, because it involves several companies and diverse relationships.

For Milan et al. (2012), as being external resource, distribution channels are built of meaningful corporate commitment, from each participating enterprise. Bowersox et al. (2009) adds that the definition and prioritization of common objectives results in higher level of the channel performance, generating acceptable compliance in relation to form, property, time, and location.

Regarding the distribution channel effectiveness, the American Marketing Association (Michel, 2007) defines channel performance by results obtained from various dimensions, like:

- Effectiveness: how well a channel responds to the customers requirements and expectations;

- Efficiency: how well a company minimizes costs related to these channels' operations;
- Productivity: mainly based on the rate of return of the channel;
- Profitability: represents the economic performance of this channel.

Distribution channel performance, however, is not measured only in terms of financial indicators, being increasingly applied, as complementation, non-financial measures (Milan et al., 2012). Brashear et al. (2007), based on the literature review, suggest a model based on five categories: strategic, client-buyer, operational, relational, and financial.

As an important component of distribution channels, transportation plays a crucial role on logistics. In Brazil's environment, according to Hijjar and Lobo (2011), road transport is the principal means of cargo disposing, being responsible for 63% of tons per useful kilometer (TUK) in the country, having transported in 2008, 770 million TUK, 14% higher than of that recorded in 2006 (Figure 1).

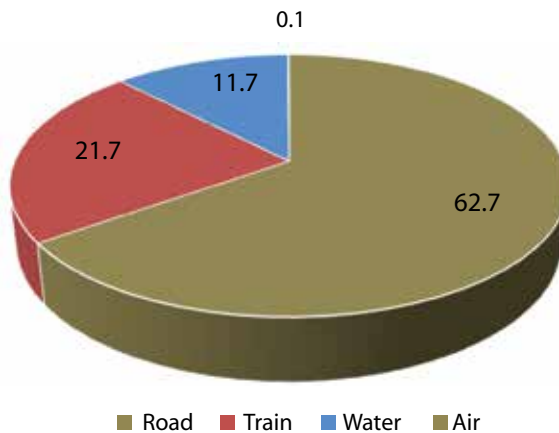


Figure 1: Transported volume by modal. Source: Hijjar & Lobo (2011).

Due to the large volume handled, and for being one of the modes with higher unit price, road freight transportation has been one of the most representatives related to Brazilian logistics costs. In 2008, expenses on cargo handling by Brazilian highways were 5.7% of the gross domestic product (Hijjar & Lobo, 2011).

According to Fleury (2002), transport is the main component of the logistics system. Its importance can be measured by at least three financial indicators: cost, revenue, and profit. The transport is around 60% of logistics costs and on average 3.5% of revenues. Transport also has a major role in the quality of logistics services, because it directly impacts the delivery time, reliability, and product safety.

For Bowersox et al. (2009), transportation decisions can minimize at the same time the financial costs (because it takes domestic spending to keep the own fleet or third party agreements), temporal (on the transport leadtime), and environmental (one of the largest consumers of fossil fuels, and, consequently, the environmental impact). In addition, road transport potentially reaches all parts of the country, unlike rail, air transportation, and waterway, and it is also able to respond quickly to market demands. Still, the road transport requires relatively small fixed investments and operating on highways maintained by public agencies, in the majority. The authors report that the variable cost, however, is high, both due to the low capacity in terms of volume transported, and also on increasing costs of equipments replacement, maintenance, drivers' salaries, and expenses with decks and park lots.

Novaes, Valente, and Passaglia (2008) state that there are different categories of carriers: the autonomous load carriers, transport companies (and own load), and car rental companies:

- Autonomous load carriers: In Brazil, the majority of trucks belong to this category, playing a key role in the economy, especially in the long distance transport;
- Transportation companies: although more organized and structured, they face various difficulties, such as the inadequate

conditions of most Brazilian roads, lack of better planning for the government agencies, and need for improvement in the operational aspects;

- Rental vehicles companies: are organizations that have truck fleets for hire, fulfilling significant role, adding flexibility and increased capacity for other companies' fleet management.

Meixell and Norbis (2008) explain that one of the main decisions in logistics management relies on transportation mode and carrier selection, to handle the company freights to inbounds and outbounds. Managers generally take in account several attributes during this decision process, and even consider costs and transit time trade-offs as main criteria; however, this is not a trivial decision, mainly because some criteria are not easily quantified. Also, these factors' importance is dependent on the industry, company size, and available facilities.

For Morelli and Simon (2012), outsourced logistics services play, in whole or in part, the supply chain management and physical distribution. Companies seek external solutions for their activities when the cost-efficiency is unfavorable, compared to outsourced alternatives.

According to Meng, Zhou, Tian, Chen, and Zhou (2011), companies must establish priorities for services in their development process, or to improve their quality. On both cases, outsource processes can be one good option.

For Ricarte, Matos, and Oliveira Santos (2004), outsourcing is a common practice in business, but requires criteria usage, such as area/application process, a time horizon, and a strategic alignment with the enterprise's objectives. Additionally, this decision can be done considering: assessment of the impact on the level of service, the operations resulting performance, the replacement degree of transform fixed costs into variable, the improvement of logistics costs control, and especially if there is organizational learning, like expertise acquisition and know-how internal development. On this basis, it is thus possible to evaluate potential logistics service providers, based on their skills.

Barros (2009) explains that the high participation of logistics costs leads to outsourcing as reductions alternatives, operations improvements, expansion of markets, and increased service levels. According to Cezar (2013), the approach that Brazilian PSLs are adopting is to improve their customers' competitiveness and reduce the fixed costs, adding personalized services, and integrating processes in the supply chain, especially through technology use (logistics and information). In this regard, Lambert (2008) states that PSLs are specializing in extended services, such as managing storage activities, inventory and transportation management in the supply chain, within local or global operations; thus, the PSLs generate competitive advantage to its customers by reducing investments in assets, and operational flexibility, which results in return on assets and investments improvements.

Fleury (2002) states that the PSLs have different sizes and shapes, arranged in small businesses to large corporations. They generally have technological flexibility and are experts on specific processes. Additionally, PSLs act in seasonal markets and stand out in situations that require marketing flexibility, like kits assembly, multiple packaging, storage, and distribution, guiding services improvement without radical processes changes, or unnecessary investments. Fleury (2002) and Novaes (2001) consider PSLs as an integrated logistics service provider, who is competent in their activities, performing functions which may include the logistics process of the company as a whole, or part, in a personalized way.

For Lim and Shiode (2011), operations are becoming more complex, technologically sophisticated and more important strategically, increasing the demand for PSLs. It stands out that, as a result of globalization, increasing customers' number, suppliers, locations for supplies and distribution, market segmentation, decreased products life cycle, new releases, different standards of service and greater distances covered.

Novaes (2001) and Fleury (2002) report the following elements, characteristics and competencies must be present on the PSLs: capacity to attend contractor requirements and expectations; information systems compatibility (between the PSLs and the contractor

company); financial stability; growth strategies, investment policies, and product/process innovation; flexibility to attend the customer; common objectives, strategic and operational information sharing, and socialize benefits, not only losses; training orientation, team work and cooperation; and price of the services.

Randall, Nowicki, and Hawkins (2011) describe that without innovation and the involvement of suppliers, the efficiency of PSLs to integrate their warehouse, inventory, transportation, purchase, and other associated functions becomes limited.

Studies in outsourcing performance are scarce on the literature. Some authors have contributed, focusing on performance components (Hartmann & Grahl, 2013). In this sense, Knemeyer and Murphy (2004) state that logistics outsourcing performance is based on: operations performance, distribution channel performance, and asset usage decrease performance. Stank, Goldsby, Vickery, and Savitskie (2003) consider operational, relational and cost performance as elements. Deepen et al. (2008) measure logistics outsourcing performance evaluating whether relationships goals were achieved.

For Daugherty et al. (2011), innovation in services is crucial to gain competitive advantage, build strong relationships and customer loyalty, generating barriers to competition. The PSL should incorporate activities to its portfolio using skills that are able to meet different types of services, combining innovation, technological advances, and delivering added value to customers; therefore, PSL should consider a flexible strategy that allows applications in information and communication technology, open standards for the Market, serving multiple clients with low cost and collaborative relationship.

CASE STUDY: THE COMPANY A

THE BRAZILIAN LEATHER INDUSTRY

The focus Company, named as Company A, belongs to the leather industry. The Brazilian production of leather almost tripled in last 20 years, from 17 million units in 1985 to 44 million

in 2006, which represents about 20% of the world market, of the order of 215 million/year. Cold leather accounts for 60% of Brazilian production, the salters 25%, and 15% are from other sources, according to Conselho Nacional da Pecuária de Corte (CNPIC, 2015).

Currently, Brazil has more than 700 companies related to leather chain, ranging from family organizations to leather medium and large corporate conglomerates industries. This is a very professional scenario, supported by modern technology employed for industrial optimization, improvement of working conditions, and reduction of environmental impacts. The Brazilian leather industry currently employs about 50,000 workers and part of this contingent is dedicated to actions for recycling water, proper disposal of waste, and improvement processes (CNPIC, 2015).

In 2011, leather products have participated in 6.7% of the Brazilian trade balance. During the first quarter of 2012, this rate reached 18.9%, as stated by the Centro das Industrias de Curtume no Brasil (CIBC, 2014).

According to the CIBC (2014), the large volume of leather exports in Brazil and their respective growth in the last decade (from US \$700 million in 2000 to \$2.2 billion in 2011) generates a positive influence of the Brazilian trade Market.

The Secretaria de Comercio Exterior (Foreign Trade Secretary) points out that for December 2014, leather exports recorded the amount of US \$255.068 million, an increase of 6.2% over the same month of the past year past, when exports totaled US \$240,090 million. In relation to November 2014, it also increased by 23.5%, when the total exports were \$206,548,000 (CIBC, 2015).

Shafaei, Shahriari, and Moradi (2009), comparing the Iranian Leather Industry with world competitors, state that Brazil has the most competitive products for: 611 (leather), 612 (leather manufactures), and 851 (footwear), based on the categories defined by the Standard International Trade Classification (SITC). Authors also present, according to Table 1, exports of leather by selected countries, from 1998 to 2004.

Table 1

World leather exports

Rank	Country	Export (US\$1,000)	%
1	China	115,393,969	21.68
2	Italy	93,321,541	17.53
4	USA	24,732,806	4.65
6	Spain	21,294,142	4
7	Brazil	17,852,078	3.35
9	Korea Rep.	14,574,960	2.74
13	Indonesia	11,076,223	2.08
31	Pakistan	2,201,880	0.41
35	Turkey	1,939,474	0.36
52	Iran	855,443	0.16

Source: Shafaei et al., (2009).

THE COMPANY A

The Company A began its operations in the late 1980s, being founded by two brothers, who bought raw materials from firogific companies of Goiás, and performed transformation processes of the skins in leather, extensively using the manpower. In the 1990s, the company expanded sales, starting its products exports, which occurred predominantly through the Port of Santos, far more than 1100 km from the production center.

In Brazil, the most commonly raw material used for the manufacture of leather is of bovine origin and can be used in the production of footwear, automotive and furniture application, and clothing. Brazil has become an important leather exporter in the 1990s. The total production of the country was about 36.5 million hides, of which approximately 26.3 million hides were exported, representing 72.1% production in 2009. The main destinations were Italy, Hong Kong, China, and United States (Faria Pacheco, 2005).

To Faria Pacheco (2005), the leather industry causes great environmental impact in all production steps (from the leather treatment to the final disposal of waste), generating materials that can

contaminate both soil and rivers. With respect to Company A, focus of this research, a set of measures was adopted such as constant employees training, as well as the implementation of socio-environmental programs, thus changing the company's image, and placing it as one of Brazil's leading of leather exporters.

Additionally, the former area acquired for operation of the leather production process had operational, environmental, productive, and financial problems. In this sense, the Company A strategic plan was aimed to recover degraded areas, implementation of best practices for the handling of solid and liquid waste, and financial restructuring.

Currently the Company A has a fleet of 17 vehicles, which corresponds to 80% of the total, the remaining 20% being composed of other outsourced fleet. These vehicles operate in the collection of the raw material in frigorific companies in Goiás state, besides some in Bahia and Brasilia.

Trucks for raw materials collect have a covered body with canvas, and with closed sides. The vehicles are specific for the kind of raw material transportation, the salted skins, which are transported to the tannery. Due to this raw materials conditons, vehicles have a rapid damage, especially for corrosion caused by bovine skin.

Faria Pacheco (2005) explains that cattle slaughter process should avoid degradation of the skin, a result of the action of microorganisms, which affects both the production process and the final quality of the leather; thus, there must be proper handling, preservation and storage of furs. When the time between slaughtering and skins processing is short, that is, between 6 and 12 hours, depending on temperature, they can wait without any pretreatment. In this case, the skins are termed "green," and its weight is 35 to 40 kg each. When the skins need to be stored and or transported for longer time, especially at higher temperatures, they must suffer a pretreatment for preservation, called "cure." In general, this retention is accomplished by stacking up the skin, interspersing salt between its layers. This process can be done in the frigorific, or the tanning themselves. In those circumstances, the skins can be stored for months until processing. The salted skins have good resistance

to microorganisms, but the salt causes dehydration of the skin, water and soluble protein elimination, resulting in a final weight of 20 to 30 kg per skin.

Skins transport has caused increasing processing costs for the Company A, since there are necessary periodic maintenance of the vehicles, and frequent exchange of such vehicles. The investment that could be aimed at buying more machinery ends up being directed to maintenance and upkeep of the fleet. Data presented in Table 2 correspond to the costs of the fleet of owned vehicles, from January 1 to December 31, 2014.

Table 2

Company A fleet maintenance costs (US\$)

Tires	Maintenance	Fuel	General	Labor	Total
28,872	103,120	530,879	134,396	242,657	1,039,924
2.80%	9.90%	51.00%	12.90%	23.30%	

Source: Own elaboration.

Based on this scenario, the company seeks to completely outsource the process of leather transports, thus reducing the costs related to their vehicles' maintenance.

In order to proceed with this outsourcing process, the framework, as presented on the Figure 2, was adopted. This framework is composed of seven steps: (1) form the working group; (2) define outsource scope; (3) define outsource criteria; (4) make a preliminary analysis; (5) Visit and audit candidates; (6) evaluate candidates, weighting criteria; and (7) make a final decision about transport outsourcing.

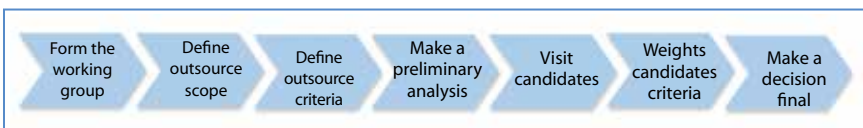


Figure 2: Company A adopted framework to transport outsourcing process. Source: Own elaboration.

To carry out the selection of potential transportation logistics companies, a working group was formed (step 1), with participation of five employees, being two of logistics, a marketing (specifically customer service) person, a purchase area employee, and a representative of the finance area. In the sequence, the outsourcing scope was defined, which is based on leather transportation, not only as finished goods, but also on raw material from suppliers (step 2). Then, the working group defined outsourcing criteria (step 3), considering leather enterprise characteristics and requirements, linked to some enterprise dimensions:

- Operations strategy: which includes specificities of kinds of product being transported, geographical limitations, regional specificities, sector impositive regulations and practices;
- Applied technology: under this category are the fleet age, level of applied technology (e.g. GPS, traceability, security devices, etc.);
- Candidate competitive elements: candidate size, market presence, existence of economies of scale, service costs, added services.

Each one of these 14 identified elements was ranked based on importance (weigh), using a Likert scale (1 = less important; 5 = higher importance). Each item's weight was obtained through several workshop sessions. During these sessions, the Delphi Technique was internally used, as a tool, by the working group.

It is important to note that transports outsourcing criteria definition is one of the most relevant steps, according to Meixell and Norbis (2008), which define transportation mode choice and LSP selection, relating them to the company strategy alignment. Also, outsourcing criteria definition is cited by Monczka et al. (2005), stating identification of relevant transportation performance variables, like service levels, carrier performance, transit time, as its elements. In addition, other factors were considered, as those cited by Wilding and Juriado (2004), which includes focus on the business objectives, reduced costs, and increased operational flexibility.

Among the potential companies to be considered in the selection process, 14 items were established as evaluation criteria, as shown in Table 3.

Table 3

Logistics transport provider selection criteria

Logistics provider supplier (LSP) outsourcing criteria								
Id	Item	Weight	LSP1	Total	LSP2	Total	LSP3	Total
1	Fleet Age	5	3	15	4	20	4	20
2	Fleet size	4	2	8	3	12	3	12
3	Vehicle type	5	4	20	4	20	5	25
4	Knowledge of the geography region	5	5	25	3	15	4	20
5	Time in the market	3	3	9	4	12	4	12
6	Number of clients	2	2	4	4	8	3	6
7	Number of clients on the leather industry	4	1	4	2	8	2	8
8	Driver's skill (experience)	3	4	12	4	12	4	12
9	Vehicles tracking system (GPS)	4	2	8	3	12	4	16
10	Service costs	5	5	25	4	20	3	15
11	Added services (e.g. information system, automation, etc.)	4	2	8	3	12	4	16
12	Flexibility to increase/decrease units	3	3	9	3	9	4	12
13	Service level (on time, mix, volume)	5	4	20	4	20	4	20
14	Available transport support equipments	4	3	12	4	16	4	16
Total				179	196		210	

Source: Own elaboration.

The next step (4) was done to verify and select companies as potential candidates, taking as a basis criteria from Table 3. There were then accepted transport companies with fleet of more than twice the number of vehicles in that of the Company A. In a universe of 45 companies based in Goiás State, comprising the Capital (Goiânia), and cities at a maximum distance of 50 km, only 15 potential candidates were selected.

In the sequence, other requirements for those 15 remaining candidates were checked, based on the following adopted procedures:

- Two initial meetings: one specific meeting for the candidate to present its structure, processes, systems and available services. The second meeting was aimed to review criteria stated on Table 3;
- The second step consisted of a site visit on the candidate's workplace, in order to validate the responses obtained previously.

From this stage, the researchers eliminated seven more companies, which showed differences between the answers provided in the meetings, and the results found during the site visits.

Of the eight remaining companies, visits were performed (step 5) to at least two of its clients, in order to verify their satisfaction regarding the service provided. For ethical reasons, enterprises in the same market sector as Company A, were not visited.

After, three best-qualified companies were ranked, in order to define which could be selected, as partner, to support Company A requirements of logistics service. In order to evaluate these potential candidates, was filled Table 3, with outsourcing criteria analysis (step 6).

Below a brief explanation of the three outsourcing candidates' companies evaluation:

1. The LSP1 is a regional company, having more fleet vehicles, with a total of 55 trucks, but not modern vehicles, and without tracking or equipment (technology) to support the skins

transport process. This increases the risk of breakages and consequent damage on the customer service level, although the perception of its customers is that LSP1 is timely, and meets the stated requirements. Additionally, it is a company that has been established for less than 10 years in the market. The positive fact is the price, since, among the three best companies, it is the one with the lowest cost.

2. The LSP2 is a company that has about 80 vehicles, with a fleet age of five years, with good conditions of servicing Company A. The critical issue is the distance traveled by the LSP2 fleet, since it serves the entire Midwest and Northeast regions of Brazil, which represents a large scope, and consequent loss of presence in the focus region of Company A. On some vehicles there are tracking devices installed, but this facility is charged separately in the contract, which increases the service costs. The company also offers a web-based support system that is available to their customers. The reason for Company A not to select LSP2 was especially due to the higher price, and great coverage served by LSP2, generating increased risks to Company A.
3. The LSP3 is a company with a modern fleet (under 5 years), and it also has more than 75 vehicles; however, their area of operation is only the Midwest, focus of the transport requested by Company A. The LSP3 has been in the market for over 15 years, and has good reputation among its customers, in particular regarding the service level, even for operations not standardized and/or established in the agreed contract. Regarding the price, it is higher than the LSP1, but less than the LSP2. Traceability features are present in its vehicles, supported by web application. For these facts, the LSP3 was selected as partner to the Company A distribution process (step 8).

Regarding this outsourcing process time, seven months were invested in the process, during which the designated team worked together, at least two full days a week.

CONCLUSION

Analyzing the Company A vehicles data on Table 2, it should be pointed out that spending on maintenance and fixed costs are higher than other services' expenses; however, few vehicles had been used near their capacity, which causes that costs outweigh revenue generated by the skins transport process; thus, Company A chose to outsource its transportation model based on traveled miles, which means, paying the supplier the amount based on the distance traveled in the month.

The estimated annual cost per vehicle, considering outsourcing, would be in US \$572,578.00, with an average cost of \$0.48 per mile traveled. This value is less than the expenditure Company A has with its maintenance vehicles, which is \$0.89 per mile traveled, generating an annual cost per vehicle of \$1,039,924.00.

The annual savings from outsourcing of the 17 vehicle fleet to the detriment of its internal maintenance is approximately US \$ 7,944,882.00; thus, both due to the costs (such as operational flexibility, technological upgrading and service level maintenance) and to preserving investments, outsourcing fleet becomes an attractive strategic option.

FINAL CONSIDERATIONS

Transport is the main component of the operations system, representing approximately 60% of logistics costs in Brazil, and an average of 3.5% revenue. In addition, it plays an important role in the quality of logistics services, influencing the level of service, particularly regarding delivery, reliability, and product safety.

Road transport, despite the low fixed cost, especially for using roads maintained by the public administration, has a high variable cost, since there is increasing replacement of equipment, maintenance, payroll expenses, and expenses with park lots and decks; thus, this paper aimed to analyze the transport process of a Brazilian company in the leather sector, checking its characteristics and main critical factors. Based on this analysis, a selection with

potential transportation providers was done, upon selection of criteria compatible with those found in the literature. Additionally, the process of outsourcing has to be feasible from the financial feasibility point of view. Finally, by outsource its transports, the Company A will have flexibility in transporting raw materials (skins) and finished products (leather), higher quality, since the vehicles have tracking and monitoring system, as well as technological upgrading, for an outsourced fleet maintenance, and preservation of investments, particularly for the acquisition of vehicles, with also the depreciation costs; thus, for Company A, the transport outsourcing is viable, helping to improve their competitiveness, maintaining the focus on their core business, and reducing fixed costs turning them into variables.

The results presented and analyzed by Company A demonstrated favorable conditions to the outsourcing of transportation, in the form of pay per mile traveled, which helped managers to opt for outsourcing of its vehicle fleet. Based on this research findings, transportation process outsourcing can be an effective operations strategic alternative, not only in terms of flexibility achievements, but also on performance and results. In addition, transforming fixed costs on variable ones, reduce the need of operational capital, and at the same time, improve the service level. These findings are aligned with Knemeyer and Murphy (2004), stating that logistics performance of outsourced processes are obtained through: operations performance, distribution channel performance, and asset usage decrease. Furthermore, the findings can be related to the concepts discussed in Stank et al. (2003) that consider operational, relational, and cost performance as performance elements.

This study provided some relevant findings; nevertheless, some limitations must be acknowledged at the moment. The research was focus on a single case study, within a specific sector, requiring further analysis in a broader set of enterprises and applied to other enterprise competitive sectors.

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