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**SOURCING DECISION: A BEHAVIORAL PERSPECTIVE, A REPLICATION OF  
DAVID HALL STUDY**

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I dedicate this dissertation to my love and best friend Cássio!  
I thank God for bringing you to my life, sharing your life, your dreams, your happiness and your seriousness, and thus making my life better. I cannot imagine ways to thank for all the support and assistance received along this trajectory, by understanding my absence and my priority dedication, for your words of support, for showing me how strong I could be.

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Jetzt Geht's Loss!

(Höhner)

## ABSTRACT

This research presents an investigation about the decision-making process regarding Make or Buy, trying to understand which variables most influence this decision to insource some activities, to outsource others, or to better estimate a percentage to combine both. The dependent variable on our research is the behavioral decision-making process, measuring the influence received by cost, quality, and monitoring. Trying to understand if differences between these independent variables influence how managers make their decision in the context of insource or outsource production. In order to test this model empirically, an experiment research was conducted, on the basis of eight different scenarios, which simulate a purchasing decision situation ranging the variables costs, quality, and monitoring of suppliers between High and Low, to understand the relationship of these constructs with the decision-making process of Brazilian managers. It was performed with a sample of 211 students from the Production Engineer course at Universidade do Rio dos Sinos (Unisinos). The data was analyzed using statistical technique ANOVA. The results demonstrate that managers consider cost variation to decide about how much to internalize and how much to outsource. They change their choices when quality is higher in their suppliers than inside the company. They also evaluate manager capability to control costs over their suppliers and on their process inside the company. However, they do not change their sourcing decision due to supplier's monitoring variation, neither when quality monitoring is considered. This issue was already addressed in Hall's study (2012) conducted in the United States. Thus, we decided to replicate his in Brazil in order to check if in a different environment, with other economic, politic, social, and regulatory situation, the manager will change their decisions. Nevertheless, after comparing both studies, we realize that the same hypothesis was supported in both studies, what means that even in another context the same variables are considered to base managers sourcing decision.

**Keywords:** Decision-making Process; Make or Buy; Outsourcing; Global Sourcing; Experiment.



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## 1 INTRODUCTION

Strategic decisions are being made in different ways and in different corporations. Some of them decide to go abroad to find advantages to enhance competitiveness and start to produce in other countries and to look for good partners all over the world. They move upstream and downstream in their supply chain activities. Thus, managers, mainly those of the purchase department, face the difficult task of developing suppliers in different places and sometimes keeping the production of some products, or activities, inside the company structure. For this reason, it is important to understand how these managers develop their strategies, and consequently how they make their decisions in where to produce and get their inputs, and which variables are considered to base their choices.

Different researches were already conducted on the way to explain what influences and helps the managers' decision, to improve supply chain performance, and several studies have also addressed the concept of the decision-making process, mainly on the idea of make or buy, like Buckley and Casson (1976), Arnold (1989), March (1994), Mantel, Tatikonda and Liao (2006), Parmigiani (2007), and others. Some of them use Coase (1937) theory of Transaction Cost Economic (TCE) as a way to understand the idea of costs to transact on the market, showing that, sometimes, these costs were smaller than those involved in the internalization of the activities were. Sourcing decisions involve comparing the production cost incurred to produce raw material and products inside the company with the cost of transacting in the market to purchase from an external source (Williamson, 1975). This involves direct and indirect costs.

When companies decide to expand their geographic scope of suppliers, they open their process to more opportunities and consequently increase the complexity of sourcing strategies (Sodhi, Son, and Tang, 2012). Thus, this global sourcing strategy refers to the ability to estimate which product will be produced in which market. Supplier's management is positively related to the decision to sourcing, selecting, developing, and monitoring through the coordination of supply chain activities (Kotabe, 2009).

Companies began to divide production process to be developed in different parts of the world and start to outsource some process of his production. This phenomenon, combined with the increase in the number of available suppliers around the world, adopts a strategic approach to sourcing a goal for several companies, as well as understanding how this strategy is being developed, and which criteria are more relevant to plan the correct way to source (Nunes, Vieira, and Antunes, 2013).

Thus, the real question is to understand how to improve supply chain management in a complex environment, mainly in poor decision-making environments, like the Brazilian one (Levinthal and March 1993). Along this line, to find out which determinants assist in the coordination of sourcing governance actions, under poor resources and infrastructure and intense competition requires special attention. Normally when related to cost reduction, the most efficient transaction structure must be adopted (Williamson, 1975), when the best use of resources is considered, it is important to developing or acquiring rare resources (Barney, 1991; Penrose 1959). Additionally, the decision-making process is influenced by the ability to monitor, quality standards, and costs involved, and these may influence manager decision to outsource or to insource.

Nevertheless, considering managers are making decisions for their companies is also important to evaluate managers as individuals, with specific characteristics, with their experience and path dependence, with knowledge and with his way to deal with business and people, which gives to the decision a behavioral perspective. This behavioral perspective may influence how these managers will evaluate and consider issues like costs, quality and supplier and process monitoring, so this decision may be considered behavioral, because each manager may consider these influences bases on his beliefs (Mantel et al., 2006).

By considering these points as influencing management decisions, we developed a study to understand behavioral decision-making on the sourcing area through a pre-defined scenarios experiment in an attempt to answer the following question: How do issues such as cost, quality, and monitoring of suppliers influence production managers on their behavioral decision-making between make or buy in Brazil context?

To answer this question several authors visions were used, to base our understanding of decision-making, issues such as: the environment of global sourcing in Brazil and the influence of Transaction Cost Economic (Coase, 1937; Williamson, 1975), Agency Theory (Eisehnhard, 1976), Resource Based View (Penrose, 1959 and Barney, 1991), Supply Chain Risk Management, and Institutional Theory (Dimaggio and Powell, 1983).

Some studies were already conducted in the way to understand companies and managers position about global sourcing on other markets, like March (1994), Ulrich and Ellison (2005), Mantel et al. (2006), Parmigiani (2007) and others. However, our work is motivated by the empirical work of Hall (2012), conducted in the United State, which called for more research on the decision-making process involving other environments. This possibility created the interesting to conduct this research in the Brazilian context, as a replication of his study to understand if this context creates the necessity to constantly control cost and quality and to

monitor all this process being developed inside or outside the company. By replication, I mean to re-do the same study did by David Hall, using the same research instrument, procedures, and analysis.

In Hall's study, an investigation was developed to understand behavioral decision-making, with 384 members of some Institutes of Supply Management (ISM) to know how they made their decisions and how they perceived their decision, evaluating if personal characteristics and psychological aspects influence the decision process, considering cost, quality, and monitoring as the most influential variables on decision-making. This was tested using the Experiment as the method to collect data. However, he has not explained institutional influences of different environments in this process of decision. Thus, the intention of this study is to apply this same search on an emergent economy, the Brazilian one and compare both information.

Brazilian market differs in many aspects from the North American environment, which justifies the application in Brazil, mainly for economic, political, institutional, and social issues. These factors act on how managers deal with issues such as cost of products, quality standards, and suppliers' monitoring, as well as our regulatory rules, even in a pharmaceutical context. All these statements induces respondents in Brazil to give a much great emphasis on the subject of monitoring and control. Thus, the mindset of Brazilian creates the need to control everything that is done. The company who exert the role of control the process, because there is no regulatory action by the governments in Brazil, so this monitoring emphasis tends to be higher than in the United States

Considering Brazilian instability, political and economic imparity, in a poor decision making environmental, decisions here tend to prefer options that allow for a higher control and monitoring over their process, their partners, and products supplied, as well as for quality statements and prices regulation.

Therefore, our intention to replicate Hall's experiment is to check whether managers' decisions vary from one country to another, if they super-estimate monitoring abilities comparing to North American decision makers, taking into account Brazilian administrative, outsourcing, and control rules differ from the American way, as a way to check if the same influences will be detected on sourcing decisions or not. Therefore, we expect that the variable monitoring will be very important for Brazilian environment, considering the constant necessity all managers face to control and to check if all processes and products are being well produced or well supplied, due to the several gaps in our monitor and economic system. By applying the experiment in Brazil, the results obtained may be compared to those found in the USA,

comparing two different culture behavioral, and a consequence may enhance scientific knowledge, comparing multicultural studies (Kantowitz, Roediger, and Elmes 2006).

This study is justified by the relevance of this subject on managers' decision-making and it involves a topic widely discussed nowadays: the outsourcing. In Brazil, this topic receives a special attention this year, with the project 'Law of Outsourcing' being approved in April 2015 by the National Congress. Some rules on the way to conduct the outsourcing have changed and it became more relevant to companies. Now the law allows the outsourcing of any activity of the company, provided that it is focused on a specific activity. There is no belief that these new measures will be effective in the Brazilian economy and its benefits for businesses and employees of these companies is still unclear. Mainly because Brazil is far behind compared to other countries when it comes to outsourcing, countries like China, the US and several European countries, which have more flexible rules than Brazil.

Based on this assertion, the general objective of this study was developed and aims to verify how issues such as cost, quality, and monitoring of suppliers influence the behavioral decision-making process of buying and the production managers in Brazil.

The specific objectives of this study include the following:

- a) to evaluate the influence of costs, quality and monitoring in the decision-making process;
- b) to verify whether decisions would change due to High or Low information in the scenarios of our experiment;
- c) to understand the decision-making process on the global sourcing scenario, in Brazil;
- d) to replicate Hall's study (2012) in Brazil comparing both results.

To reach this objective, we carried out an experimental research based on eight (8) different scenarios, which simulate a purchasing decision situation in which the participant assumes the role of purchasing manager of a pharmaceutical company called Alpha Pharma. This pharmaceutical industry was selected for being a familiarized sector, and due to its representative in the world, so it is easier to perceive the influence of good strategies for producing medicine as a way to gain competitive advantage. Thus, the scenarios developed in this industry explain an outsourcing situation, searching for the managers' decision. In situations ranging costs, quality and monitoring, we aim to understand the relationship of these constructs to the decision-making process of Brazilian managers.



Experimental design is the best method for this research because of the necessity to examine managers' behavior decision-making. It allows for a high degree of control over data collection as well as reduction of extraneous influences (Hernandez, Basso and Brandão, 2014).

The practical implications of these results include the notion that management can ensure a more rational make-buy decision if they understand the biases that influence the decision and point these biases out to the decision maker (Mantel et al., 2006). What we will try to understand is the outcome of the decision, not the decision-making process by itself (March, 1994).

Therefore, the next chapters will be structured to support and sustain decision-making process of these managers to evaluate the influences generated by the variables: cost, quality, and monitoring, in light of the transaction, costs economics (TCE), agency theory, Resources Based View (RBV), and Institutional Theory. After this literature review, we will explain data collection in the field with the use of Experiment Design to check how managers base their decision to outsource or insource production. The dissertation structure will be Literature Review, explaining TCE influence on the context of Global Sourcing and Agency Theory and RBV, and describing the influence of Institutional Theory and regulation issues. After that, a brief explanation of the behavioral decision process and conceptualization of the variables, cost, quality, and monitoring will be provided, followed by our method description, the results founded in this study. Finally, a comparison between the results of the American study to the Brazilian study.

## 2 LITERATURE REVIEW

This chapter describes the basis of our theoretical framework, using seminal and contemporary studies, which present the core concepts relevant to understand the decision-making and the influences managers receive from variables, such as cost, quality, and supplier monitoring. The Cost Economic approach, Agency Theory Resource Based View, Supply Chain Risk Management and Institutional Theory were considered, plus some regulatory structure explanation and comparison.

In the first chapter, it will be presented an overview of Hall's thesis (2012), which formed the basis of this research and led us to replicate it here in Brazil. The main idea of his study will be described, as well as his hypotheses' definition, supported by data analysis, and those was not supported too. Some of the theory used in this study are the same used in David Hall study, and other ones was included into this literature review as a way to complement the explanation. After that, we will explain the Brazilian environment and the difference between American characteristics in the context of institutionalization and regulation.

We will then explain the variables that will be used and his importance to explain our framework.

### 2.1 DAVID HALL'S STUDY

The idea to check the relationship between cost, quality, and monitoring in managers decision-making in the context of production and sourcing comes from a research already developed in the United States of America by Hall (2012) on his Doctoral Thesis in 2012. He uses an experiment as the method to collect his empirical data, to evaluate which variables were more important to influence the decision-making process of managers regarding the decision to make or buy, or even the definition of a good percentage to be allocated for domestic production and purchase in the market. His sample was collected from the Supply Chain Institute Members, resulting in 304 samples, from 15 different places of the United States.

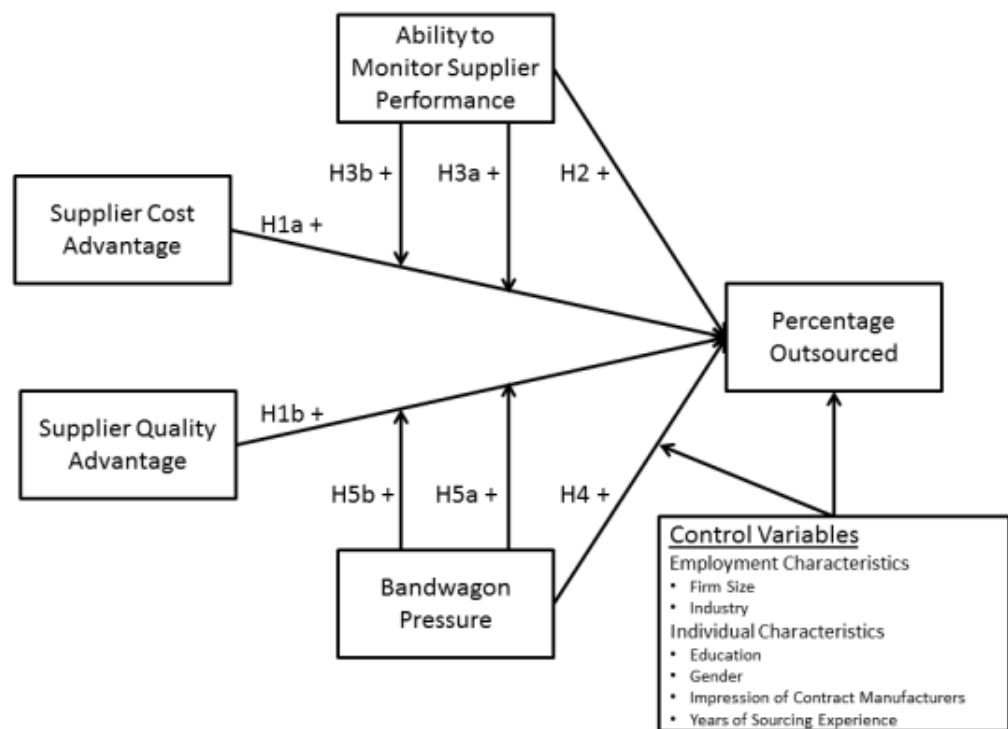
According to his search, decisions are taken by managers and may be influenced by several variables. Therefore, he uses a scenario-based role experiment to control organizational constraints. Which normally consider lower costs, good resources supplying or produced with lower risk. Thus, he tried to answer the questions: how do managers choose to satisfy in

governance decisions? Moreover, what are the biases that influence a manager's sourcing choice? How does a manager perceive the risks and benefits associated with their decision?

To check their answers variability, Hall (2012) stipulates the variable used in his study based on the literature, where he founded four general categories: cost advantage, most desirable resources and lowest risk, and bandwagon pressure. Lowest cost may be the most efficient transaction structure managers will use (Williamson 1985), the most desirable resources should be acquire by managers (Barney, 2012), and lowest risk may be related to efficiency (lowest transaction costs) and effectiveness (best resources). Therefore, both efficiency and effectiveness may not be attainable if risks are realized. Nevertheless, achieving efficiency, effectiveness, or low risks is becoming more complex.

Trying to answer his problem questions, Hall developed some hypotheses related to the variables: cost, quality, monitoring, and Bandwagon pressure, as a way to find a positive or negative relation to the dependent variable, percentage outsourced. The framework below describes Hall's hypothesized model for essay 1.

Figure 1. Hall's (2012) Hypothesized model



Source: Hall (2012).

In addition, to test this model and these hypotheses, Hall (2012) developed eight different scenarios ranging these variables between Low and High. The respondents of his experiment application received one of these eight scenarios and were supposed to answer, through a pen and paper questionnaire, the best place to allocate the production of a new drug called Livero. With these answers in hand, he made some statistical tests to be able to evaluate his hypotheses, supporting those statistically relevant and rejecting those not strongly perceived on the respondents' answers.

The table below summarizes his hypotheses and the results that he found:

Table 1- Summary of Hypotheses and Results

HYPOTHESES	RESULTS
<b>H3b (H1a):</b> The positive relationship between supplier quality advantage and the percentage outsourced is reduced (increased) when the buying firm's ability to monitor supplier performance is low (High).	<b>REJECTED</b> – the relationship between supplier's quality advantage and the percentage of outsourcing does not depend on the ability to monitor the supplier's performance. This may be attributed to manager's overconfidence, assuming that a supplier's quality will not change when monitoring is difficult. It means managers do not change their production allocation due to this variable.
<b>H1b:</b> Supplier quality advantage (disadvantage) relative to the buying firm has a positive (negative) influence on the percentage outsourced.	<b>SUPPORTED</b> – Managers may increase the percentage outsourced to suppliers when a contract manufacturer has some quality advantage, comparing to when they have not.
<b>H1a (H2a):</b> Supplier cost advantage (disadvantage) relative to the buying firm has a positive (negative) influence on the percentage outsourced, ceteris paribus.	<b>SUPPORTED</b> – Managers may increase the percentage outsourced to suppliers with cost advantage. Simply put, managers outsource more when a contract manufacturer has a cost advantage.
<b>H3a (H2b):</b> The positive relationship between supplier cost advantage and the percentage outsourced is reduced (increased) when the buying firm's ability to monitor supplier performance is low (high).	<b>SUPPORTED</b> – When suppliers have cost advantage and ability to monitor the percentage outsourced is influenced.
<b>H2 (H3):</b> The ability (inability) of the buying firm to monitor supplier's performance has a positive (negative) influence on the percentage outsourced.	<b>REJECTED</b> – This results from manager's overconfidence on their firm's ability to detect supplier malfeasance and overlooking increased transaction costs resulting from increased risks. In short, this finding suggests managers will not change their production allocation, and may be complacent, and suppliers may benefit by pursuing opportunistic behavior.
<b>H4:</b> Bandwagon pressure has a positive influence on the percentage outsourced, ceteris paribus.	<b>SUPPORTED</b> - supply chain decisions are influenced by the actions of the competition. There is a significant and positive relationship between bandwagon pressure and percentage outsourced.

<b>H5a:</b> The relationship between supplier cost advantage and the percentage outsourced is increased when bandwagon pressure increases.	<b>REJECTED</b> – Managers are not increasing their outsourcing because cost may not directly influence on bandwagon pressure.
<b>H5b:</b> The relationship between supplier quality advantage and the percentage outsourced is increased when bandwagon pressure increases.	<b>REJECTED</b> - Managers, on average, are not increasing their outsourcing because they are not jumping on the bandwagon to increase quality.

Source: Elaborated by the author.

In summary, Hall (2012) finds that cost and quality capabilities act to increase outsourcing. In contrast, difficulty to monitor suppliers' performance has no moderating influence on supplier's quality advantage. Managers may be overconfident about their ability to monitor supplier's quality advantage but not their cost advantage, mainly because managers may believe that supplier cost opportunism is likely to occur, different from supplier's quality opportunism.

The bandwagon pressure, related to the influence manager received from the society, from the market and from their competitors, and this variable are evaluated in Hall's study, with the aim to check how managers will be influenced when the bandwagon is present and what exactly changes when it is absent. The author tried to understand if managers' governance decisions are influenced by competitor's actions because of social pressures.

The H4 was supported in his study, which confirms that managers may outsource more when their competitors are outsourcing because managers are socially influenced to jump on the outsourcing bandwagon, as a way to confirm they are taking the correct action. However, the H5a and H5b were not supported in Hall's study. This means that when cost advantage is detected the percentage outsourced does not change, and the same happens for quality advantage.

In our study, this Bandwagon variable was taken from the analysis due to the lack of time to evaluate the influence of an additional variable and due to methodological issues, which means the need for running sophisticated statistical analysis, such as multi-level regression analysis. Thus, the Bandwagon theoretical definition was taken from this study. The hypotheses related to this subject and consequently the analysis of the questions concern to this variable in the experiment, which measure this influence on the decision-making.

Hall (2012) organized his respondent answers considering their work experience. Thus, he realized that managers with more sourcing experience are not so likely to be influenced by pressure from the bandwagon effect because outsourcing bandwagon may be a psychological phenomenon instead of an institutional one. Besides the work experience, he also used other

control variables, such as employment characteristics (firm size and industry) and individual characteristics (education, gender, impression of contract manufacturers and years of sourcing experience)

Hall (2012) thesis consists of another study, in addition to the one analyzed in this research. His second essay, also from 2012 explains that managers may assess the risks and benefits of their governance decisions based on their feelings. Moreover, this assessment process may be biased so that risk and benefit are perceived to be negative, not positively, related. Hall (2012) establishes an important link between psychology and supply chain risk.

Despite this difference, this study follows the same structure of Hall's study (2012). As a way to reinforce the theory which based Hall explanation of these variables, considered in this study, it is important to understand Transaction Cost Economic, Agency Theory, and Resource-Based View, as well as risk explanation to explain the use of these variables on sourcing decision and complement with the definition of institutional theory and the regulatory influence.

Based on this influence of transaction cost economics, we will explain, in the next chapter, how decision-making is influenced by transaction cost on the outsourcing issue, and so the relevance of these theories to the decision-making process will be discussed.

## 2.2 TRANSACTION COST ECONOMICS

Transaction costs can be described as the existence of additional costs to production costs, basically generated with managers' searching in the market, and the cost involved with negotiation, drafting contracts and requiring it to be complied, looking for what is necessary for the production, whether this process occurs inside or outside the company (Williamson, 1975). These assumptions of opportunistic action, state that through contracts it would be possible to ensure the correct execution of the established, but their elaboration and control also generates costs, as well as issues related to limitation of the human being, complexity and uncertainty of the market, which creates an asymmetry of information (Buckley and Casson, 1976).

This frequency, mentioned by Williamson (1985), may be interpreted as how often a transaction occurs, and may influence how managers make their decision in the supply chain, in the same way as the asset specificity refers to the investment that must be made to conduct the transaction. Uncertainty is associated with the behavioral uncertainty of firms to determine suppliers' potential results.

Transaction costs play an important role in the decision-making process, since the costs to transact with the market starts admitting the existence of additional costs, beyond the production costs. Distinguishing firms and markets to coordinate the production between them, evaluating the so-called transaction costs (Coase, 1937).

The Theory of Transaction Costs, as well explains Williamson (1975), is grounded by limited rationality, complexity and uncertainty, opportunism, and asset specificity. For example, producing in a vertical manner, when companies internalize some process to their operational structure, is easier to reach economies of scale and thus increase trading costs, and implementation of contracts, offsetting domestic production, with low transaction costs. However, as previously discussed by Buckley and Casson (1976), transaction costs act as a stimulus for the internalization of the various productive activities. Even considering the costs involved in this internalization, such as the governance of these various processes, adaptation to a new environment, political and social costs plus administrative costs, it is viable to internalize at the point that these internal costs are greater than the costs of transacting with the market (Bukh, Klausen, Mimbaeva, Mols and Poulfelt 2014).

Therefore, the transaction costs serve as one of the best drivers to assist in decision-making between make or buy, or what and how much to produce or buy (Parmigiani, 2007). Thus, the struggle for cost savings becomes constant, especially when it comes to the intangible, non-accounting, or trading costs (Coase, 1937). The costs of transacting with the market induce many companies to work in a hierarchy (Williamson, 1976; Buckley and Casson, 1976), and this process can reduce costs or enhance differentiation, depending on the company and the activity involved. However, the firm's entryway on the market is not trivial, it requires efforts that incur costs, and to stimulate this growth-diversification of the segment is proposed its maintenance for market expansion (Ulrich and Ellison, 2005).

Most explanations or decision-making tools start from the assumption that the Theory of Transaction Costs is the answer to managers' problems because it is feasible for managers to justify their decision based on costs, or on how expensive may a purchase offer be, before evaluating the benefits involved in this sourcing strategy. These benefits may be perceived when comparing options and different markets strategies (Fine and Whitney, 1999).

However, managers may also detect suppliers' problems, discrepant intentions between buyer and supplier, and the consequent opportunistic action of an agent or a principal, as well explained in the Agency Theory of Eisenhard (1976), controlled by the use of contracts (Williamson 1975), or in the view of firms capability (Teece, 1986), based on the idea of

competitive strategies (Porter, 1985). With that in mind, we will improve the definition of Agency Theory in the next chapter.

### 2.3 AGENCY THEORY

Agency Theory is originated when economists realize the existence of some divergent points of view, and interest among parts and companies (Jensen and Meckling, 1976; Eisenhardt, 1989; Mills, 1990), and the consequent emphasis on conflicts between them. This metaphor of contracts is used to describe these relationship problems, highlighting the conflicts between principal and contract objectives (Whipple and Roh, 2010). Similarly information asymmetry and trust start to worry, since wrong data generate misinterpretations, and consequently, decisions that are not according to companies' objective (Zu and Kaynak, 2012; Steven, Dong and Corsi, 2014).

In the terminology of agency theory, the preceding discussion describes the difficulty that a principal (the buyer) faces in ascertaining the characteristics and behaviors of a particular agent (the external supplier or the firm). When managers make their decision, it is important to evaluate and control this relationship, mainly when firms tend to use a plural governance approach, using one "agent" to manage another (Zu and Kaynak, 2012). However, a plural form approach needs to focus on reducing information asymmetry in relation to other types of agent (Heide, 2003).

The way companies used to be controlled, centralizing power in just one person, is now being substituted by professional administrators, conducting firms to their owners (Eisenhardt, 1989), as a compensation, those hired administrators, or agents as they are commonly called, receive a remuneration from their bosses, or principal, to execute some activities on their own (Jensen and Meckling, 1976). The relationship described above could be called an agency relationship when this principal contracts an agent and delegate him authority to make decisions (Mills, 1990; Whipple and Roh, 2010; Zu and Kaynak, 2012).

To keep agents' attitudes on the same way of principal interests, it is necessary to continuously instigate agent as a way to close both parts' goals (Whipple and Roh, 2010). A good alternative is to compensate the agent based on his performance, or with commission, as Eisenhardt (1989) suggests. This brings, as a consequence, a rise in prices of products and services, when considered in buyer/supplier relationship, for example, which needs special attention due to the responsibility to contract suppliers and services providers, to supply the whole firm (Whipple and Roh, 2010; Zu e Kaynak, 2012; Steven et al., 2014).



According to Eisenhardt (1989), the biggest challenge companies may develop is to have an optimal contract, which considers behavioral aspects and expected results for both parties, giving to the agent the obligation to provide a service, which in turn receives decision-making powers to maximize the return on the principal. By contrast, contracts are not supposed to determine the consistency of all parties' objectives, but the metrics set out to produce results since the contracts alone cannot be considered as control mechanisms (Zu e Kaynak, 2012). To avoid these conflicts, some costs may incur as a way to mitigate opportunistic action with monitoring, to restrict agent's action, and to protect the principal, to prevent residual losses arising from the divergences of the decisions taken by the agent, to improve agent/principal relationship, developing good contracts thus providing cost savings with agency problems (Jesen and Mecklin, 1976).

Nevertheless, in some cases agreements are not met, to reduce their costs, or by prioritizing partnerships with other companies (Steven et al., 2014). Sometimes, companies trust more in internalized process to protect themselves from these opportunistic attitudes. However, to do that, companies must have some special resources and capabilities, and this topic is widely discussed in Barney's (1991) approach based on the Resources-Based View, which will be discussed in the next chapter.

## 2.4 RESOURCE-BASED VIEW

The growing demands of the global market and intense market competition have influenced many companies to concentrate their effort on those activities they excel in while outsourcing other activities. This, added to a significant volume of purchases from foreign suppliers, has increased the dependence of buying firms on the capabilities and performance of their supplier's base (Verma and Pullman, 1998).

Following this line, it is acceptable to say that to guarantee success in this international sourcing, it is important to have suppliers with important, specific, and rare resources, mainly when these resources are different from companies' resources (Verma and Pullman, 1998).

Thus, the Resource Based View (RBV) of the firm describes how managers identify, acquire, or build resources (Barney, 1991). It also proposes organizations with unique and non-transferable resources and capabilities to improve their competitiveness (Barney, 2012) since these resources are the firm's assets and are related to organizational structure (Penrose, 1949).

Thereby, different from previous studies that focus on external influence to gain competitive advantage, the Resource Based View emphasizes both the capture of superior gains

from internal skills and the external reach effectiveness (Horn, Scheffler, and Schiele, 2014). Different strategic and productive resources will generate different results in the market, assuming that, to obtain competitive advantages, it is necessary to identify the activities that add value and those that damage the process. It is also necessary to consider which resources are available to achieve this advantage and which are necessary to be sourced in the market (Ulrich and Ellison, 2005).

Barney (2001) suggests that resources, dynamic capabilities, and knowledge are closely interlinked. Companies spend effort and time to develop some specific resources, and when they are not feasible, companies should go to the market to make the best use of their suppliers' resources (Peng 2001).

Based on that, the concept of RBV influences the way managers perceive their resources, which they consider important to gain competitive advantage, and the sourcing of these resources globally, when internally unavailable (Verma and Pullman, 1998). Therefore, the manager will value the resources that are a source of competitive advantages and will look for them in the market (Lopes, Hoelmen, and Boer, 2012).

Thus, companies' success comes from resources and capabilities they control, especially those valuable, rare, imperfectly imitable, and not substitutable (Barney, 2001). These resources and capabilities are viewed as both tangible and intangible assets, including a firm's skills management, processes, and routines organization, and the information and knowledge control (Lahiri, Ben and Mukherjee, 2012). RBV suggests that ability to attain higher performance is determined by the nature of strategic resources possessed and utilized by firms (Barney, 1991).

As a way to help managers on decision-making, RBV suggests that the choice between internal production and external suppliers depends on who possesses superior production capabilities and resources (Barney, 1991; Verma and Pullman, 1998). Therefore, the manager's ability to identify the best combination of internal and external resources to increase the effectiveness of the company can also be considered as an important skill, and as such, an indispensable resource for the performance of the institution (Peng, 2001).

There are some programs to develop suppliers' resources as a way to transfer knowledge, capabilities, and resources from the customer to the supplier, and from them to the firm (Krause, Pagell, and Krukovic, 2001). Hence, to make it more effective, it is important to conduct it in a process-oriented way, to build capabilities that guarantee permanent improvements (Lopes et al., 2012).

Additionally, when companies decide to go to the market to get or to transfer knowledge, as a way to improve their resource, they must be aware of the relevance this process has to the

development of new capabilities (Lahiri *et al.*, 2012). The knowledge acquired through external relationships or networking is relevant. Thus, suppliers with high learning intent would be more proactive to knowledge acquisition and put more effort to internalize the knowledge transferred by customers. Moreover, this ability of a firm to utilize external knowledge allows the development of absorptive capacity, a dynamic capability that has been extended from the firm to the internal process (Lopes *et al.*, 2012). These dynamic capabilities can be a source of competitive advantage if they are applied faster and better than their competitors are.

Thus, it is important to understand that, to make the correct decision, managers need to have correct information about their process and strategy, about their suppliers' capabilities and resources to choose the option, which offers the best set of resources, with greater possibility to improve competitive advantage. Based on that, we will explain how the impact of managers' understanding and characteristic influences the perception of risk in the supply chain.

## 2.5 SUPPLY CHAIN RISK MANAGEMENT

A supply chain base is frequently summarized as buying firms managing their suppliers on a supply base, engaged to achieve competitiveness, purchasing goods, and services from a group of suppliers controlling its activities (Choi and Krause, 2006). In other words, the more the company decides to buy instead of making, the more dependent it is on the supply base, which increases the importance of supply base management (Choi and Krause, 2006).

This management is normally associated to cost reducing. However, to meet this objective most supply chains became more complex, more costly, and consequently more vulnerable, increasing risk exposure (Sodhi *et al.*, 2012). These risks are associated with the disruption of the normal flow of goods or services in the supply chain or not meeting the target rate. In addition, they may have negative effects on firm performance, and on potential loss or hazards (Ellis, Henry, and Schockley, 2010). According to Zsidisin (2003) and Heckmann *et al.* (2015), supply risk exists when a company cannot meet their objective or their customers' demand or create negative events related to this result. For the buying company risks refer to the possibility of a decrease in the company's agility and flexibility and increase in the cost (Heckmann, Comes, and Nickel, 2015).

To manage those risks becomes essential to fast perceive them as a way to guide the adoption of correct business strategy, and consequently decision-making regarding purchase and information search (Ellis *et al.*, 2010). When company understands and perceives risk, it is easier to create strategies to mitigate them, reducing the likelihood of a particular risk

occurrence and reducing its potential impact exposure or occurrence (Zsidisin, 2003). However, when firms cannot prevent risk they need to respond quickly when they realize, to contain the damages, so the faster companies answer to risk events the lower would be the consequences (Sodhi *et al.*, 2012).

The increasing of system complexity let companies exposed to more risks, mainly when associated with a weak perception of risks, due to market situational factors (Ellis *et al.*, 2010). These environmental influences are created from technological uncertainty, market thinness, item customization, and item importance (Ellis *et al.*, 2010). Moreover, complexity and uncertainty are also related to the number of suppliers in the supply base, to the degree of differentiation among these suppliers, and to the interaction of these suppliers, affecting the buying company competitiveness, due to the increasing supply risks (Choi and Krause, 2006).

Similarly, those uncertain events may be created by environmental risk sources, risk network sources, and organizational risk sources (Sodhi *et al.*, 2012). Other dimensions of supply chain risk can be summarized as: (1) inbound supply (2) information flow (3) financial flow (4) security of firm's internal information system (5) relationship with partners, and (6) corporate social responsibility (Zsidisin, 2003).

To manage this situation of supply chain risk, companies are supposed to first identify risk, evaluate potential risks involved in specific projects or situations, and find alternatives to mitigate them and responsiveness to risk incidents, which can be from natural incidents or by supply-demand uncertainty (Sodhi *et al.*, 2012). But the primary goal is to keep uninterrupted flow of material and service to the base, which affect directly decision-making process and the sourcing of supply (Ellis *et al.*, 2010), as a way to achieve efficiency and effectiveness, even in adverse condition with minimal resource spending (Heckmann *et al.*, 2015).

Making well-informed decision requires risk analysis and controlling. When some perception of loss or probability of risk is detected, it is important to find a safety position to keep good/service providing unaffected. It means that after decision-making, risk should be managed to reach companies' objectives (Heckmann 2015).

Uncertainty scenarios must be monitored in order to keep products or service quality at good prices. This monitoring is even important on suppliers' performance, and consequently it affects manager perception of value and, on doing so, their decision-making (Heckmann, *et al.* 2015).

Considering our goal to understand the process of sourcing decision-making, risk management plays an important role in the selection and definition of the supplier base, since the number of partners is directly linked to the process level of risk. Therefore, for some

managers, risk becomes more moderated with fewer partners involved, but the decision to reduce the number of suppliers may increase the dependence on them and reduce supplier responsiveness, whereas more suppliers are usually associated to more competitive pressures (Choi and Krause, 2006).

Supply Chain design involves several strategic decisions; the most important lie on how to choose and develop supplier, how to organize the interfaces on global sourcing, and how to integrate it with the manufacturing system. Normally supply chain creates a network of suppliers, distributors and consumers, and consequently the relation between buying organizations and its suppliers.

After the comprehension of the variables managers should use to evaluate the options to make their decisions, we realize the need to have more explanations about the institutional influence for managers. Therefore, besides those theories used by , we include the institutional theory in our theoretical definition, to understand how companies or environment structures influence the way decisions are made, and consequently companies' relationship between firm and society (Dimaggio and Powel, 1983). Moreover, as the pharmaceutical sector is under analysis on the scenarios of the experiments, it is important to understand how regulatory statements differentiate Brazilian and American environment. Some of these differences are perceived on issues like politics, economy, and the social situation.

## 2.6 INSTITUTIONALIZATION AND REGULATION

The institutional theory is included in this dissertation as a way to complement Hall's thesis (2012), mainly as a way to contrast how the institutions in American environment are different from the Brazilian one, and how these differences may influence some decisions, including the context of make or buy.

Institutional Theory can be explained as the organization of political and social environment through institutions, which dictates rules and imposes standards of conduct as a way to organize and standardize certain initiatives from civil society (March and Shapira, 1987). In addition, has the purpose of organizing individuals' activities in a society whose organizational standards are defined from some permanent problems, common in any society (Emmendoerfer and Silva, 2009).

Institutional environment consists of: (a) the State, understood as constitutional structure, bureaucratic organizations and decision processes in the context of political power structures; (b) the Government, with regard to constitution of sovereign power rules and, for

governments replacing; (c) institutions of formal political structure, which gives the format of each society (Hall and Taylor, 1996). Consequently, political power changes over time and space, influencing the decision-making process in several spheres, this helps to understand how decisions are taken. Thus, it can be said that companies adapt themselves to attend the demands of the external environment. Therefore, instead of seeking differentiation, there is a tendency to the homogenization, motivated by the environment in which they operate, leading companies to seek an institutional legitimacy (DiMaggio and Powell, 1983).

This institutional theory definition can evolve towards the Neoinstitutionalism, which explains that the interaction of people in society are not random, but standardized with actions based on institutional norms, through moral or cognitive models which base people's interpretation acting as an individual guideline, in which their actions are built as reference to institutional norms (Hall and Taylor, 1996; Emmendoerfer and Silva, 2009).

According to Hall and Taylor (1996), it is also possible to associate the Institutional Theory to the economic study of Williamson (1985) regarding the influence of institutions, regarding the rules and efforts, to reduce transaction costs, and according to Eisenhardt (1989) the actions of regulatory agencies within an institutional environment. In this context, there is also the influence of the trajectory and experience of each industry and the way they deal with the environment in which they live (Emmendoerfer and Silva, 2009). Institutions interact in a broader socio-economic context in which much of its operation is not permanent, and must be reconfigured if social changes and companies' experiences will dictate how these changes will influence them and consequently how to deal with future decisions (Emmendoerfer and Silva, 2009). This has a strong influence on how managers will structure their decisions on strategic issues, such as the make or buy, and their willingness to risk situations, their monitoring capability, or even the relevance that issues such as cost and quality have on their companies.

The historical and social contexts have the property to establish opportunities and motivate society in different ways. Therefore, same active forces produce different results depending on the place or context to which they belong (Hall and Taylor, 1996). This may justify different actions by decision-makers for being inserted in different environments, or different countries, which depends on institutions such as state, government, nation, or society, which configure a specific process over time and space.

However, to have superior economic performance, it is essential to have efficient institutions, because environments with less efficient institutional setups have higher transaction costs since they are not efficient on guaranteeing contract enforcement (Schrammel, 2013). This situation is perceived when comparing pharmaceutical regulations in the United

States of America to the regulations in Brazil: we found some institutional voids or less efficient institutional setups. These institutional voids can be described as the lack of institutional facilities or regulations supporting markets economy, or the absence of specialized intermediaries in the institutional environment to facilitate their transaction and become necessary with the increasing complexity of a transaction. When these intermediaries are missing, they normally fail to accomplish the role expected from them (Schrammel, 2013).

We can also find situations where the institution is in place but not properly functioning, this may happen due to information problems, already described in the Transaction Cost definition or even in the principal-agent-relations (Schrammel, 2013).

When we consider the differences between Brazil, an emerging country, and the United States, we find numerous factors that make this relevant to be replicated, like economic, political, and social differences in Brazil, especially in the operation of regulatory frameworks (Santos, 2009). These regulatory aspects are important to understanding the differences of controlling and monitoring some activities, in addition to the roles and regulations that each segment suffers. Although the regulation represents a major institutional innovation, even in Brazil, in a context of institutional heterogeneity, organizational models, and complexity of regulatory instruments making evident the need for intra-governmental coordination and improved regulatory quality (Peci, 2011).

Brazilian regulatory agencies were developed based in the independent North American model, with some characteristics of the European model, and is influenced by the regulatory institution of our federal government (Santos, 2009). It is described by the economic conception of regulation, and it is related to the state's role changes, due to privatization processes of the 1990s in Brazil, a reform with economic, political, and institutional consequences. Although they have different goals, Brazilian agencies have a high degree of dependence of the ministries, which are responsible for formulating regulatory policies.

The Brazilian bureaucratic context is characterized for delegating regulatory powers to independent regulatory agencies, similar to the US context. However, unlike the US context, the idea of independence is a new concept in the Brazilian institutional framework, traditionally dominated by the executive at the expense of other powers. Guidance for efficiency remains a secondary objective in a context predominantly legalistic, with many differences between independent agencies, regarding degree of autonomy, depending on the institution (Peci, 2011).

The diversity of the Brazilian context is related to the dynamics of public policies, to regulatory process highly fragmented, resulting in the absence of a consistent regulatory "system." On the other hand, ministries working directly with agencies are considered weak in

terms of organizational capacity and policy-making (Peci, 2011). Therefore, the modernization of the regulatory structural is essential to increase the efficiency of national economies, their competitiveness, and changes adaptation. The regulatory state has as its fundamental principles: decentralization, privatization, and delegation autonomously, seeking the strengthening of the state to be effective in its regulatory action (Farias and Ribeiro, 2002).

Regulation can promote competitive markets to guarantee consumers rights and stimulate private, domestic and foreign investment to pursue quality of services at the lowest possible cost, ensure the adequate remuneration of investments, resolve conflicts between consumers, and prevent the abuse of economic power by public service providers (Peci, 2011). To do this, the agency must have decisional autonomy and independence, publicity of relevant standards when regulated department, procedures and reporting, with simplification of the relationship between the regulator and consumers by consumers and investors in the standardization process at public hearings with limited state intervention (Farias and Ribeiro, 2002).

Differently from the American regulation, which are based on Administrative Procedures Acts, Brazilian regulation has an absence of tradition of a National Congress in control of outcomes and evaluation of the institutional performance of public, lack of autonomy and political control, and this distances our structure from the American mode (Farias and Ribeiro, 2002).

These differences are emphasized when comparing different sectors like the pharmaceuticals. The pharmaceutical industry throughout his history showed a rapid innovation, growing around 8.1% annually, introducing new drugs or improving products, due to technological innovation, high investments in research and development and broad support of the international intellectual property system and significant spending on marketing and advertising (Santos and Ferreira, 2012). Regulation act to guarantee a more efficient allocation of national resources, submitting pharmaceutical market to the government regulation, controlled by Agência Nacional de Vigilância Sanitária (ANVISA), which controls all areas related to people health and is linked to the Health Minister (Santos and Ferreira, 2012).

The global pharmaceutical market grew by 40.7% from 2006 to 2011, an increase of a little over \$ 247 billion dollars over five years. The United States is the world's largest pharmaceutical market reaching 312.2 billion dollars, followed by Japan and Germany. Brazil was the eighth largest world market in 2010 to \$ 22.1 billion (Santos and Ferreira, 2012).

The Brazilian pharmaceutical market was for a long time dominated by big multinational industries and is considered monopolistic or oligopolistic, since the companies



are based in the United States and Europe with subsidiaries present in many countries, creating a very low innovation tax in Brazil, once it is done on their base structure. However, in recent years there have been important changes, such as the implementation of the Patent law and the law of Generic medicines (Santos and Ferreira, 2012).

Therefore, the decision in this environment may be tied to some government approval, and may be different in both countries. After these theories explanation, we can describe his influence on Global Sourcing context, and consequently to better allocate the decision-making process in this environment We will also be able to describe our theoretical framework to collect our data.

## 2.7 GLOBAL SOURCING

Firms' structure is normally based on market analysis considering price influence, in several economic organizations, on a strict business environment (Richardson, 1972). The relationships between firms and markets are normally not clear about co-ordination within a capitalist economy. Thus, the market and the products firms produces explain how firms will handle it inside or in the market, and to do that it is necessary to use appropriated companies capabilities, knowledge, skills, and experience (Fine and Whitney, 1999; Agrawal, Meyer and Wassenhove, 2014).

The way companies relate to market changes, suppliers, and distributors has changed in last years, and as a way to use the best resources or capabilities each part has to reduce costs, exposure, for companies to take effective decisions, finding alternatives to improve process and quality to guarantee less risk (Richardson, 1972). This process refers to the choice made by companies through a set of activities developed within the company, managing global opportunities identification (Nunes et al., 2013).

Those global opportunities refer the possibility of expanding the boundaries of purchase businesses, by adopting partners in different parts of the world (Mantel et al., 2006). With this, evolution the global search for suppliers or manufacturing partners also starts to happen globally, this Global Sourcing is described as the strategic orientation of companies to seek supplier all over the world, where managers organize supply structures in heterogeneous environments (Arnold, 1989). This structure may not be confused with international purchase that refers to the simple purchase of goods from suppliers located overseas, not involving international business units (Kotabe, 2009).

In this global search context, the main gain is the possibility to mix the features and benefits of partners around the world, using what each part or country has to offer with internal skills of the company (Kotabe and Murray, 2004). In this scenario, an appropriate governance is necessary to identify the strengths and weaknesses of the treatments of purchase and production, to take appropriate decisions. With this, we seek to identify which factors most affect these decision makers to understand how to distribute properly a percentage of production to be developed in-house and other externally (Parmigiani, 2007). These decision-makers should develop a Global Sourcing strategy, managing logistical issues of development and production, with the maintenance of the intrinsic capabilities of the company and suppliers skills (Kotabe and Murray, 2004).

Few studies have investigated the behavioral influence to the decision makers (Mantel, 2006; Hall, 2012). These studies reveal a change in the way sourcing decision is made, taking into consideration the managers' experience, behavior, and influence to the company strategy.

The combination of insourcing and outsourcing production is the best option when the lack of some resources is realized by companies (Agrawal *et al.*, 2014). They will use the ability and competences of the market to search for materials to attend the companies' need, and will depend on their supplier to keep firm working, in the other hand will outsource the responsibility to keep improving process with more knowledge to produce even better with a low cost (Redmer, 2014).

When the firm decides to act combining the purchase and production simultaneously, and more cautious management is required, stressing the challenge of monitoring suppliers and produce efficiently to improve the process as a whole (Parmigiani, 2007). From this part up to a new challenge, managers seek to understand how much of the process will be produced and how much will be bought (Puranam, Gulati, and Bhattacharya, 2013). So performance acquired in one strategy can be used as a standard for monitoring or control the other, since the market share helps to discipline and lead to domestic production (Parmigiani, 2007).

With that, governance should be conducted strategically prioritizing the coordinated relationship between buyers and suppliers to monitor performance and promote their development, so that they can produce and deliver cost-effectively to minimize risk opportunism (Heide, Kumar, and Wathne, 2014). This capability will vary according to companies' resources and the way managers organize those resources. Companies' efforts are concentrated on those activities at which their competitors are not good. In other words, they underling their rare and unique resource as a way to acquire competitive advantage (Barney, 1991).

The governance of this global sourcing impacts on the way managers perceive the costs involved in the process, and how they consider quality of products or services, quality of partners and suppliers, and the importance given to the ability to monitor such factors, besides the influence of actions taken by its competitors and partners (Kotabe and Murray, 2004). These managers will have to know the resources and capability each part has, to make their decision and check which costs will be generated, and how able they will be to monitor it.

So the decision-making process is present on different areas, but our focus is on make or buy decisions, or on the use of plural sourcing (Fine and Whitney 1996; Horn et al., 2014). Thus, the make or buy decision will influence companies' competitive advantage. They will base their decision on the option offering low information asymmetry or high knowledge about technology or production, or even to reduce cost or to instigate competition between suppliers, to improve their performance, charring external scale economy variability, responsibility for fluctuations in demand, instant access to capabilities and decreased investment required (Ulrich and Ellison, 2005; Parmigiani, 2007). Understanding this process helps managers on the sourcing decision-making, when facing those trades offs connected to the objectives that supply chain management face, even when the decision will combine better both options (Arnold, 1989).

This ability to seek the best partnerships to develop inputs, raw materials, or services, can be seen as a strategic resource for many companies, and should be developed by those who depend on the market (Agrawal et al., 2014). Developing a close relationship with suppliers might contribute to improving the purchase expertise as a way to add value to manager's knowledge and negotiation skills and consequently influence costs involved. By sharing information with suppliers is possible to reduce uncertainties, particularly those linked to market demand forecasts, and to improve product structures (Ulrich and Ellison, 2005).

This dependence on suppliers may bring some advantages linked to the need of lower organizational coordination and leaner governance structure, risk outsourcing and lower capital investment. However, it will consequently bring lower operational flexibility, less development of productive capabilities, or involvement with the process and, therefore, less autonomy or control (Redmer, 2014). On the other hand, it requires a more assiduous control of suppliers and monitoring by buyers, a deeper market knowledge to find effective partners able to develop and provide products or services according to the needs and demands of the purchasing industry (Fine and Whitney 1996).

## 2.8 CONCEPTUAL MODEL – BEHAVIORAL DECISION

Decisions in the business environment are usually taken based on firm's strategies in the political and economic scenario, in social and cultural influences, and based on the action of its competitors and the needs of its customers. This means that the decisions are important in all areas of the company and need to be carefully studied. Nevertheless, our focus in this research will be the decision-making process of make or buy, regarding the supply area of the company. On this scenario, when considering the bias to outsource or insource, companies could consider the effective allocation of resources (Barney, 1991) by outsourcing non-core activities, and by focusing their operational efforts and capacity in core competencies: skills, knowledge, and technologies that a company must have to insource and to compete effectively (Mantel et al., 2006). Outsourcing occurs when firms hand over their value chain activities to foreign, independent providers (Lahiri et al., 2012).

However, it is not just firms that takes decision, this process is driven by human, employees like managers, purchasers, directors or others, and their ability to capture information, rate them and process them also influence companies decision and make them more behavioral (Coase, 1937; Penrose, 1959; Williamson, 1975). It is coherent to consider these decisions as behavioral, to the operational make-buy context (Mantel *et al.*, 2006). In addition, thereby humans tend to be influenced by environmental changes, by their path-dependency, number of alternatives available, time pressure, knowledge, risk aversion, and their capability to evaluate costs and quality and to correctly monitor the manufacturing process, both internally and in its suppliers (Mantel *et al.*, 2006).

These decision makers select alternatives that maximize their utility, satisfying solution. However, due to individual limited cognitive capabilities and incomplete information, alternatives selected will not maximize the individual's utility, but will be better than other solutions within reach (March, 1994). Managers tend to choose an obvious solution based on existing structures and to obey rules which enable them to find an agreement between a certain situation and their socially defined identities, gained from past experiences (March, 1994).

What leads a person to take such decisions? Why should some standards be considered? What do they tend to avoid or look for, or what do they expect to do? Some people consider the consequences of each decision before making their choices, as an ability to anticipate the future, as well as the logic of propriety in terms of the learning process and ability to develop useful identities (March, 1994). Sometimes, due to limited resources, not all actions can be completed,

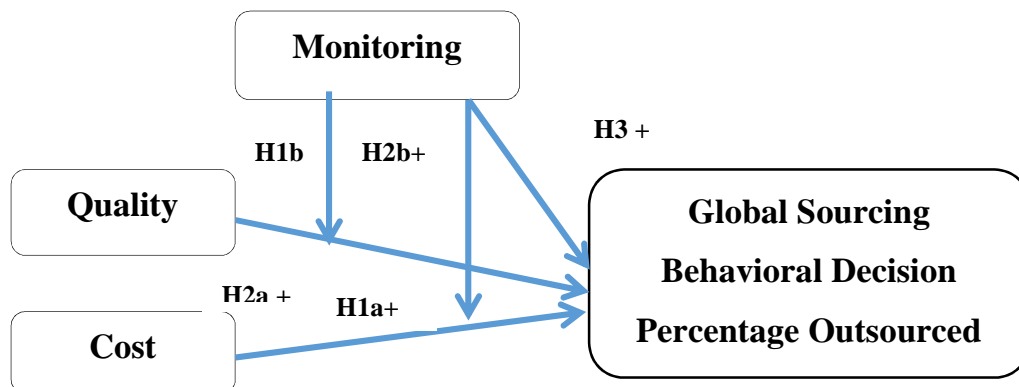
so humans try to meet their subjective desires in a consistent way, considering human coherency (Mantel *et al.*, 2006).

What we try to understand is the outcome of the decision, not the decision-making process by itself (March, 1994), because some actors believe in Rational Choice as being the correct way to make decisions. However, our main purpose is to understand the make or buy decision process managers are facing, according to Mantel *et al.* (2006) these decisions are related to three main factors: perception of supply risk or “strategic vulnerability,” the degree of core competency, about the product and the formality of the information about supply alternatives. However, our focus will be on cost, quality and monitor influences the decision making, while considering that these factors influence the decision-making process, managers can ensure a more assertive and rational decision, mainly if they understand the biases that influence the decision and point these biases out to the decision makers (Mantel *et al.*, 2006).

With that, decision makers tend to consider costs involved in the process. Thus, it is important to understand the notion of Transaction Cost Economics (Coase, 1937; Williamson, 1985), considering agent opportunism and the relation between Principal and Agent, as on the Agency Theory (Jensen and Meckling, 1976; Eisenhardt, 1989), and the idea of resources and capabilities firms have or do not have to compare to the market (Penrose, 1949; Barney, 1991; Teece, Pisano and Shuen, 1997).

To summarize the objective of this research, we develop a framework with the intent to evaluate how the constructs quality, cost, and monitoring, in fact, influence the decision-making.

Figure 1: Hypothesized Model – Source



Source: Elaborated by the author.

This framework describes the three variables we will observe during the experiment. The intention is to understand if the quality of products or service will influence the decision to outsource or insource, or if both, choosing between what and how much to make or buy. The same for cost advantage or even between costs related to developing the product inside or to search for good suppliers abroad and the transaction cost involved in this process. The ability or the capacity to correctly monitor the process inside the company or quality and costs on supplier's plant is also an important factor in the role of decision-making.

Based on that, we will discuss in the next subchapters the importance of these constructs and their effect on the decision-making. Hence, the next chapters will describe how these characteristics are perceived by managers, how they affect the companies' strategy, and how the decision process depends on these constructs.

### **2.8.1 Quality**

With the growing of Supply Chain Management, discussing quality issues became more important, mainly on operations management, which focuses on process and products control and improvement, aiming to reduce costs (Foster, Wallin, and Ogden, 2011). Similarly, the need to control the quality of purchases and their suppliers' quality, reinforce the need to understand how managers control it, and what is effectively prioritized by them. Even more in the pharmaceutical area where quality control influence people health and the problem of not controlling it originate collateral effects that may influence the firm structure significantly.

Quality is stated to be the most important drive of the sourcing decision, nevertheless when comparing to cost, monitoring and other factors seem to be more influential (Foster et al., 2011). Managers will normally feel they make the correct decision, when choosing the option of make or buy, which provides a high quality, with higher benefits, with a superior quality involved, and with good partner, and will procure it due to lower risk involved (Chen, Paulraj and Lado, 2004).

This quality searching asks for monitoring to ensure customers will receive exactly what they expect to receive, and to control this quality it is necessary to spend some time and money to prevent quality problems, such as inspection and training people to produce according to the pre-defined parameters (Kaya and Ozer, 2009). The subject of control quality daily sometimes provides an argument to managers decide about insource production (Gray, Roth, and Tomlin, 2009). The need to understand quality parameters and to improve it induce buyers to be more carefully in suppliers searching, choosing for those even more committed to delivering superior

quality standards, with conformance quality, consistent delivery, and prompt response (Foster et al., 2011).

Thus, Kaya and Ozer (2009) summarize the concept of quality as customer satisfaction, where they normally prefer to have more, looking for functioning and physical characteristics of products. It is also acceptable to say that a high probability of non-defective items creates the likelihood to have good quality. When it is possible to measure or to define correctly quality parameters in a manufacturing contract, the company will not lose efficiency due to outsourcing (Kaya and Ozer, 2009). Consequently, it influences managers' decision-making, because they will feel comfortable to estimate a bigger percentage to outsource production (Gray et al., 2009).

However, when high costs are involved to ensure this quality companies' profits may be decreased, and consequently create the possibility to decrease quality as a way to save money or to invest in new technologies (Kaya and Ozer, 2009). The pressure for cost reduction is directly related to product's quality, cause low purchase costs often does not equal low overall cost, which is handled by the quality of products and consequently the total cost of the ownership, influencing managers decision-making, and reinforcing the importance of quality problems (Chen et al., 2004).

In this buyer-supplier relationship scenario, it is a priority for companies, because of their focus, to seek for change, prioritize quality suppliers, show that supply chain managers tend to emphasize quality values more than traditional operations managers, and improve the efficiency of production (Foster et al., 2011). Buyers are committed to developing good partners as a way to guarantee they will supply the resources correctly they are looking, and they will be able to monitor their performance (Chen et al., 2004). As a way to improve this buyer-supplier relationship, they must share knowledge and capabilities to facilitate the use of some approaches, including leadership, benchmarking, complaint resolution, supplier development, change management, design for the environment, and others (Foster *et al.* (2011).

Considering supplier's quality and inside process performance is easy for decision makers to better combine make and buy in a plural sourcing strategy, and with this determinate the percentage to be insourced and outsourced (Parmigiani, 2007). This percentage means a partial outsourcing, thus companies' simultaneity makes and buys (Mantel et al., 2006). Consequently managers do not need just to buy or just to make, they can do both, but consequently administrate quality of two different process. Therefore, their decision will be directed to outsource when quality is better outside, when it is easier to control it in the market,

and produce inside when companies' quality and capabilities is higher than outside (Parmigiani, 2007).

The gains obtained with production improvement generated with the correct use of quality controls, were sometimes not enough to alleviate financial stresses (Stermann, Reppenning, and Kofman, 1997). This is because managers turn their attention on areas with a visible improvement, restructuring their strategy and capabilities to improve technology, competition, R&D, and customer's needs (Stermann et al., 1997).

This same mechanism to guarantee products or service quality must be applied to control suppliers' quality or internal process quality, considering attributes such as quality, price, flexibility, and delivery performance (Verma and Pullman, 1998). Sometimes quality cannot be easily observed, and the manager cannot ensure high conformance quality. Other times, suppliers may not realize the impact to provide poor or high quality, which means that managers may not be able to monitor and evaluate quality performance (Gray et al., 2009). Because quality disadvantage represents poor performance to the company, even when suppliers did not realize the impact of poor quality (Heide, 2003). In addition, when managers are not able to monitor this quality, they will not realize the benefits or the risks involved to transact with them and may not realize the benefits involved on having a quality advantage (Kaya and Ozer, 2009; Ellis et al., 2010).

Quality produce results faster, affecting business performance because high products and service performance allows charging of premium prices, a good way to grow and gain market share (Juran, 1986). Therefore, managers will face pressure to adopt the strategy that can guarantee quality, offer good products, or services to their customers, and as a tool to maintain competitiveness and to build a strong reputation in the market.

With this idea, Hall (2012) hypothesis is brought to check if:

*H1a: The positive relationship between supplier quality advantage and the percentage outsourced is reduced (increased) when the buying firm's ability to monitor supplier performance is low (high).*

*H1b: Supplier quality advantage (disadvantage) relative to the buying firm has a positive (negative) influence on the percentage outsourced.*

Nevertheless, when this high quality standard requires higher costs investment, managers must evaluate even more deeply the options available, based on that we will discuss in the next chapter about the influence of costs on decision-making.



### 2.8.2 Costs

Decisions about to outsource or insource production essentially compares manufacturing costs of a particular component with the cost of getting it on the market (Horn et al., 2014). Since the decision-making process takes often into consideration a number of advantages, as shown Buckley and Casson (1976), greater control of the activities, and prices in the target market, costs involved to outsource, compared to the cost of produce inside, market power concentration, and possible reduction of uncertainties in transactions. Thus, Penrose (1959) has described the firm as a set of financial, technological and human resources, with the aim of growing, and not to max profits, because the way the firm uses these resources will determine their market performance, generating heterogeneous companies, with particularly competences, abilities, and skills.

Considering this high level of complexity that most business activities have, it is consistent to state that knowledge, skills, and various resources to produce them fully internally are required (Fine and Whitney 1996; Ulrich and Ellison, 2005;). When this possibility is available, it is important to consider the core competencies, the dynamic capabilities, and the design of the supply chain of the company (Fine and Whitney 1996), using them as a strong argument for internally exploit them, either related to the production system, product development, administration or even the path dependence (Penrose, 1959; Barney, 1991).

Decisions regarding the choice to have international manufacturer need to consider that sometimes the same supplier may be competitive in quality but not in price (Gray et al., 2009), or be in cost but not in quality. A supplier may have advantage in costs when their production cost will be lower from the firm's costs, when the cost to transact with them is lower than to produce it internally, and when the resources this suppliers has are valuable for the firm, or even when they are feasible to monitor and control (Gray et al., 2009).

Labor cost is one of the most important drivers of outsourcing decisions or looking for some specific product (Gray et al., 2009). Product's or service's costs must be considered, besides price, the influence of political, economic and environment instability, exchange rate fluctuation, freight costs, taxes, storage, and handling (Nunes, *et al.*, 2013). Butter and Linse (2008) describe these different costs. Managers must evaluate to consider a product with attractive cost, and they are related to strategy development, information, experience, and knowledge of legal procedures and contracts, and risks mitigation. They also state that the managers' goal is to found a sourcing solution, which keeps the lowest total price, even with those special costs.

Thus, specificity of the good to be produced or high technological standard linked to the product, generates a predisposition to internalization (Williamson, 1975), because manager feels the need to protect information considered rare and strategic. However, the same feature that stimulates internalization can act as determinants in the decision to outsource, especially due to the high investment to be fixed to prepare the industry to start producing a new set of products inside the company. Usually, a large amount of money is spent on the purchase of machinery and equipment for production, and the likelihood to have an obsolete technology, in a short period or much faster than the volume expected for sales, create a risk wave to the vendor (Ulrich and Ellison, 2005).

For this reason, the development, or the purchase of high technological products, or innovative products, is normally sought in the market. This leads to transfer the risk and the cost of investment to a third part, offsetting the purchase in the market, and the possibility of economies of scale as a good solution to ammoniate some costs, when producing big quantities (Ulrich and Ellison, 2005).

Likewise, the uncertainty of both the environment as technological or of the difficulty of forecasting demand and the unpredictability of volume also induces some decision makers to search for good suppliers abroad (Verma and Pullman, 1998). Since it is linked to individual contracts with suppliers, and the definition of attractive prices, or even schedule production to ensure a lower cost to produce internally, this linking them with the costs of processes that can influence the purchase or production decision (Parmigiani, 2007; Bukh *et al.*, 2014).

The decision to develop the product internally can be adopted to avoid dependence on suppliers, either by capacity or knowledge, to retain information on production to save costs, to gain competitive knowledge, when a determinant item for production, or development of the ability to produce is considered essential for the proper functioning of the company as a way to gain market differentiation (Fine and Whitney, 1996). Companies will tend to produce internally when owns the necessary expertise to do so, when applicable to his line of business, when knowledge for this is related to previous experiences, when the cost to do it is lower than the outside, or when it has the necessary resources (Penrose, 1959; Barney, 1991 ). For these reasons, companies with a larger structure or with wide market experience will find it easier to internalize activities (Parmigiani, 2007). These aspects are considered important on the cost evaluation because these resources or the lack of them will result in a different perception of costs by manager, and consequently how attractive an alternative may be (Fine and Whitney, 1996).

The use of internal knowledge and suppliers economies of scope allows companies to find more assertively, alternatives with lower costs. Since some partners on having surpluses may trade these goods more competitively comparing to internal production, using the best of each structure, and reducing the cost of both, encouraging combination of internal resources and the resources of suppliers (Parmigiani, 2007). Thus, we conclude the best decision is not necessarily tied to the make or buy, but on what to buy and what to make (Parmigiani, 2007).

Using internal producing knowledge helps to evaluate sourcing alternatives available on the market and control costs, quality, and the production time. All becomes more assertive, decreasing the chances of opportunistic actions, because with more emphatic monitoring the results are more effective, allowing the transfer and uptake of external knowledge (Bukh *et al.*, 2014). Similarly, with the operation within the company the buyer is able to use the knowledge acquired from suppliers and replicate the market expertise internally (Heide *et al.*, 2014).

Additionally companies informed about all costs involved transacting with the market and those to internalize production will be prepared to better estimate the percentage to be outsourced. Considering that managers can simultaneously make and buy, their decision will be directed towards estimating the percentage to be outsourced or insourced. Thus, a manager will outsource the part of the production that offers competitive resources with low costs and when it is easier to control it in the market, and produce inside when companies' costs is lower than outside (Gray *et al.*, 2009). Therefore, the hypotheses developed by Hall (2012), regarding cost relevance, can be stated as:

*H2a: Supplier cost advantage (disadvantage) relative to the buying firm has a positive (negative) influence on the percentage outsourced, ceteris paribus.*

*H2b: The positive relationship between supplier cost advantage and the percentage outsourced is reduced (increased) when the buying firm's ability to monitor supplier performance is low (high).*

### **2.8.3 Monitoring**

Firms, whose strategy is to acquire products or service in the market, must develop skills to monitor their supplier's performance, mainly regarding issue such as quality and cost (Mayer and Salomon, 2006). Inherent to manager's ability to monitor we will face supplier opportunism (Jensen and Meckling, 1976), whose monitoring has a cost and can be related to drafting contracts or actions to mitigate risk exposure (Williamson, 1975).

Buyers that use market to source need to have skills to monitor and control suppliers' quality and ability to deliver their products or services (Heide, 2003). However, managers have difficulty to monitor suppliers when the quality of output is not easy to observe or measure because it is not clear how to gauge or to ask for quality (Mayer and Salomon 2006). When managers face this lack of monitoring ability or a costly control system to measure performance, managers tend to outsource less and prefer to internalize production (Eisenhardt, 1989). The same situation of monitoring problems is faced when managers find information asymmetry because suppliers even with the right characteristic to produce or provide some material may fail to use them, whereas information is not clear (Heide, 2003).

Additionally, some capabilities help managers to conduct better this activity of supplier monitoring, like the use of technological capabilities to enable firms to select capable suppliers, and monitor their progress, as a way to diminish costs related to contractual hazards (Mayer and Salomon, 2006).

When companies decide to outsource, they must consider some important points to be able to correctly monitor and to guarantee that the decision will result in a good business performance. Thus, understanding the company is important to know: why they decided to outsource/insource, what to outsource, how strategy to decide will be developed, and to implement the decision and which outcome to expect, mainly to understand how corporations manage and monitor suppliers in a context of multisourcing (Herz et al., 2013). According to Herz et al. (2013), a good monitoring is related to time, quality, efficiency, customers, currency, and people administration. Collaboration between various suppliers is especially important in multisource environments because of the interdependence of activities.

The main driver of the increase on multisourcing strategies has been the need for cost efficiency, flexibility, and quality in a global business environment. Because companies try to improve their quality, in order to obtain best services and build competition between suppliers, mitigating risks or reducing costs, because they agree that performance measurement is important in outsourcing, so successful governance responds for the success of sourcing, and this control is associated with the process of monitoring (Herz et al., 2013).

Thus, companies that retain the ability to monitor suppliers' performance, or even to well accompany internal production are able to make conscious decisions, based on the idea of guarantee good quality with the lowest cost involved. With that certainty, Hall (2012) hypotheses fit for saying that:

*H3: The ability (inability) of the buying firm to monitor supplier performance has a positive (negative) influence on the percentage outsourced, ceteris paribus.*

### 3 METHOD

This chapter presents the design of the study and the procedures adopted to achieve the objectives initially proposed in this research. This conception is essential to specify the structure and detail the processes required to answer the proposed research problem (Malhotra, 2012). Properly define the search method is essential to correctly collect data, to meet this dissertation goal (Creswell, 2009). To Kerlinger (1979), this phenomenon is called Method, which is described as the systematic set of activities that will lead to the achievement of proposed objectives.

This research corresponds to the development of a quantitative study, in a deductive way, with descriptive and explanatory characteristics in order to measure the variables set in the research, testing their respective hypothesis and validating statistically the study (Creswell, 2009). We use primary quantitative data, with information that can be counted (numbered) and subject to statistical analysis, where the main advantage is the direct analysis of the data, the reliability and reproducibility of results that have been obtained, and allowing the inference to other contexts (Malhotra, 2006).

It is also characterized by a technical collection and statistical analysis of data, as they were collected only once and in a specific hazard of time with a cross-section (Tranfield, Denyer and Smart, 2003; Collis and Hussey, 2006; Malhotra, 2012).

This research is under the bias of a positivist paradigm, which uses as the theoretical framework of analysis: decision-making, been influenced by variables such as cost, quality, and monitoring and marked out by the theory of transaction costs, Resource Based View and Agency Theory. Our study is considered causal, where we seek evidence of cause and effect, and transversal, in which data are collected only once (Malhotra, 2012). In this dissertation is considered a cross-collection, since the purpose is to understand the research in question, at a specific period, and is considered casual due to the experimented method applied.

Based on that, hypotheses was developed, with the intention to answer the problem identified as research subjective, as a way to confirmed or refuted them with our collect data and theory base (Creswell, 2009).

We performed a literature review to build a theoretical basis about the topics addressed in this study, related to Decision-making Process, Make or Buy, Behavioral Decision, Cost Influence, Quality, Suppliers Monitoring. We also described some important theories, as Transaction Cost Economics, Resource Based View, Agency Theory, Supply Chain Risk Management, and Institutional Theory to reinforce our study. We start by using the same papers

Hall (2012) uses, and some current articles were searched to complement our study. With keywords “Decision Sourcing,” “Behavioral Decision-making,” “Make or buy,” the Ebsco and Capes databases were used to find around 20 relevant papers from journals, such as *Production and Operations Management* and *Journal of Supply Chain Management*.

This literature review, according to Creswell (2009), acts on two points that correspond to the research problem, as follows: (a) research and analysis of previous studies, of the same theme or related converge topics; and (b) discussion and interpretation of the theoretical framework. In other words, it can be deducted that we can justify research problem, in the proposed studies, from the grounded and theoretical appropriation.

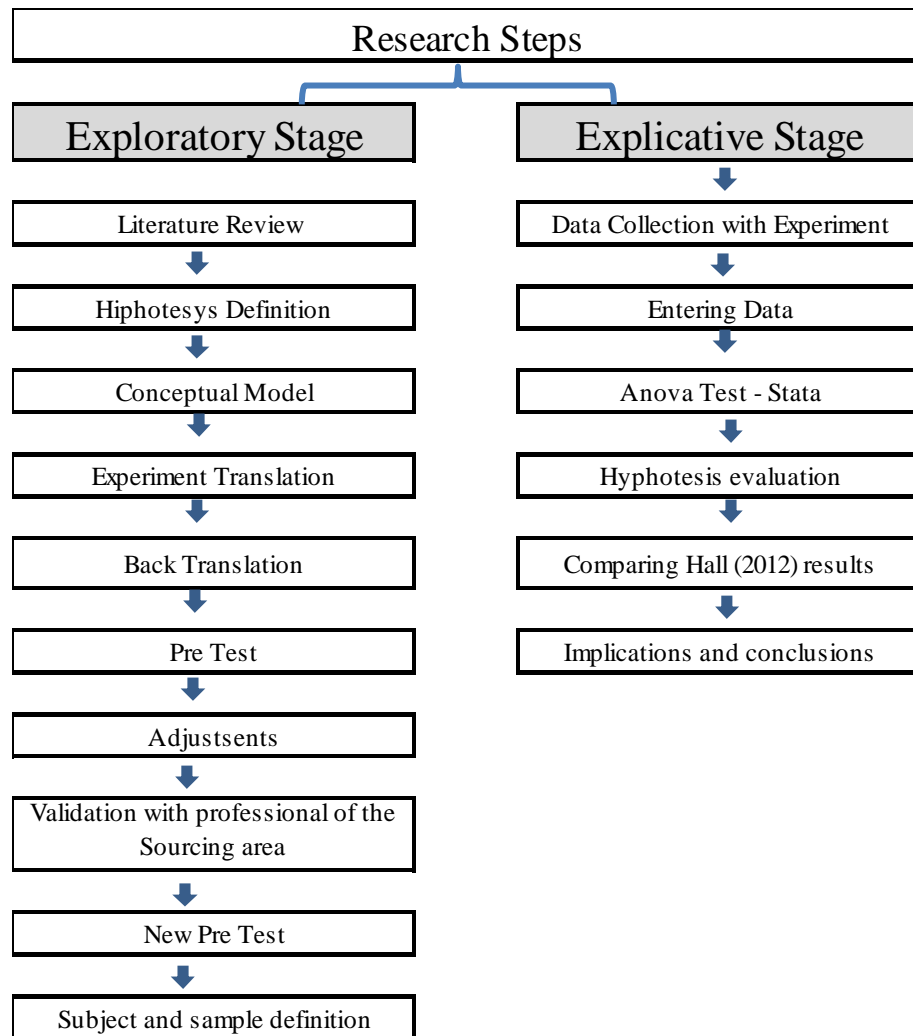
To assist in understanding the problem situation, an explanatory/analytic research was developed, to explain a casual relationship between variables (Malhotra, 2012). Therefore, to collect data we first consider the eligibility of respondents and the sample size to meet the initial objectives of this research. It is also important to consider an error margin not exceeding 5% of answers, taking into account the proportion in which the focus characteristics manifests in the population (Kerlinger, 1979).

To understand the research design and all steps we follow to conclude our research, a simple framework is described in figure 2.

Analyzing this framework, we can explain this research methodology as an experimental technique, which studies the influence of some variables in a controlled environment, evaluating variations caused by manipulation of the variables (Kerlinger, 1979). This procedure can be summarized as the manipulation of independent variables to see the effects it causes on the dependent variables. To conduct this method, it is important to test units and the way they can be divided into smaller samples, which independent variables will be manipulated, which dependent variables will be measured, and how the extrinsic variables will be controlled (Goodwin, 2010).

Considering that this experiment was already conducted in the United States of America, we aim to check if there is any results’ variability due to the environment in which decision makers are inserted. Brazilian market differs in many aspects of the North American environment, mainly for economic, political and social issues, and these factors may act in the way managers deal with issues, such as products cost, quality standards, and suppliers monitoring. Therefore, it was checked whether managers' decisions making vary from one country to another. By applying the experiment in Brazil, we will be able to compare results obtained in the USA and Brazil, and consequently enhance scientific knowledge (Kantowitz, 2006).

Table 2 - Research Design



Source: Elaborated by the author

This study investigates differences in behavioral decision-making among supply managers based on situational elements contained in the decision (Mantel et al., 2006). These differences were investigated under varying levels of supplier monitoring, of quality and costs, high and low variable, and the bandwagon pressure, on present or absent because independent variables must be manipulated in the experiment in a quantitative or qualitative way to bring different consequences (Kantowitz, 2006).



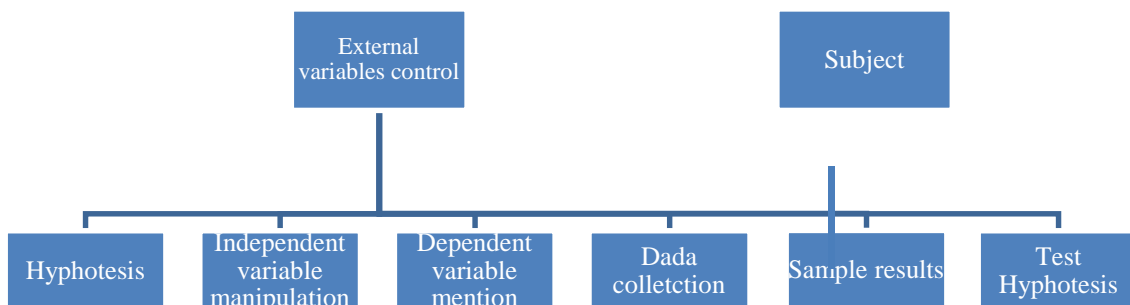
### 3.1 EXPERIMENTAL DESIGN

Experiment-based research in operations management is relatively new in supply chain research, but represents a special challenge, mainly because business people, who understand the way business goes, constitute the sample of this study. Different from marketing or consumer behavior experiment, where a convenience sample can be used (Mantel, 2006; Rungtusanatham, Wallin, and Eckerd, 2011).

The experiments were run on this subject mainly because of the possibility to manipulate the environment and to control some external influences. It is thus expected that any factor influences the results besides those on test, because the others are under control, and consequently the results will be related to the independent variable (Kantowitz, 2006; Hernandez *et al.*, 2014). Through this process, it is possible to understand the relationship of cause and effect in the existing supply management environment (Goodwin, 2010). This causality relationship can be inferred to some conditions, only if four criteria are met: time sequence, variation concomitant, not spurious association and theoretical support (Hernandez *et al.*, 2014), and this research was conducted respecting this criterion.

In the figure below the definition and steps of this research are clearly explained:

Figure 3 –Experiment Elements



Sourced: Hernandez *et al.* (2014)

The need to examine managers' behavior decision-making makes an experimental design suitable for this research, since it allows for a high degree of control over data collection, reducing extraneous influences (Hernandez *et al.*, 2014). Being an experiment, it is necessary to have a dependent variable and an independent one. This independent, according to Kantowitz (2006), is considered a manipulation of the environment, controlled by the experimenter and

the dependent is the answer, which depends on people. At the same time, Hernandez *et al.* (2014) considers the independent variable, or explanatory variable, as the responsible for the cause, and the dependent as responsible for the effect.

### **3.1.1 Instrument Translation**

As previously reported, this experiment was developed in English, by Professor Hall (2012), of Wright State University in the United States, as it can be seen in Appendix A of this study. In addition, to ensure the best content equivalence of the result on the original instrument, the back-translation technique was applied.

In studies involving different cultures the use of previously developed instruments and with good psychometric characteristics can save time and effort. Although these instruments must be culturally accepted and translated properly to be considered valid and to not lead to erroneous conclusions (Hernandez et al., 2014), the adaptation of instruments for use in a cultural context and with different language should be conducted in a very careful way, and the translation process is extremely important in multicultural research (Vijver, and Leung, 1997). For the experiment, it was necessary prior scenarios translation from the English to the Portuguese.

A bilingual translator, with English Language graduation at USP-University, aware of the objectives and concepts underlying this study to detect the ambiguities and unexpected meanings in the original items, translated the instrument from its original language to Portuguese. With the Portuguese version and a second translator made the Portuguese version back to the original. In possession of the two versions, a comparison with the equivalence of content was made. To avoid any misunderstandings adjustments a third translator was involved to correct and let the versions identical (Brilsin, 1970).

### **3.1.2 Experimental Procedures**

The experiment conducted in this research consists of the analysis on the variables that most influence the behavioral decision-making process between the dyad make or buy. From this research idea, eight scenarios were designed with issues, such as price, quality, and monitoring vary. In these developed scenarios, a purchasing decision situation is simulated, where the participants assume the role of purchasing manager of a pharmaceutical company called Alpha Pharma, and after the development of a new drug, called Livero, this manager

must decide between produce it internally, outsource the production, or combine the two processes by the simultaneous management of purchasing and production. This is carried out to analyze the behavior of managers, regarding factors influencing the decision to outsource or insource production, as well as the effect of variations between these variables.

Once this is done, a brief description of the pharmaceutical industry, the structure of the Alpha Pharma, the product being developed called Livero are given. The company applying for the external production is called XYZ. The variations between the scenarios happen when describing the costs of capacity, the quality produced by each company, and monitoring condition of companies, both its suppliers and its production, between low and high capacities. Thus, creating eight distinct scenarios that describe high and low-cost control capacity, quality control of high and low capacity, and performance of monitoring suppliers high and low and Bandwagon pressure.

After reading the scenario, the respondents will have twenty-three (23) questions to answer in order to qualify their scenario and identify or locate their decision as the best alternative to the Alpha Pharma, the answer to these questions will also identify the sample profile.

The first part of the questionnaire intended to measure the understanding of the respondent about the proposed system, the nine (9) questions consisted of a Likert scale of six points, ranging from significance "low" to "high" followed by "do not know." The following six questions refer to scenarios designed to identify the position of the respondent on the production or purchase of LIVERO, or the appropriate percentage, in his point of view. The first three (3) scenarios are made up of three issues where the first ranges from "very misaligned" to "very aligned" and the other two of "very low" to "very high." The sets 4, 5, and 6 measure the percentage suggested by the respondent to produce XYZ and Alpha Pharma, wherein the first and second range in 11 points of "0%" to "100%," where 0 is completely insource and 11 100% outsource and the other two "very low" to "very high."

Finally, questions related to demographic variables were added, such as gender, age, length of experience, level of education. In addition to questions about the relevance and applicability of answered questions, Hall (2012) had already applied in the context of sourcing decision. However, it was in the North American market questions and scale, and this is the first application to Brazilian managers. This research can be considered as intercultural since it seeks to compare two different cultures, the American and the Brazilian ones (Vijver and Leung, 1997). In this study will be compared the position adopted in making the purchase and production decision. Considering this is a replication of an already conducted research it is

important to make sure that after collected, data can be compared to the original research. So any question was taken out just was adapted to Brazilian environmental.

Due to the experimental nature of this work, respondents were not able to answer these questions at home, or receive any other external influence besides those on the environment, so we identify our experiment as a laboratory experiment (Landridge, 2004). With a strict control of the environment, it is easier to control and measure the dependent and independent variables, and to assure all respondents will have the same light, noise, or other distractions influence (Howitt and Crame, 2011).

Based on Hall (2012) experiment, a pen and paper experiment was used. So participants were conducted to read the scenarios and then answer the questions regarding this information received.

In order to avoid spurious results, we try to minimize the impact of experiment error on results. Thus, according to Landridge (2004), it is important to use the correct sampling, administrate properly the experimental condition, randomization of the experiment (or counterbalancing) and inaccurate measurement way.

One of the most important issues to start collecting data is the definition of the target population, from which we want information and want to draw inferences. After defining the population of this part, or as we call a sample, we will analyze to infer the results we seek (Malhotra, 2006).

### **3.1.3 Pretest**

After the questionnaire was properly translated the experiment was properly aligned, a pre-test of the instrument was performed to detect possible errors and difficulties of interpretation. The pre-test constitutes a test of the data collection instrument conducted with a small sample of respondents to identify and eliminate potential issues (Hernandez *et al.*, 2014). It is not recommended to collect data without the instrument being previously tested.

A pre-test was employed to verify accordance, translation, and applicability, to ensure the same quality, to check possible interpretations problems, and as a preliminary validity check and assessment of results. This first pre-test was conducted with 13 students of Business Administration Master Degree from Unisinos. It intended to identify possible problems of understanding and filling and other questions that might arise during data collection. The invitation to the participants was done via e-mail explaining the intention to evaluate the interpretation and applicability.

The eight (8) scenarios were randomly distributed among participants of this pre-test to begin the response process. After answering, respondents were asked about their perception to perform the search. The feedback allowed for changes in five points: formatting, presentation of the issues, writing and phrase structure, terminology, and target audience. A major contribution of the pre-test was the recommendation to apply the experiment to people who were aware of the purchase and production process, suggesting students of Production Engineering courses. After the completion of the changes, the new version was able to collect data.

After this pre-test and the properly modification suggested by the first respondents, we applied a second pre-test with students from two classes of Business Administration. One studied at Faculdade Cesuca at Cachoeirinha, RS, and the other with students from Faculdade São Marcos at Alvorada, RS. These results show us the students understand better the question, while the experiment was ready to be applied with the focus group.

As a third step to ensure the experiment was suitable for application in Brazil, four source managers, were also contacted, from three different companies to have a more professional opinion to validate this experiment questions. So they were exposed to the questionnaires to check their comprehension of the issue, if the questions were well structured to measure where our research was supposed to measure, as well as their opinion about the research importance. All of them confirm this study relevance in the industry decision-making process as a way to understand the main aspects that this important decision may consider. They also contribute with some words changing as a way to have a better understanding of the questions. These contributions were considered in order to have the final version of the experiment questionnaire in Portuguese. This version can be seen in Appendix B of this study.

### 3.2 VARIABLES

There are numerous types of variables, but to conduct the experiment we will use just dependent and independent variables (D.V and I.V). The variation in independent variable, manipulated by the researcher, is supposed to affect the dependent variable, which is measured, so the I.V has a casual effect on the dependent variable (Howitt and Crame, 2011).

While considering the need for at least two variables (dependent and independent), with the minimum of two setting levels, comparing at least two conditions (Landridge, 2004), the dependent variable will be the decisions managers will take regarding the possibility to outsource or insource production, or combine both, when influenced by some independent

variables, which will be: cost, quality, and ability to monitor supplier or inside process, which might be high or low, depending on the scenario in which they operate.

We will describe the variables used in this study in the next chapters:

### **3.2.1 Independent Variables**

On experimental designs, the Independent Variable, also viewed as the treatments, is manipulated to guarantee that certain levels of the Independent variable cause different responses on dependent variable (Hernandez et al., 2014). In our research the independent variables, quality, cost and monitoring, will be exposed to level High and Low.

#### **3.2.1.1 Quality**

The quality of products, services, process, or suppliers is constantly desired for all companies, and the importance each manager gives to this factor that will influence on how much this variable may induce the decision-making process on the issue of outsourcing.

According to Gray et al. (2009), quality has a strong impact on decision makers since they tend to feel more comfortable to adopt strategies that bring quality results. Thus, the selection of suppliers and definition of the best option among internalization and outsource induces buyers to be even more cautious in defining their production strategy (Foster et al., 2011).

On the scenarios, participants may face two different options of a quality standard in the pharmaceutical industry, to choose between to produce, the new drug called LIVERO, at the Alpha Pharma or to outsource it to XYZ Co, or in what level distribute the production between this both companies. To evaluate managers' quality perception, the scenarios range between XYZ with inconsistent/consistent quality, vary in order to identify if, and how, managers are considering the issues and quality standards before making their decisions on the issue of outsourcing.

On these eight scenarios, sometimes quality issue will be with high-quality parameters, on the other hand, some subjects may receive a scenario base, which shows low-quality parameters. Therefore, the respondents will face two different sets of information with High or Low quality advantage, but each respondent will receive just one information for quality, or High or Low, as stated below:

Table 3- Quality Scenarios

<b>XYZ Co's capabilities compared to Alpha Pharma</b>	
<b>High Quality Advantage</b>	<b>Low Quality Advantage</b>
XYZ Co's manufacturing function provides inconsistent quality, while Alpha Pharma does not.	XYZ Co's manufacturing function provides consistent quality, while Alpha Pharma does not.
XYZ Co produces a higher number of defective units of drugs similar to Livero than Alpha Pharma.	XYZ Co. produces a lower number of defective units of drugs similar to Livero than Alpha Pharma.

Source: Hall (2012).

After the reading of the scenarios, respondents must answer some questions to check the quality influence on their decisions. The questions, which will measure this treatment, are:

Table 4 – Question to measure quality

<b>Questions to check participant's perception of quality</b>
<p><b>2. How would you rate quality as a priority for Alpha Pharma?</b>  <input type="radio"/> Low <input type="radio"/> Somewhat Low <input type="radio"/> Neither <input type="radio"/> Somewhat High <input type="radio"/> High <input type="radio"/> Do not Know</p>
<p><b>6. XYZ Co has lower quality than Alpha Pharma.</b>  <input type="radio"/> Disagree <input type="radio"/> Somewhat Disagree <input type="radio"/> Neither <input type="radio"/> Somewhat Agree <input type="radio"/> Agree <input type="radio"/> Do not Know</p>
<p><b>9. To what degree is Alpha Pharma able to determine quality standards and specifications are adhered to by XYZ Co?</b>  <input type="radio"/> Unable <input type="radio"/> Somewhat Unable <input type="radio"/> Neither <input type="radio"/> Somewhat Able <input type="radio"/> Able <input type="radio"/> Do not Know</p>

Source: Hall (2012)

### 3.2.1.2 Costs

The cost analysis essentially compares manufacturing costs of a particular component with the cost of getting it on the market (Horn et al., 2014). Thus, it is acceptable to say that the most obvious reason to search abroad is the intention to reduce cost because the managers' goal is to found a sourcing solution that keep the lowest total price (Butter and Linse, 2008)

On these eight scenarios of our experiment, sometimes cost issue will be higher at Alpha Pharma than on XYZ, on the other hand, some subjects may receive a scenario that shows low costs parameters.

The variable cost is measured with questions after the reading of the scenarios to check manager's perception of the ability of supplier, XYZ, to compete on costs compared with the cost of insourcing the process, at Alpha Pharma plant. Where sometimes the cost of XYZ is

higher and other they are lower than Alpha Pharma's costs, the statements below will be responsible to influence managers' perception of costs.

Thus, the respondents will face with two different set of information with High or Low-cost influence, as stated below:

Table 5 – Costs Scenarios

<b>XYZ Co's capabilities compared to Alpha Pharma</b>	
<b>High Cost Advantage</b>	<b>Low Cost Advantage</b>
XYZ Co's manufacturing costs are higher than Alpha Pharma.	XYZ Co's manufacturing costs are lower than Alpha Pharma.
XYZ Co purchases materials at higher costs than Alpha Pharma	XYZ Co purchases materials at lower costs than Alpha Pharma
XYZ Co is not skilled at reducing costs once production has started; Alpha Pharma is adept at reducing costs.	XYZ Co is skilled at reducing costs once production has started; Alpha Pharma is not adept at reducing costs.

Source: Hall (2012)

After the respondents read the scenario, they must answer some questions to check cost influence on manager's decisions:

Table 6 – Question to measure Costs

<b>Cos's Questions</b>
<p><b>1. How would you rate cost as a priority for Alpha Pharma?</b></p> <p><input type="radio"/> Low   <input type="radio"/> Somewhat Low   <input type="radio"/> Neither   <input type="radio"/> Somewhat High   <input type="radio"/> High   <input type="radio"/> Do not Know</p>
<p><b>3. Livero requires investment in a unique production system and specific assets.</b></p> <p><input type="radio"/> Disagree   <input type="radio"/> Somewhat Disagree   <input type="radio"/> Neither   <input type="radio"/> Somewhat Agree   <input type="radio"/> Agree   <input type="radio"/> Do not Know</p>
<p><b>4. Livero's production technology may change over time.</b></p> <p><input type="radio"/> Disagree   <input type="radio"/> Somewhat Disagree   <input type="radio"/> Neither   <input type="radio"/> Somewhat Agree   <input type="radio"/> Agree   <input type="radio"/> Do not Know</p>
<p><b>5. XYZ Co has lower costs than Alpha Pharma.</b></p> <p><input type="radio"/> Disagree   <input type="radio"/> Somewhat Disagree   <input type="radio"/> Neither   <input type="radio"/> Somewhat Agree   <input type="radio"/> Agree   <input type="radio"/> Do not Know</p>
<p><b>8. To what degree is Alpha Pharma able to determine the production costs of XYZ Co?</b></p> <p><input type="radio"/> Unable   <input type="radio"/> Somewhat Unable   <input type="radio"/> Neither   <input type="radio"/> Somewhat Able   <input type="radio"/> Able   <input type="radio"/> Do not Know</p>

Source: Hall (2012)

After these questions, respondents will be exposed to situations that may arise as decision makers about the production or outsourcing. These issues have the purpose to measure



how much the scenarios, received by this respondent, can affect the perception of the respondent about the variable cost.

### 3.2.1.3 Monitoring

Firms whose strategy is to acquire products or service in the market have to develop skills to monitor his suppliers' performance, mainly regarding issues as quality and cost (Mayer and Salomon, 2006).

Concerning managers' ability to monitor suppliers' performance, or to monitor their process inside the company, there will be questions ranging from the high to the low level of ability to monitor evaluating if this performance will be a subjective/objective process.

Table 7 – Monitoring Scenarios

<b>Information about the ability to monitor XYZ Co</b>	
<b>High ability to monitor supplier</b>	<b>Low ability to monitor supplier</b>
Evaluating XYZ Co's performance will be primarily a subjective process.	Evaluating XYZ Co's performance will be primarily an objective process.
Alpha Pharma is unable to determine the production cost of XYZ Co.	Alpha Pharma is able to accurately determine the production cost of XYZ Co.
Alpha Pharma is unable to determine whether agrees upon quality standards and specifications are adheres to by XYZ Co.	Alpha Pharma is able to accurately determine whether agrees upon quality standards and specifications are adheres to by XYZ Co.

Source: Hall (2012)

After the respondents read the scenario they will be supposed to answer some questions to check monitoring influence on managers' decisions, we use the question of Table 8 to measure if their answer changes according to the level of High and Low of monitoring on the scenario they received.

After these questions, respondents will be exposed to situations that may arise as decision makers about the production or outsourcing. These issues have the purpose to measure how much the scenario, received by this respondent, can affect the perception of the respondent about supplier monitoring.

### 3.2.2 Dependent Variable

The dependent variable in our research is Behavioral decision-making process, where we measure the influence received by cost, quality, and monitoring. Therefore, we try to understand if differences between these independent variables will influence how managers make their decision on the context of insource or outsource production.

There was in the scenarios a scale to understand the percentage outsourced by managers, so an 11-point scale is presented, where zero reflects just insourcing activities and 11 completely outsourced.

The questions used to understand if these independent variable influence the dependent variable are stated below:

Table 8 – Question to evaluate managers decision-making

<b>Scenario 4: As the sourcing manager, you can allocate production of Livero between Alpha Pharma and XYZ Co. How should production be allocated between Alpha Pharma and XYZ Co?</b>										
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	0%
XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ
Co	Co	Co	Co	Co	Co	Co	Co	Co	Co	Co
0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Alpha	Alpha	Alpha	Alpha	Alpha	Alpha	Alpha	Alpha	Alpha	Alpha	Alpha
Pharm	Pharm	Pharm	Pharm	Pharm	Pharm	Pharm	Pharm	Pharm	Pharm	Pharm
a	a	a	a	a	a	a	a	a	a	a

Source: Hall (2012)

After the clear definition of the variables used in our scenario-based role experiment, it is important to discuss and explain how other points of our research will be conducted.

### 3.3 SCENARIOS

In our scenario-based role-playing experiment, supplier cost advantage, quality advantage, and ability to monitor suppliers' performance were manipulated at level High versus Low. In order to reduce the chance of spurious influences on these perceptions, we decided to use a scenario-based role-playing experiment (Rungtusanatham et al., 2011). According to Tomlinso, Dineen, and Lewicki (2004), who already conducted a study in the United State with decision-makers, the decision-making scenarios was designed to show all relevant information

about suppliers' cost and quality advantage, ability to monitor, isolating individual decision-making characteristics.

The scenario-based role-playing experiment is widely accepted in general management research, because it has the impact of individual characteristics and allows subjects to make decisions in a hypothetical make-buy situation.

The biggest advantage of the experiment is the control over external variables, since nothing influences the outcome, as the other factors are under control. If these factors are held constant, then all the variations that occur are due to manipulation of the dependent variable, which is because it is varied, thus identifying the cause of such variation and eliminating more external variables than other methods. However, to success in this method it is important to perform an experiment design, minimizing the effects of external variables (Hernandez et al., 2014).

In experiments, there are also some levels on the environment where it is applied, which can be qualitative or quantitative. Thus, it is necessary to compare at least two conditions to each other to check if one independent variable influences the results on another, so that we can test different options of results (Collins, Joseph and Bielaczyc, 2014; Kantowitz, 2006). Based on these eight different scenarios, created by Hall (2012), eight different situations were simulated, varying levels of cost, quality, and monitoring, between high and low, which were distributed according to:

Table 9: Measure design matrix – Between-Subjects factors

<b>Between-subject factors</b>			
<b>Scenario</b>	<b>Cost</b>	<b>Quality</b>	<b>Monitoring</b>
A- HHH	High	High	High
B- HHL	High	High	Low
C- HLL	High	Low	Low
D- HLH	High	Low	High
E- LLL	Low	Low	Low
F- LLH	Low	Low	High
G- LHL	Low	High	Low
H- LHH	Low	High	High

Source: Hall (2012)

All other elements of the scenarios were held constant, given a base idea, on which the changes will occur.

Controlled variable is commonly used to control external variables, and to check if the results are being influenced by the independent variable. Therefore, it is commonly affirmed that independent variables are manipulated, dependent variables are observed, and controlled variables are held constant (Kantowitz, 2006). Sometimes this condition of control is not clear, and stay implicit, and in some experiments this control group is not necessary (Goodwin, 2010). In the previous thesis of Hall (2012), this control group was not used because the comparison will not be between those who read the scenarios and those who do not read it. On the contrary, it will compare the influence each of these variables on the behavioral decision-making. Therefore, the scenarios' differences could create eight different options of responses.

In these developed scenarios, a purchasing decision situation is simulated, where the participant assumes the role of purchasing manager of a pharmaceutical company called Alpha Pharma. After the development of a new drug, called Livero, this manager must decide between producing it internally, at Alphapharma, to outsource the production, to the XYZ.Co, or combining the two processes by the simultaneous management of purchasing and production. The pharmaceutical industry was selected because most people know what a drug is and how important it is for the end customer. Consequently, cost and quality are important aspects in this context, and due to the existence of the patents that may influence the managers' decisions. Hall (2012) based the scenario cost and quality priority information based on Boyer and Lewis (2002) study. In addition, the contract manufacturer description was based on Gray et al. (2012) where suppliers have complete responsibility of production for the product (Mayer and Salomon, 2006). The technological uncertainty added in the experiment by Hall (2012) was based on today's ever changing technology described by Fine (2000) and Sutcliffe and Zaheer (1998). Lastly, capacity and economies of scale differences between the firm and suppliers were eliminated because both may influence outsourcing (Hayes et al., 2005; Porter, 1985).

The variations between the scenarios happen when describing the costs of capacity, the quality produced by each company, and monitoring condition of companies, both its suppliers and its production, between low and high capacities. Thus, it creates eight distinct scenarios that describe high and low-cost control capacity, quality control of high and low capacity, and high and lowperformance of monitor suppliers.

Additionally, to avoid any experimenter intervention in the implementation of the experiment, it is necessary the random allocation of subject to the experimental condition, to remain neutral, or in other words, to withhold the experimental condition (Kantowitz, 2006). This quality of randomness means each has an equal chance to receive any of the eight

scenarios; they will not be selected according to each participant knowledge or capabilities to answer (Goodwin, 2010).

For this reason, in our study, the experimenter distributed the eight scenarios randomly, making sure samples were multiple of eight (8), so that all scenarios have equal distribution among the participants. According to Hernandez *et al.* (2014), all subjects should have the same probability of being selected for either experimental condition, to prevent the researcher to assign subjects to experimental conditions that he believes to be the most effective and to eliminate any differences between subjects.

To these participants, the following information was concealed: the existence of different information in each scenario, variations between the intensities of products' cost to be outsourced, quality of products produced or supplied, and different forms of monitoring. This process is commonly called double-blind studies, where the participant is unaware of the conditions in which they are (Landridge, 2004).

We exposed each subject to only one experimental treatment (because they had just participated once in the experiment) and then compared the values between the exposed subject to different treatments. This treatment is identified as drawing between subjects (Hernandez, *et al.*, 2014). Data were collected in groups, and different participants were exposed to different conditions or scenarios. This process is called between-subjects, but we take care that the participants would not influence or interfere with the data.

### 3.4 SAMPLE

Experimentation allows for a high degree of control over data collection, and a mechanism to reduce extraneous influences requires subjects with specialized domain knowledge. Thus, it is important to have a significant sample of population to collect data because subject with empirical knowledge about sourcing or the necessary information to consciously decide between make or buy will be important to ensure a more realistic image of the decision process (Hernandez *et al.*, 2014).

The target population outlines the elements or individuals that share some characteristics (Malhotra, 2006). The target population of this study comprises students of Production Engineering, since Hernandez *et al.* (2014) comment that a homogeneous sample is recommended to minimize other factors influencing the results. Moreover, this population was determined by the researcher whereas the sampling technique can be probabilistic and non-probabilistic. This first uses a random selection of respondents, and the second consists of

sampling based on the judgment of the investigator, without characteristics of randomness (Malhotra, 2006). Within this dissertation, the sample is considered non-probabilistic for convenience since it uses undergraduate students from the Production Engineering course at the Universidade do Vale do Rio dos Sinos (Unisinos).

We were also careful to use classes placed at the end of the course, which ensures that students have already seen the theoretical concepts about the decision process between making and buying. Consequently, they may already be working in the field. Therefore, we selected the course of Production Engineering as a prerequisite for the application of the experiment, precisely because it prepares students for this kind of situation and decision; for understanding aspects of production that may assign competitiveness to the product or not, and consequently confirming if it is possible to produce inside the company as well as outsource it. The sample studying at night are normally students who are already working in the area and have knowledge about the operation of the corporate structure and how the decision-making is grounded.

After the data collected, we will consider their experience on the sourcing decision environment, to their company size and industry type, because this may influence their decisions. Some individual characteristics may also influence the way decisions are made, so the respondents' answers will also be separated, and the age of the respondent will be considered, as the gender and education level. This information will be obtained with the answers to the questions below:

Table 10 - Questions about the Sample Characteristics

<b>10. What is your current or most recent job title?</b>				
<b>11. How many years of experience have you had in a sourcing related role?</b>				
<b>12. How many total years of work experience do you have?</b>				
<b>13. What is your highest level of education? Please mark the most appropriate choice.</b>				
<input type="radio"/> High School	<input type="radio"/> Associate's Degree	<input type="radio"/> Bachelor's Degree	<input type="radio"/> Master's Degree	<input type="radio"/> Doctorate
<b>14. What is your age?</b>				
<input type="radio"/> 20 and under	<input type="radio"/> 21-30	<input type="radio"/> 31-40	<input type="radio"/> 41-50	<input type="radio"/> 51-60
<input type="radio"/> 61-70	<input type="radio"/> 71+			
<b>15. What is your gender?</b>				
<input type="radio"/> Female		<input type="radio"/> Male		
<b>16. Which category below best describes the industry where you currently work or most recently have worked? Please circle only one.</b>				
a) Aerospace				
b) Automotive				
c) Consumer Products				
d) High-Tech				
e) General Manufacturing				
f) Pharmaceutical				
g) Other, please specify _____				

**17. What is the approximate number of employees employed by your business unit where you currently work or most recently have worked?**

- 0-250       251- 500       501-750       751-1000       1001+

Source: Hall (2012)

Firm size and industry influence the level of internalization and the learning process, as well as for the bandwagon pressure they receive and the way organizations will respond to these situations. Individual characteristics will also influence decision-making, mainly their education or social position, and may moderate the bandwagon pressure and the percentage outsourced (March, 1994).

The respondents were also asked to inform their level of knowledge regarding the issue of the experiment. Those who answered that they understand what the issue of the experiment will also be taken from the sample due to the possibility of their responses having been answered in order to achieve the hypotheses or the stipulated objectives, thus not representing the real way that leads to the decision process (Howitt and Cramer, 2011).

To limit the number of participants in the experiment, we used the criteria of minimum 20 participants for each treatment, considering a minimum to test differences between treatments to see differences in effects (Hernandez *et al.*, 2014). Beyond the likely errors in invalidations, function or failures occurred with the participants during the experiment.

### 3.5 DATA COLLECTION

With the final Portuguese version of our experiment, some Production Engineer professors were contacted to check their availability to use their classes to apply the experiment. From this contact, we get the permission to use ten classes at Universidade do Vale do Rio dos Sinos. The use of student's class time was a way to keep all respondents in the same environment without other external influence.

Data collection was conducted between August and September 2015, in 10 different classes. We started the class with the presentation of the researcher. After that we explained in what the research consists and invited them to participate voluntarily, reading the pen and paper scenarios and answering the questions, considering the advantage and disadvantages to produce at Alpha Pharma or to outsource to XYZ Co., and making their decision.

The eight (8) scenarios were randomly distributed among participants of each class. The first part of the experiment was read by the experimenter to explain the context of the study.

After that, each participant could start to answer. Researcher signaled its availability in case of any doubt.

As a way to keep respondents concentrated, motivated, and attentive and as a reward for their dedication to respond, we offered them some sweets, cakes, cookies, candies, and soft drinks during data collecting process. This process took around 1 hour per class and, after this process, the students were available to continue their lessons.

### 3.6 DATA ANALYSIS

According to Howitt and Cramer (2011), when different groups of participants for each condition are used, the use of an unrelated statistical test is recommended to analyze the variance or difference between groups with ANOVA test using Stata software, comparing means between more than two experimental groups on a quantitative variable. This analysis checks whether there is a significant difference between the group means and if the factors influence some dependent variable, which allows finding results for the interpretation of subsequent data (Malhotra, 2006). The data examined are the independent variables (cost, quality, and monitoring) on the dependent variables to score possible relationships of cause and effect between the variables. In our study, each of the eight scenarios will be considered as a group, so we will have eight (8) groups with the variables Cost, Quality, and Monitoring, varying at level of high and low

Pooling tests were conducted to exclude the effects of order (to test that results are consistent regardless of whether the particular scenario appeared first or second) and to ensure that results could be combined across scenarios.

Anova attempts to identify some differences in groups' means. Firstly, this test finds a general mean then checks how distant each individual mean is from this general mean, and analyzes with the results obtained in the test ANOVA the variation that may occur with some data, to check if this difference reflects the variables we manipulate in the experiment (Dancey and Reidy, 2013). The F statistic is the variance reason between groups by intragroup variance.

It is necessary to prepare them to the analysis after their collection/application and tabulation, in order to use correctly collected data sometimes, to evaluate data consistency and missing data, mainly because of omissions of answers by respondents, and to identify outliers (atypical observations) and extreme responses, which may influence the analysis outcome (Hair et al., 2009).



Missing data may occur when no valid values are informed to some variables. These missing data were carefully evaluated to treat them in order to keep them in the database. To keep the same analysis of Hall (2012), we excluded subjects with excessive missing data and those who had missing data on the make-buy decision. Hair et al. (2009) assume that no more than 10% of data can be omitted, because the impact of missing data is the reduction of sample size for analysis, in a case of excluding from the database. After evaluating the answers, none of these 211 respondents was discarded because most of the questions were correctly answered, with respondents leaving less than 10% of unanswered questions.

Outliers are those data with very distinctive values, considering a common point to all cases (Hair et al., 2009). Our respondents are considered homogeneous, because all of them had the same instruction level and were able to respond adequately to all issues in a homogeneous form. Thus, we do not eliminate any respondent due to distinctive characteristics.

After checking outliers and missing information, distribution assumption was considered. One of this assumption is the independence of observation within samples, checking the way data were collected. In our study, the experiment structure shows that each row of data was included in the sample in an independent way (Kline, 2005). Each respondent received just one scenario with questions to answer, and one sample was not dependent on another.

In order to confirm if the results were obtained by chance, it is necessary to evaluate the statistical assumptions necessary for the use of ANOVA Test, to check how the dependent variable is distributed in the population. Thus, the normality test helps to understand in which way data are distributed and if people's scores are close to the mean. According to Hair et al. (2009), these assumptions aim to prevent distortions and biases in the data, as this distribution of data is very important to the Anova test.

## 4 RESULTS

In this chapter, the results of our data collection interpretation will be explained, in order to confirm or reject the hypothesis developed and to find out if there is a relation between the dependent variables, sourcing decision, and at what level and direction.

### 4.1 SAMPLE CHARACTERISTIC

The data analysis of this research began with some statistical tests for descriptive analysis of the variables to characterize the sample participating in our experiment, with the frequency and percentages of socio-demographic items. A frequency test on the SPSS Software was provided and was used as the basis to understand how Brazilians make their decision on sourcing situations and how they are influenced by the independent variables: Cost, Quality, and Monitoring. With this information, it was possible to draw a general picture of the profile of respondents.

The sample of our data collection consist of 211 undergraduate students from the course of Production Engineer at Universidade do Vale do Rio dos Sinos – Unisinos, located in the city of São Leopoldo, in the Northeast of Rio Grande do Sul region, part of the Greater Porto Alegre, reaching about 34 km from the state capital.

Considering that the decision-making process is driven by humans, that is, employees like managers, purchasers, directors or others, it is important to evaluate our respondents profile as a way to understand if any of these characteristics influence their ability to capture information, rate them, and process them and under these decisions (Penrose, 1959). The first characteristic evaluated was the participants gender, and it was found that 69.7% were male and 30.3% female, as stated on the table below:

Table 11 - Gender definition

<b>Gender Definition</b>		
<b>Gender</b>	<b>N</b>	<b>Percent</b>
Female	64	30.30%
Male	147	69.70%
<b>Total</b>	<b>211</b>	<b>100%</b>

Source: Elaborated by the author.

Considering our samples, undergraduate students were most of our respondents aging from 21-30 years old, with 65.90% and 20.4% aging from 31-40 years old. The table below presents the frequency of each age, according to the grade available for respondents to allocate themselves:

Table 12 - Age variation

Age		
Age	N	Percent
Under 20	28	13.3%
21-30	139	65.9%
31-40	43	20.4%
41-50	1	.5%
<b>Total</b>	<b>211</b>	<b>100%</b>

Source: Elaborated by the author.

These respondents have on average eight years of work experience, ranging from 1 year to 27 years of working experience. It shows that despite being students their profile corresponds to a working person. This is a characteristic of the Unisinos students, who work during the day and study at night. This same profile was not found on all Brazilian universities, because some of them have on average full-time students, different from the ones identified here. Some of these respondents present sourcing experience; around 53 respondents work or have worked in purchase areas or some sourcing department.

Respondents were also asked about the category that best describes the industry where they currently work or most recently have worked, asking them to choose between seven options. These questions were relevant because, the market and the products firms produced use to explain how firms will handle the sourcing, if inside the company or if will look in the market, using companies' capabilities, knowledge, and experience.

It was found that 43.1% work on general industry, and 30.3% on other types of companies. In the table below, it is possible to see the frequency on each type of industry available for the respondents to allocate themselves.

Table 13 – Industry type

<b>Industry</b>		
<b>Industry</b>	<b>N</b>	<b>Percent</b>
Not Working	8	3.80%
Aerospace	1	0.50%
Automotive	22	10.40%
Consumer Products	16	7.60%
High-Tech	8	3.80%
General Manufacturing	91	43.10%
Pharmaceutical	1	0.50%
Other	64	30.30%
<b>Total</b>	<b>211</b>	<b>100.0</b>

Source: Elaborated by the author.

These samples were working in different companies' sizes, 39.8% on firms with 0-250 employees. At the same time 24.2% work on firms with more than 1000 employees. Firm size is evaluated because it may influence manager's decision. This will limit or facilitate access to information, or access to outsource, and sometimes the environment to support outsourcing decision, or the possibility to improve their production process to be able to insource some activities only available on the market. The same is valid for the way managers perceive the costs involved in the process, and control for quality of their production or of their partners and suppliers, and the importance given to the ability to monitor such factors (Kotabe and Murray, 2004). It also may influence the level of institutionalization and the way they will be influenced by some regulation rules. The complete description of number of employees can be seen in the table below:

Table 14 - Number of Employees

<b>Number of Employees</b>		
<b>Employees</b>	<b>N</b>	<b>Percent</b>
0	7	3.3%
0-250	84	39.8%
251-500	32	15.2%
501-750	20	9.5%
751-1000	17	8.1%
1001+	51	24.2%
<b>Total</b>	<b>211</b>	<b>100.0%</b>

Source: Elaborated by the author.

Respondents' profession were also asked, and based on their responses, it was observed that 81% of them operate in some manufacturing function. Consequently, their ability to answer properly to the questions related to production decision is higher. They will be able to identify the strengths and weaknesses of the purchase and production treatments, to take appropriate decisions, evaluating the factors that most affect these decisions in order to understand how to properly distribute a percentage of production to be developed in-house and externally. The professions most often cited by respondents are listed below. The full list can be viewed in the Annex C.

Table 15 – Profession description

<b>Position</b>		
<b>Description</b>	<b>N</b>	<b>Percent</b>
Production Manager	23	10.9%
Production Assistant	21	10.0%
Intern	19	9.0%
Quality Analyst	16	7.6%
Industrial Maintenance	14	6.6%
Administrative assistant	11	5.2%
Production Engineering	10	4.7%
Purchaser	9	4.3%
PPCP Programmer	9	4.3%
Sales	8	3.8%
Students	8	3.8%
Businessman	7	3.3%
Logistics	7	3.3%
<b>Total</b>	<b>162</b>	<b>76.7%</b>

Source: Elaborated by the author.

Therefore, even those who are not managers may play a role in the decision-making process because they provide to the manager the information they need to take a more assertive decision. After the experiment application on the ten classes, there were 211 answers, with at least 26 answers for each scenario, distributed as it shown in the table below:

Table 16 – Scenario quantities

<b>Scenario</b>		
<b>Scenario Range</b>	<b>N</b>	<b>Percent</b>
1	26	12.3
2	28	13.3
3	26	12.3

4	26	12.3
5	27	12.8
6	26	12.3
7	26	12.3
8	26	12.3
Total	211	100.0

Source: Elaborated by the author.

#### 4.2 ANOVA ASSUMPTIONS

After sample analysis, it was also provided a test to evaluate the values of kurtosis and skewness, which was verified with SPSS Statistical Software. According to Kline (2005), the kurtosis values should be below 10 as the corresponding asymmetry values should stay below 3. Results above these indicate a problematic distribution and do not represent a normal distribution. The table below shows the result for the question QS4a, with the values of skewness and kurtosis indicating results that are within the values allowed in the literature and close to the normality.

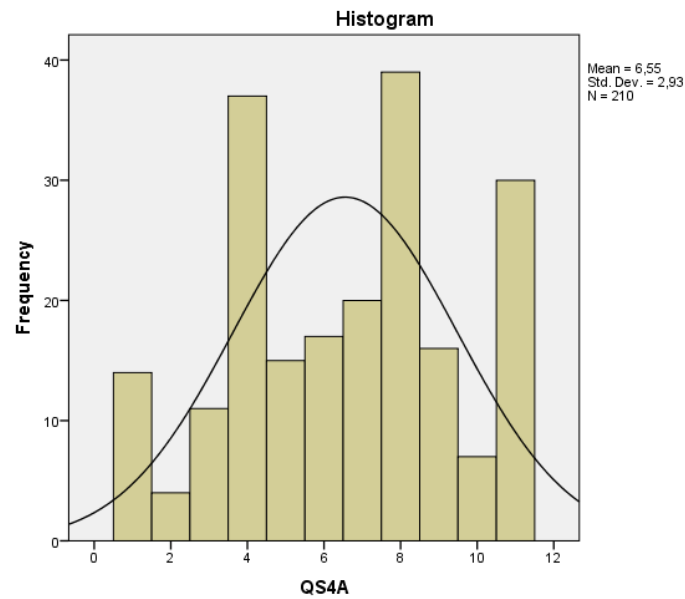
Table 17- Anova Assumptions

Descriptive Statistics							
	N	Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
QS4A	210	2,930	8,583	-,127	,168	-,911	,334
Valid N (listwise)	210						

Source: Elaborated by the author.

As a way to make this question validity clear, a graphic was also provided to show the variance of the mean value for this question:

Figure 4: Variance Graphic



Source: Elaborated by the author.

In addition, the homogeneity of variance, sometimes called homoscedasticity assumption, is clearly verified by the standard deviation of 2.93. With the Levene statistical test is possible to detect a difference between each value in its group, so homoscedasticity is assumed, since  $\text{Sig} > 0.05 = 0.86$  shows that there is no significant difference between groups variation, F Levene shows if there is difference among groups

Table 18: Homogeneity test

**Test of Homogeneity of Variances**

QS4A			
Levene Statistic	df1	df2	Sig.
.463	7	202	.860

Source: Elaborated by the author.

Based on this information of the analysis of Anova assumptions, the next chapter will report the general results of Anova, as a way to confirm some of the control variables.

### 4.3 ANOVA RESULTS

The analysis of the statistical tests aims to demonstrate if issues like cost, quality, and monitoring ability influence global-sourcing decision, and consequently confirm how respondents will allocate the production of this new drug, called Livero, discussed on the

experiment. The table below shows the result of an Anova test, allowing variable checking regarding significance and consequently may support or reject this study's hypotheses.

Table 19 – Variable Significance – Anova Test

Source	Sum of Squares	Mean Square	F	Sign.
Cost	58.43	58.43	7.34	0.0075*
Quality	77.26	77.26	9.71	0.0022*
Cost x Quality	15.14	15.14	1.9	0.1697
Monitoring	0.16	0.16	0.02	0.8859
Cost x Monitoring	25.03	25.03	3.15	0.078**
Quality x Monitoring	0.95	0.95	0.12	0.73
Cost x Quality x Monitoring	0.63	0.63	0.008	0.7781
Experience	122.96	5.59	0.7	0.8328
Age	22.76	7.59	0.95	0.4164
Company Size	28.15	7.04	0.88	0.4746

\*  $p < 0.05$ ; \*\*  $p < 0.1$

Source: Elaborated by the author.

Based on Anova test results, we realize that there is a significance in three variables: costs were  $P > 0.05$ ;  $p = 0.0075$ , in the variable quality due to  $P > 0.05$ ;  $p = 0.0022$ , and in Cost Monitoring  $p > 0.05$ ;  $p < 0.1$   $p = 0.078$ .

From this information, the hypotheses previously developed in our study may be confirmed or rejected, testing the relation between the manipulations of the variable cost, to support H2a stating that, when the supplier (XYZ Co.) has some cost advantage relative to the buying firm (Alphapharma) decision-makers outsource more.

However, when respondents were asked about their ability to monitor this supplier costs, we did not detect this same relation because  $p > 0.05$ ;  $p < 0.1$   $p = 0.078$ , but we are still able to confirm H2b. This is due because the percentage outsourced has a small variation when the buying firm's ability to monitor supplier cost change from low to high or vice versa.

Based on these, we also connect to Buck's (2014) studies, which affirm that decisions become more assertive due to emphatic monitoring, and also Gray et al. (2009) who say that managers will outsource the part of the production that offers low costs and when it is easier to control it in the market. This data collection shows that the ability to monitor costs or control it in the market does not exert influence on the decision to outsource, not at least in defining the percentage to be allocated internally and to be outsourced.



Hypothesis 1b can also be supported after checking significance test, thus it is possible to affirm that, when a supplier (XYZ Co.) has some quality advantage relative to the buying firm (Alphapharma), decision-makers outsource more. This variable was handled changing the production quality of XYZ Co., between HIGH and LOW, on scenarios 1, 2, 7, and 8 shows High-quality standards for XYZ Co., and on scenarios 3, 4, 5, and 6 Low-quality information was attributed to XYZ Co.

These results are in line with the theory, which states that high probability of non-defective items creates the likelihood to have good quality, choosing partners even more committed to delivering superior quality standards, with conformance quality, consistent delivery and prompt response (Foster *et al.*, 2011).

Nevertheless, this same relation was not confirmed in our study when respondents were asked about their ability to monitor supplier quality because for Quality#Monitoring any significance was attributed  $P < 0.05$ ;  $p = 0.7$ . Therefore, it is not possible to support H1a because the percentage outsourced is not reduced or increased when the buying firm's ability to monitor quality change from low to high or vice versa.

These results, on the other hand, contradict the importance of quality monitoring brought in theory by several authors, such as Gray *et al.* (2009) and Kaya and Ozer (2009) and Foster *et al.* (2011). They state that monitor quality is important and confirm that quality searching asks for monitoring in order to ensure customers will receive exactly what they expect to receive, training people to produce according to some pre-defined parameters, and consequently influencing managers decision-making, because they will feel comfortable to estimate a bigger percentage to outsource production. Even when the quality cannot be easily observed, and the manager cannot ensure high conformance quality or evaluate quality performance. In addition, when managers are not able to monitor quality, they do not realize the benefits or the risks involved to transact with the market or to concentrate their production in some place that do not control or ensure quality parameters (Heide, 2003).

The ability to monitor suppliers or the process inside the company is also verified by the ANOVA test, in order to understand the relevance to the XYZ Co. production, so as on other independent variables, it was manipulated, in the eight scenarios ranging XYZ ability to control and monitor, between HIGH and LOW. Scenarios 1, 4, 6, and 8 show High Monitor ability for XYZ Company, and scenarios 2, 3, 5 and 7 have Low monitoring ability.

While evaluating monitoring results based on the respondent's answers, we realize that with High monitor ability or Low monitor ability, the manager was not used to change their outsourcing decision. It means they keep their decision independent of Low or High monitor

ability. This can be verified by checking the variance in table 22. There is no significance in this variable and there is a weak correlation ( $F= 0.02$   $P>0.05$ ;  $p=0.8859$ ). Based on this we cannot support H3, and conclude there is no relationship between the ability to monitor process and supplier quality and cost to the percentage outsourced. Therefore, the ability of the buying firm (Alphapharma) to monitor supplier does not influence the decision to outsource.

According to several authors, monitoring is considered a relevant point on decision-making. However, in our study this variable does not show such relevance to the decision to outsource or insource production. Herz et al. (2013) state that companies with the ability to monitor suppliers' performance or even to well accompany internal production are able to make conscious decisions, based on the idea of guaranteeing good quality with the lowest cost involved.

However, this lack of association may be associated to the inability to detect monitoring relevance, lack of monitoring ability, or even due to information asymmetry, which was already explained by Heide (2003). Also, the structure of the firms where the respondents work may not allowing them to realize this control that can be automatically registered or done, to detect and identify cost advantages and quality, is not an isolated action.

After this, a table is provided to summarize the hypotheses that were supported and those that were not supported:

Table 20 – Hypotheses and Results

<b>Summary of Brazilian's Hypotheses and Results</b>	
H1a: The positive relationship between supplier quality advantage and the percentage outsourced is reduced (increased) when the buying firm's ability to monitor supplier performance is low (high).	Not Supported
H1b: Supplier quality advantage (disadvantage) relative to the buying firm has a positive (negative) influence on the percentage outsourced.	Supported
H2a: Supplier cost advantage (disadvantage) relative to the buying firm has a positive (negative) influence on the percentage outsourced, ceteris paribus.	Supported
H2b: The positive relationship between supplier cost advantage and the percentage outsourced is reduced (increased) when the buying firm's ability to monitor supplier performance is low (high).	Supported
H3: The ability (inability) of the buying firm to monitor supplier performance has a positive (negative) influence on the percentage outsourced, ceteris paribus.	Not Supported

Source: Elaborated by the author.

After the analysis of the results presented on Anova test, as it is showed in the table below, it is possible to inform how these variables cost, quality, and monitoring influence the managers' decision to outsource. These variables' margin point was calculated using the predicted average of the groups, to understand in which point of the question of situation 4, respondents allocate Livero's production. The more to the left range the result is, more respondent outsource, and therefore, as much to the right scale the result is they prefer to produce more internally at Alpha Pharma.

It was also identified the respondents' positioning, according to the moderating effect received through the scenario. Thus, the proposed hypotheses were not merely tested, as a way to support or reject, they were also properly tagged into respondent answers, and a group mean is provided to arrange a strong background to understand clearly how influential these variable were on the definition of the percentage to be outsourced.

Table 21 – Groups Mean

	<b>Margin</b>	<b>Std error</b>	<b>Sig</b>	<b>95% CI</b>	
				<b>Lower</b>	<b>Upper</b>
<b>Cost</b>					
Low	5.97	0.291	20.58	5.4	6.54
High	7.15	0.29	24.26	6.57	7.73
<b>Quality</b>					
Low	5.87	0.3	19.64	5.29	6.45
High	7.22	0.29	24.59	6.64	7.8
<b>Cost x Quality</b>					
Low Low	5.59	0.41	13.64	4.79	6.4
Low High	6.34	0.42	14.94	5.51	7.17
High Low	6.15	0.44	13.86	5.28	7.02
High High	8.12	0.43	18.87	7.28	8.96
<b>Monitor</b>					
Low	6.52	0.3	21.86	5.94	7.1
High	6.6	0.3	21.77	6	7.2
<b>Cost x Monitoring</b>					
Low Low	5.55	0.42	13.27	4.73	6.37
Low High	6.41	0.43	14.83	5.56	7.26
High Low	7.51	0.44	17.15	6.65	8.37
High High	6.78	0.44	15.45	5.92	7.64
<b>Quality x Monitoring</b>					
Low Low	5.9	0.43	13.73	5.06	6.74
Low High	5.83	0.43	13.71	5	6.66
High Low	7.11	0.43	16.67	6.27	7.94
High High	7.33	0.43	16.85	6.48	8.18
<b>Cost x Quality x Monitoring</b>					
Low Low Low	5.18	0.58	8.93	4,04	6.32

Low Low High	6,02	0.61	9.83	4.82	7.22
Low High Low	5.91	0.61	9.71	4.71	7.1
Low High High	6.79	0.61	11.29	5.61	7.97
High Low Low	6.64	0.63	10.63	5.42	7.87
High Low High	5.64	0.63	8.99	4.41	6.87
High High Low	8.35	0.63	13.25	7.11	9.58
High High High	7.89	0.63	12.52	6.65	9,12

Source: Elaborated by the author.

The information on Table 21 confirms that when cost is manipulated to LOW in the experiment, respondents allocate their answer around the position 5.97 in our Likert scale. It means they tend to outsource 50% to XYZ Co and 50% to Alpha Pharma. Likewise, respondents who received a scenario to base their answer with HIGH Cost information for XYZ Co., they allocate the production of Livero 40% to be outsourced to XYZ Co and 60% to be produced in house, at Alpha Pharma, because they are likely to set their answer at the position 7.15.

Similarly, to the variable cost, it was also possible to measure the mean percentage indicated by the respondents when quality issues are being discussed. For the quality influence on respondents' answers, a similar behavior is seen on respondents' perception about quality to the variability between Low and High. It means that those who receive LOW quality information for XYZ Co. decide to distribute Livero production 50% to XYZ Co and 50% to Alpha Pharma, because their answers were allocated in the margin position 5.87. The respondents who received a scenario to base their experiment answer, with HIGH Quality information, tend to allocate the production of Livero 40% to be outsourced to XYZ Co and 60% to be produced in house, at Alpha Pharma, positioning 7.22.

However, for the variable monitoring, there is no statistical difference between High and Low manipulation in the scenarios. Respondents allocate 50% to 40% of Livero's production at XYZ Co, or 50% to 60% to be insourced at Alpha Pharma. Regardless of the level of monitoring, they insert their answer on position 6.52 to Low Monitoring ability and 6.6 for high monitoring ability.

These results of allocating part of the production at Alpha Pharma and part of XYZ confirm Parmigiani's (2007) explanation about better allocation of production, where managers do not need exclusively to produce internally or buy 100% from suppliers. Managers used to estimate a percentage to be produced internally and to be outsourced, using the best of each structure, reducing the cost of both, and encouraging a combination of internal resources and the resources of suppliers (Parmigiani, 2007).

These findings support what was already brought by the theory, where supplier's quality, cost, and inside process performance helps manager to better combine make and buy

in a plural sourcing strategy, and with this determinate the percentage to be insourced and outsourced. It means a partial outsourcing, so companies' simultaneity makes and buys (Mantel et al., 2006). Consequently, managers do not need just to buy or just to make, they can do both, so their decision will be directed to outsource when quality is better outside, with low costs, when it is easier to control it in the market, and produce inside when companies' quality and capabilities are higher than outside.

## 5 COMPARISON OF HALL AND WEBER RESULTS

After the explanation of the results of this research, a comparison will be made between the original work of Hall (2012), which was the basis for this dissertation, and the findings described in the previous chapter.

As a way to easier compare, it is important to state the difference between the hypotheses distribution of both studies. A difference in the development of the theoretical sections generated a different distribution of hypotheses in each study. With the aim to make a better comparison, a new table comparing which of David hypotheses are equivalent to the one used in this study is shown below:

Table 22 – Hypothesis Differences

Weber Study		Hall Study	
H1a	Not Supported	H3b	Not Supported
H1b	Supported	H1b	Supported
H2a	Supported	H1a	Supported
H2b	Supported	H3a	Supported
H3a	Not Supported	H2	Not Supported

Source: Elaborated by the author.

By evaluating this table, it is possible to conclude that all hypotheses behaved similarly in both studies.

For instance, Hall (2012) found out that quality advantage influence managers decision (H3), it means that managers use to outsource more when XYZ presents higher quality information. This hypothesis (H1a) was also supported in this study. Hall (2012) also supported the hypothesis (H1a) that state that cost variation influences the decision makers. It was confirmed in this study, confirming this influence of H2a, and results to support cost-monitoring influencing on sourcing decision (H2b/H3a) were found. Similarly, the influence on managers' decision (H3a/ H2) was not supported, thus monitoring and quality monitoring do not act as a determinant for decision makers.

This similarity in the findings between the study in Brazil and the United States shows that, despite the economic, political and social differences, institutionalization, level of development and even divergent controls and regulations existing between the countries, decision-makers of both countries consider relevant issues such as costs and quality to make their decisions to insource or to outsource production. Similarly, it is possible to state that the variable monitoring does not influence the managers' decisions for Livero production allocation, and thus are not influenced by monitoring.

These common answers may be related to the level of education. Our respondents were undergraduate students and Hall's sample (2012) was 79% with a bachelor degree or more. Thus, we may assume that respondents had the same teaching about the relevant point to consider making a correct decision in the context of making or buying. It is possible to conclude that, despite the differences in the economic environment of USA and Brazil, issues such as cost and quality are relevant for companies inserted in any country structure.

Hall's (2012) demographic information is also compared to this study demographic information. Some characteristics are common between the experiment participants, like their gender and occupation, because these respondents are mostly male and work on general manufacturing or others. Some tables are structured to summarize the sample characteristics and to make the comprehension easier. The table below shows the gender comparison:

Table 23 – Gender Comparison

<b>SAMPLE CHARACTERISTICS</b>					
<b>Weber Sample</b>			<b>Hall Sample</b>		
<b>Gender</b>					
	<b>N</b>	<b>%</b>		<b>N</b>	<b>%</b>
Male	147	69.70%	Male	177	58.20%
Female	64	30.30%	Female	127	41.80%
<b>Total</b>	<b>211</b>	<b>100%</b>	<b>Total</b>	<b>304</b>	

Source: Elaborated by the author.

However, several differences are detected by comparing the characteristics of both studies. For example, table below, specify age difference, were most respondents are between 21-30 years (65.9%) on the other hand Hall's (2012) respondents have in their majority over 41 years (66.88%). It means that age does not influence the way managers perceive the variables cost, quality, and monitoring. Therefore, it is clear that both younger and older decision makers allocate similarly outsourced percentage for XYZ and percentage to be produced in the Alpha Pharma.

Table 24 – Age Comparison

<b>SAMPLE CHARACTERISTICS</b>					
<b>Weber Sample</b>			<b>Hall Sample</b>		
<b>Age</b>					
	<b>N</b>	<b>%</b>		<b>N</b>	<b>%</b>
Under 20	28	13.30%	Under 30	20	6.60%
21-30	139	65.90%	31-40	34	12.20%
31-40	43	20.40%	41-50	77	32.60%
41-50	1	0.50%	More than 51	125	48.10%
<b>Total</b>	<b>211</b>	<b>100%</b>	<b>Total</b>	<b>256</b>	<b>92.90%</b>

Source: Elaborated by the author.

Another important characteristic, which sometimes could influence the respondent opinion or their decision about outsourcing, is the education. Brazilian respondents are 100% undergraduate and on Hall's research (2012) 45.9% have concluded their Bachelor Degree and 30.1% have Master Degree. Even with these differences on samples characteristics, the results of both studies are the same. Then it is possible to conclude that these aspects are not influencing the managers' decisions. It can also be asserted that there are similar patterns of education in both countries. Universities probably instruct their students on the same theoretical rules, by teaching the conditions to be considered as relevant in decision-making and which do not exert the same influence on business decisions, at the global sourcing and production allocation. Thus, when talking about the operations area, the Brazilian education, at undergraduate level, looks very similar to the US, despite often being criticized.

Table 25 – Comparison of Education level

<b>SAMPLE CHARACTERISTICS</b>					
<b>Weber Sample</b>			<b>Hall Sample</b>		
<b>Education Level</b>					
	<b>N</b>	<b>%</b>		<b>N</b>	<b>%</b>
Undergraduate	211	100%	Less than Bachelor	64	21.10%
			Bachelor's Degree	145	47.70%
			Master's Degree	95	31.30%
Total		100%	Total		

Source: Elaborated by the author.

The number of employees at the companies where each respondent works is also compared, as a way to understand this information relevance on our results. Most Brazilian respondents work for companies with under 1000 employees, around 72.6%, and 24.2% on companies over 1000 employees. American respondents, on the other hand, work in companies with more than 1000 employees. Therefore, the size of the company where respondents' works do not influence their perception of cost, quality, and monitoring reliance. Even if the company's size is an indication of the company structures to adhere to a decision or another, it is noticeable that, regardless of being a company with less number of employees, the variables exert the same impact that exert in decision makers who work in small businesses.



Table 26 – Comparison of the number of employees

SAMPLE CHARACTERISTIC					
Our Sample			David Sample		
Number of Employees					
	N	%		N	%
0	7	3,3			
0-250	84	39,8			
251-500	32	15,2			
501-750	20	9,5			
751-1000	17	8,1	Under 1000	133	43,8
1001+	51	24,2	1001+	171	56,3
Total	211	100,0	Total	304	100

Source: Elaborated by the author.

In addition to the size of the company that respondents are working, the table below shows the kind of industry they work. 43.1% of Brazilians work and 28.3% of Americans in some type of manufacture industry:

Table 27 – Industry Comparison

SAMPLE CHARACTERISTIC					
Weber Sample			Hall Sample		
Industry					
	N	%		N	%
No Working	8	3.80%	No Working		
Aerospace	1	0.50%	Aerospace	25	8.20%
Automotive	22	10.40%	Automotive	42	13.80%
Consumer Products	16	7.60%	Consumer Products	29	9.50%
High-Tech	8	3.80%	High-Tech	26	8.60%
General Manuf.	91	43.10%	General Manuf.	86	28.30%
Pharmaceutical	1	0.50%	Pharmaceutical	13	4.30%
Other	64	30.30%	Other	83	27.30%
Total	211	100.0	Total	304	100.00%

Source: Elaborated by the author.

Sample sourcing experience was also compared between each sample group. In the table below, it is possible to check the information. Actually, this study sample is basically composed of Production Engineer students. It means they are just starting to work on sourcing areas and consequently are less experienced than David's samples, who were chosen to participate in the research precisely because of their professional qualification.

Table 28 – Sourcing experience Comparison

<b>SAMPLE CHARACTERISTICS</b>					
<b>Weber Sample</b>			<b>Hall Sample</b>		
<b>Years of Sourcing Decision</b>					
	<b>N</b>	<b>%</b>		<b>N</b>	<b>%</b>
Less than 3 years	189	89.57%	Less than 3 years	16	5.30%
3-8 years	18	8.53%	3-8 years	60	19.70%
9-15 years	3	1.42%	9-15 years	102	33.60%
16 or more	1	0.47%	16 or more	126	41.40%
	211	100%		304	100.00%

Source: Elaborated by the author.

Besides the description of the characteristics of this 211 experiment respondents, we will also describe the managers we interviewed in the pre-test to validate our experiment questions in the Brazilian environment. Four managers of the sourcing area, from four different companies, which works national and internationally, in companies with more than 1001 employees of general manufacturing. These managers have more than 20 years of general experience, more than 15 on sourcing jobs on the purchase area in Brazil and abroad. They are 100% male, age ranging from 31 to 40 years old. Two of them are undergraduate, one is taking his Master Degree, and one of them is post-graduated.

The profile of these four managers may reflect the profile of the vast majority of purchase managers from Brazil, who according to studies conducted by the Procurement Business School in 2014, were 77% male professional and just 23% were women. This shows that companies still have purchasing department in a conservative model, occupied by men. They also show in their research that 50% of the purchasers are over 36 years-old, of which 82% have bachelor degree or more, as well as 46% of them working on companies with more than 1000 employees, where 53% were from general manufacturing companies, 57% have more than 5 years of sourcing experience, and 36% have worked from 1 to 5 years in this area.

This shows that purchasers from Brazil and the USA have similar profiles and are influenced by common variables to make their sourcing decision. When considering the respondents of our experiment, they have no large experience on sourcing area, but work on departments that provide, to the source area, the necessary information for planning and controlling the demand, in order to ensure the best allocation of purchases or production, to make the process more efficient, with lower costs, and to monitor these processes to those responsible to make the decision on the sourcing area.

## 6 CONCLUSIONS

This chapter presents the conclusions obtained during this study and some theoretical implications about results for Operation and Supply Chain Management. In addition, it will also explain some practical implication as well as some limitations and suggestions for future research.

The initial objective of this research was to verify how issues such as cost, quality, and monitoring of suppliers influence the behavioral decision-making process of buying as well as production managers in Brazil, as a way to compare results obtained in the American research with those obtained in Brazil.

Therefore, the results obtained in the study may answer the problem question of how issues, such as cost, quality, and monitoring of suppliers influencing production managers on their behavioral decision-making between make or buy in Brazil context, with the analyses of our respondents' answers to the experiment being applied. Thus, now it is clear that managers use to consider cost variation to decide about how much to internalize and how much to outsource, they also change their choices when quality is higher in their suppliers than inside the company and they also evaluate managers' capability to control costs over their suppliers and on their process inside the company.

Thus, the influence of cost for manager behavioral decision is relevant, because we identify that managers observe which part, if supplier or if the company, has the best cost and direct the production to the more competitive one. This results confirm what some other authors already explained (Fine and Whitney, 1996; Verma and Pullman, 1998; Butter and Linse, 2008; Gray et al., 2009), who state that managers' goal is to found a sourcing solution that keeps the lowest total price. This explains why costs are so important and why our respondents change their answers when XYZ Co. presents high cost and when presents low costs.

Following the same argument, it is possible to assume that managers are influenced by the Quality variable to make their decision between make or buy in Brazilian environment, since our respondents allocate Livero's production to the option that show the best quality. It is considered the most important drive of the sourcing decision, nevertheless when comparing to cost, monitoring and other factors seem to be more influential (Foster *et al.*, 2011).

Therefore, managers will normally feel they make the correct decision, when choosing the option of make or buy, which provides higher quality, with higher benefits with a superior quality involved (Chen et al., 2004). The theory explains that supplier's quality and inside process performance helps manager to better combine make and buy in a plural sourcing

strategy, and with this determinate the percentage to be insourced and outsourced, meaning a partial outsourcing, so companies' simultaneity makes and buys (Mantel et al., 2006). It was also clearly confirmed after data analyze that managers can simultaneous buy and make, as stated on Parmigiani's study (2007), thus the decisions are directed to outsource more when quality is better outside, and produce more inside when companies' quality and capabilities are higher than outside, estimating an optimal percentage to better combine both options.

However, contrary to our expectation about the relevance of monitoring in an uncertain context as the Brazilian one, which needs a special control as a way to prevent opportunistic actions present in our mind et, or even to control external influences on the implementation of internal processes, or any breach of contracts by suppliers, the monitoring showed no significance in the positioning of our decision-makers about the production allocation of Livero medicine. Monitoring does not show to be, in our experiment, a relevant variable for the decision making, because managers do not change they production allocation when monitoring is high or low.

By evaluating the ability to monitor supplier's or controlling the inside process, our study does not confirm several authors' explanation about monitor relevance. They state that firms whose strategy is to acquire products or service in the market have to develop skills to monitor their suppliers' performance, mainly controlling quality and cost standards (Mayer and Salomon, 2006). In this sense, our study was able to point out the significance, given by the management, to cost control.

The relevance to the quality monitoring of this medicine production, especially in a sector like the pharmaceutical, where quality control can be responsible for saving lives or lose them, was not evidenced. This liability for the consequences of actions taken may not have been considered by the respondents of this research, which could explain the lack of relevance given to the quality monitoring, mainly because they did not feel responsible for the result of the decisions taken.

Thus, it is possible to say that the specific objectives of this study were also reached. Hall's study (2012) was in fact replicated with the Brazilian decision-making. The influence of costs, quality, and monitoring was evaluated in the decision-making process. The variation of decisions are real when changing variable to High or Low in the experiment scenarios, and these results also allow for a better understanding of the decision-making process on the global sourcing scenario in Brazil.

## 6.1 LIMITATION, CONTRIBUTIONS AND SUGGESTIONS

The study of the decision-making process normally falls into manager perception and the commitment of managers to show results for the companies they work for, choosing the option that provides the best quality with the lowest possible cost. However, in studies simulating some hypothetical scenarios respondents may not have the same commitment to choose the best option, mainly when respondents are not used to evaluating such variables daily in their jobs. Therefore, a limitation of this study may be less sourcing experience respondents, although most of these Production engineer students work on industrial areas and somehow produces information to the decision makers, attempting to show the need for a deeper investigation into this subject.

As suggestion for future research is to understand why the decision-making is so conservative in their decisions in the context of global sourcing for the allocation of production, using other research methods with other samples. Maybe a focus group would help to figure out why variables such as monitoring are not considered relevant in decision-making, mainly in environments such as the Brazilian one.

Another way to follow up the research would be applying it in other environments, such as other emerging countries, to compare the Brazilian and American research, to check if what was found here may have the same support on all countries, or if the way this research was conducted influenced the outcomes, or even if the similarities in conducting business between these two countries is actually greater than their differences.

Future research may also include the Bandwagon pressure in the analysis as a way to understand if the hypotheses supported and rejected on Hall's study will have the same behavior as the other hypotheses that were coincidentally confirmed and rejected. Some other variables could be added to the study including questions about suppliers' confidence, the influence of time administration over global sourcing, due to a late answer for the decisions taken, cultural aspects as trade barriers to buying abroad, as well as lack of knowledge of customs matter and the foreign exchange instability in Brazil.

The lack of pharmaceutical knowledge among the respondents can also be characterized as a limitation for this study. Thus, a suggestion for future research could also follow into developing scenarios, simulating decision situations in a closer context for the participants.

Some other studies could be applied in a qualitative method as a way to understand these same variables: cost, quality, and monitoring trough some case studies on companies that are outsourcing and producing, and some steps of their process together, in a way to understand

how they deal with those variable and how they distribute the percentage outsourced to have the most beneficial results on their process.

As a theoretical contribution, this study helps to spread the use of the experiment, as a data collection method, in research of operations in Brazil, which has incipient uses. The description method also provides a detailed explanation of how to conduct this type of collection in research of this nature. In addition, it allows for a comparison of the decision-making process between completely different cultures, such as the American and Brazilian, with very distinctive economic situations, with institutional processes implemented and conducted in specific ways in each country, with its regulatory purposes, mainly on pharmaceutical issues. This study also improves the literature of sourcing decision, which normally focuses on the competitive advantage that can be achieved through its adoption, and this study provides some empirical contribution to understanding in what condition managers outsource more or less, giving arguments and explaining how it is conducted in Brazilian environment

The results of this study also provide managerial contributions, where the operations area managers can tailor their processes in order to better understand the variables considered in decision-making, as the influence of the cost and the monitoring of this cost, as well as the quality of supplied or produced product. In addition, working those aspects seems relevant, but that did not appear in the research as influential, such as action to monitor suppliers and processes and quality monitoring, thus being able to educate their team to validate and observe such effects before, during and after making the decision between purchasing and production.

It was clear in this study that the manager considers as relevant the most important condition on almost all decision: cost and quality. Those variables are taught, from an early age, as determinants on individual choices, whether this happens in business or personal level. Moreover, the variable monitoring sometimes follow into the lack of information by people and the difficulty to control it outside the companies' boundaries.

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## APPENDIX A – ORIGINAL EXPERIMENT QUESTIONS

### The Sourcing Decision Exercise

**YOUR ROLE:** *You are a sourcing manager at Alpha Pharmaceuticals. Alpha Pharma has just successfully completed clinical trials on a new proprietary drug, Livero. Livero has been approved by the Food & Drug Administration (FDA). However, Alpha Pharma has not done full-scale manufacturing of Livero.*

*Your task as the sourcing manager will be to make the Livero sourcing decision for Alpha Pharma. It is up to you to decide whether to manufacture Livero internally, outsource to XYZ Co or choose a mixture of in-house and contract production. Furthermore, you have been given full authority to make this choice. There are no ‘correct’ answers, so please respond based upon what you believe to be the best option.*

Please read the following scenario and answer the subsequent questions based upon your understanding of what you just read. Again, there are no ‘wrong’ answers. *Additional space is provided for your questions and comments. Your participation is voluntary and strictly confidential.*

#### ***Background information on the pharmaceutical industry***

The pharmaceutical industry currently faces the following challenges:

- Increasing demand for pharmaceuticals.
- Intellectual property rights allow innovative drugs (patented) to be licensed or produced exclusively.
- New process technology and product offerings are common.
- Competitive pressure to provide high return on assets, equity, and revenues.
- Low switching costs and multiple drugs within a category allow for customer substitution.
- Brand image, company reputation, and consumer trust are critical to achieving and maintaining market share.
- The pharmaceutical industry is highly regulated.
- Companies are required to track conformance quality as well as undergo production site inspections.
- The industry is facing greater price controls and negotiated drug prices.

#### ***Alpha Pharma***

Alpha Pharma is a pharmaceutical company that innovates and brings drugs to the market.

- To compete, Alpha Pharma has to be able to commercially produce high quality drugs at low cost.
- Cost is a competitive priority because drugs are selected based on cost and patient benefit.
- Quality is a competitive priority because switching costs are low, brand image is a driver of sales, and the cost of a drug recall is high.
- Any sourcing decision at Alpha Pharma must consider cost and quality priorities.

Questions about your understanding of the scenario. Please refer back to the scenario if you need to.

**1. How would you rate cost as a priority for Alpha Pharma?**

Low  Somewhat Low  Neither  Somewhat High  High  Do not Know

**2. How would you rate quality as a priority for Alpha Pharma?**

Low  Somewhat Low  Neither  Somewhat High  High  Do not Know

**3. Livero requires investment in a unique production system and specific assets.**

Disagree  Somewhat Disagree  Neither  Somewhat Agree  Agree  Do not Know

**4. Livero's production technology may change over time.**

Disagree  Somewhat Disagree  Neither  Somewhat Agree  Agree  Do not Know

**5. XYZ Co has lower costs than Alpha Pharma.**

Disagree  Somewhat Disagree  Neither  Somewhat Agree  Agree  Do not Know

**6. XYZ Co has lower quality than Alpha Pharma.**

Disagree  Somewhat Disagree  Neither  Somewhat Agree  Agree  Do not Know

**7. How subjective is the process that Alpha Pharma uses to evaluate the performance of XYZ Co?**

Subjective  Somewhat Subjective  Neither  Somewhat Objective  Objective  Do not Know

**8. To what degree is Alpha Pharma able to determine the production costs of XYZ Co?**

Unable  Somewhat Unable  Neither  Somewhat Able  Able  Do not Know

**9. To what degree is Alpha Pharma able to determine quality standards and specifications are adhered to by XYZ Co?**

Unable  Somewhat Unable  Neither  Somewhat Able  Able  Do not Know

As the sourcing manager, it is your responsibility to choose where Livero is produced.

**Scenario 1: As the sourcing manager, you are forced by circumstances outside of your control to use Alpha Pharma to produce Livero. How aligned is the decision to produce Livero using Alpha Pharma with Alpha Pharma's capabilities?**

- Very Unaligned   
  Unaligned   
  Somewhat Unaligned   
  Neither Aligned nor Unaligned   
  Somewhat Aligned   
  Aligned   
  Very Aligned

**Given that Alpha Pharma is used, what is your perception of Livero's supply risk?**

- Very Low   
  Low   
  Somewhat Low   
  Moderate   
  Somewhat High   
  High   
  Very High

**Given that Alpha Pharma is used, what is your perception of Alpha Pharma's financial and operational benefit?**

- Very Low   
  Low   
  Somewhat Low   
  Moderate   
  Somewhat High   
  High   
  Very High

**Scenario 2: As the sourcing manager, you are forced by circumstances outside of your control to use XYZ Co. to produce Livero. How aligned is the decision to produce Livero using XYZ Co. with XYZ Co.'s capabilities?**

- Very Unaligned   
  Unaligned   
  Somewhat Unaligned   
  Neither Aligned nor Unaligned   
  Somewhat Aligned   
  Aligned   
  Very Aligned

**Given that XYZ Co. is used, what is your perception of Livero's supply risk?**

- Very Low   
  Low   
  Somewhat Low   
  Moderate   
  Somewhat High   
  High   
  Very High

**Given that XYZ Co. is used, what is your perception of Alpha Pharma's financial and operational benefit?**

- Very Low   
  Low   
  Somewhat Low   
  Moderate   
  Somewhat High   
  High   
  Very High

**Scenario 3: As the sourcing manager, where would you choose to have Livero produced?**

- Alpha Pharma   
  XYZ Co

**Given your choice, as sourcing manager, what is your perception of Livero's supply risk?**

- Very Low   
  Low   
  Somewhat Low   
  Moderate   
  Somewhat High   
  High   
  Very High

**Given your choice, as sourcing manager, what is your perception of Alpha Pharma's financial and operational benefit?**

- Very Low
- Low
- Somewhat Low
- Moderate
- Somewhat High
- High
- Very High

**Scenario 4: As the sourcing manager, you can allocate production of Livero between Alpha Pharma and XYZ Co. How should production be allocated between Alpha Pharma & XYZ Co?**

- |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 100%                  | 90%                   | 80%                   | 70%                   | 60%                   | 50%                   | 40%                   | 30%                   | 20%                   | 10%                   | 0%                    |
| XYZ Co                | XYZ Co                | XYZ Co                | XYZ Co                | XYZ Co                | XYZ Co                | XYZ Co                | XYZ Co                | XYZ Co                | XYZ Co                | XYZ Co                |
| 0%                    | 10%                   | 20%                   | 30%                   | 40%                   | 50%                   | 60%                   | 70%                   | 80%                   | 90%                   | 100%                  |
| Alpha Pharma          | Alpha Pharma          | Alpha Pharma          | Alpha Pharma          | Alpha Pharma          | Alpha Pharma          | Alpha Pharma          | Alpha Pharma          | Alpha Pharma          | Alpha Pharma          | Alpha Pharma          |

**Given your choice, as sourcing manager, what is your perception of Livero’s supply risk?**

- Very Low
- Low
- Somewhat Low
- Moderate
- Somewhat High
- High
- Very High

**Given your choice, as sourcing manager, what is your perception of Alpha Pharma’s financial and operational benefit?**

- Very Low
- Low
- Somewhat Low
- Moderate
- Somewhat High
- High
- Very High

**Scenario 5: As the sourcing manager, you find out that Alpha Pharma’s competitors are outsourcing similar production to contract manufacturers. How should production be allocated between Alpha Pharma & XYZ Co?**

- |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 100%                  | 90%                   | 80%                   | 70%                   | 60%                   | 50%                   | 40%                   | 30%                   | 20%                   | 10%                   | 0%                    |
| XYZ Co                | XYZ Co                | XYZ Co                | XYZ Co                | XYZ Co                | XYZ Co                | XYZ Co                | XYZ Co                | XYZ Co                | XYZ Co                | XYZ Co                |
| 0%                    | 10%                   | 20%                   | 30%                   | 40%                   | 50%                   | 60%                   | 70%                   | 80%                   | 90%                   | 100%                  |
| Alpha Pharma          | Alpha Pharma          | Alpha Pharma          | Alpha Pharma          | Alpha Pharma          | Alpha Pharma          | Alpha Pharma          | Alpha Pharma          | Alpha Pharma          | Alpha Pharma          | Alpha Pharma          |

**Given your choice, as sourcing manager, what is your perception of Livero’s supply risk?**

- Very Low
- Low
- Somewhat Low
- Moderate
- Somewhat High
- High
- Very High

**Given your choice, as sourcing manager, what is your perception of Alpha Pharma’s financial and operational benefit?**

- Very Low
- Low
- Somewhat Low
- Moderate
- Somewhat High
- High
- Very High



**Scenario 6: As the sourcing manager, you find out that that majority of firms in Alpha Pharma’s industry are outsourcing similar production to contract manufacturers. How should production be allocated between Alpha Pharma & XYZ Co?**

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	0%
XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ	XYZ
Co	Co	Co	Co	Co	Co	Co	Co	Co	Co	Co
0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Alpha	Alpha	Alpha	Alpha	Alpha	Alpha	Alpha	Alpha	Alpha	Alpha	Alpha
Phar	Phar	Phar	Phar	Phar	Phar	Phar	Phar	Phar	Phar	Phar
ma	ma	ma	ma	ma	ma	ma	ma	ma	ma	ma

**Given your choice, as sourcing manager, what is your perception of Livero’s supply *risk*?**

<input type="radio"/> Very Low	<input type="radio"/> Low	<input type="radio"/> Somewhat Low	<input type="radio"/> Moderate	<input type="radio"/> Somewhat High	<input type="radio"/> High	<input type="radio"/> Very High
--------------------------------	---------------------------	------------------------------------	--------------------------------	-------------------------------------	----------------------------	---------------------------------

**Given your choice, as sourcing manager, what is your perception of Alpha Pharma’s financial and operational *benefit*?**

<input type="radio"/> Very Low	<input type="radio"/> Low	<input type="radio"/> Somewhat Low	<input type="radio"/> Moderate	<input type="radio"/> Somewhat High	<input type="radio"/> High	<input type="radio"/> Very High
--------------------------------	---------------------------	------------------------------------	--------------------------------	-------------------------------------	----------------------------	---------------------------------

**Please tell us a little bit about yourself and your current employer. Your feedback, answers, and identity will be anonymous and kept confidential. If a question does not apply to you please leave it blank. Thank you for your participation.**

**10. What is your current or most recent job title? \_\_\_\_\_**

**11. How many years of experience have you had in a sourcing related role? \_\_\_\_\_**

**12. How many total years of work experience do you have? \_\_\_\_\_**

**13. What is your highest level of education? Please mark the most appropriate choice.**

<input type="radio"/> High School	<input type="radio"/> Associate’s Degree	<input type="radio"/> Bachelor’s Degree	<input type="radio"/> Master’s Degree	<input type="radio"/> Doctorate
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**14. What is your age?**

20 & under    21-30    31-40    41-50    51-60    61-70    71+

**15. What is your gender?                       Female                       Male**

**16. Which category below best describes the industry where you currently work or most recently have worked? Please circle only one.**

- h) Aerospace
- i) Automotive
- j) Consumer Products
- k) High-Tech
- l) General Manufacturing
- m) Pharmaceutical
- n) Other, please specify\_\_\_\_\_

**17. What is the approximate number of employees in your business unit where you currently work or most recently have worked?**

- 0-250       251- 500       501-750       751-1000       1001+

**APPENDIX B – EXPERIMENT - PORTUGUESE VERSION – APPLIED IN BRAZIL****Exercício de Decisão de Compra**

**SEU PAPEL:** *Você é gerente de compras na Alpha Pharmaceuticals. A Alpha Pharma concluiu recentemente testes clínicos com um novo medicamento patenteado, chamado Livero. Livero foi aprovado pela Agência Nacional de Vigilância Sanitária (ANVISA). No entanto, a Alpha Pharma ainda não iniciou a produção do Livero em larga escala.*

*Sua tarefa como gerente de compras será de tomar a decisão de produção do Livero para a Alpha Pharma. Cabe a você decidir como produzir o Livero internamente, terceirizar para a XYZ Co ou escolher uma mistura de produção própria e produzir por contrato. Foi dada a você total autonomia para tomar esta decisão. Não existem respostas corretas, então por favor, responda baseado naquilo em que você acredita ser a melhor opção.*

*Por favor, leia o cenário a seguir e responda às questões subsequentes baseado em seu entendimento sobre a leitura. Reforçando que não há respostas erradas. Foi colocado um espaço adicional para suas perguntas e comentários. Sua participação é voluntária e estritamente confidencial.*

***Informações sobre a indústria farmacêutica***

A indústria farmacêutica depara-se atualmente com os seguintes desafios:

- Aumento de demanda para produtos farmacêuticos.
- Direitos de propriedade intelectual permitem que medicamentos inovadores (patenteados) sejam licenciados ou produzidos de forma exclusiva.
- Disponibilidade de novas tecnologias de processos e produtos são comuns.
- Pressão da concorrência para fornecer alto retorno sobre ativos, patrimônio e receitas.
- Baixo custo de trocas de vários medicamentos, permitindo a substituição por parte dos clientes.
- Imagem da marca, reputação de empresa e confiança do consumidor são decisivos para o alcance e a manutenção do *market share*.
- A indústria farmacêutica é altamente regulada.
- As empresas devem controlar a qualidade conforme normas estabelecidas podendo sofrer inspeções nos locais de produção.
- A indústria farmacêutica enfrenta acentuado controle de preços e negociação de preço dos medicamentos.

***Alpha Pharma***

Alpha Pharma é uma empresa farmacêutica que inova e desenvolve medicamentos para o mercado.

- Para competir, a Alpha Pharma precisa produzir comercialmente medicamentos de alta qualidade com baixos custos.
- O custo é uma prioridade competitiva já que os clientes selecionam os medicamentos baseados em seu custo-benefício.

- Qualidade é uma prioridade competitiva já que os custos de troca são baixos, a imagem da marca é essencial para as vendas e o custo da retirada do medicamento do mercado é alto.
- Qualquer decisão de produção na Alpha Pharma deve considerar prioritariamente o custo e a qualidade do *Livero*.
- O Livero requer um sistema de produção sob medida para atender às necessidades operacionais específicas.
- A implementação de um Sistema de produção único irá demandar tempo e recursos significativos para treinamento e desenvolvimento de pessoal.
- A tecnologia de produção do Livero é incerta e pode mudar com o tempo.
- Futuras melhorias na tecnologia poderão tornar a atual obsoleta.
- Alpha Pharma e XYZ Co têm capacidade de produzir o Livero.
- Alpha Pharma e XYZ Co possuem economias de escala similares.

### ***XYZ Co***

A Alpha Pharma examinou várias organizações com potencial para firmar contratos para produção de seus medicamentos. Atualmente, estão avaliando uma organização em particular: a *XYZ Co*.

- A XYZ Co possui capacidades similares às das empresas concorrentes da Alpha Pharma.
- A Alpha Pharma solicitou e recebeu relatórios de custos e qualidade da XYZ Co.
- A Alpha Pharma obteve registros de inspeções públicos da XYZ Co através da ANVISA.

Como gerente de compras, você acaba de receber as seguintes informações:

***Questões relativas ao seu entendimento da situação proposta. Se necessário, volte a ler a situação.***

**1. Como você classificaria a importância do custo para a Alpha Pharma?**

Baixo    Relativamente baixo    Indiferente    Relativamente alto    Alto    Não sei

**2. Como você classificaria a importância da qualidade para a Alpha Pharma?**

Baixo    Relativamente baixo    Indiferente    Relativamente alto    Alto    Não sei

**3. O Livero necessita de investimentos em um único sistema de produção e ativos específicos.**

Discordo    Discordo parcialmente    Indiferente    Concordo parcialmente    Concordo    Não sei

**4. A tecnologia para produção do Livero pode mudar com o tempo.**

Discordo    Discordo parcialmente    Indiferente    Concordo parcialmente    Concordo    Não sei

**5. A XYZ Co possui custos menores do que a Alpha Pharma.**

Discordo    Discordo parcialmente    Indiferente    Concordo parcialmente    Concordo    Não sei

**6. A XYZ Co possui qualidade inferior a Alpha Pharma.**

Discordo    Discordo parcialmente    Indiferente    Concordo parcialmente    Concordo    Não sei

**7. O quão subjetivo é o processo que a Alpha Pharma utiliza para avaliar a performance da XYZ Co?**

Subjetivo    Relativamente subjetivo    Indiferente    Relativamente objetivo    Objetivo    Não sei

**8. Até que ponto a Alpha Pharma está apta a determinar os custos de produção da XYZ Co?**

Inapta    Relativamente inapta    Indiferente    Relativamente apta    Apta    Não sei

**9. Até que ponto a Alpha Pharma está apta a determinar se o padrão de qualidade e especificações são respeitados pela XYZ Co?**

Inapta    Relativamente inapta    Indiferente    Relativamente apta    Apta    Não sei

**Como gerente de compras, é sua responsabilidade escolher onde o Livero é produzido.**

**Situação 1: Como gerente de compras, você é forçado por algumas circunstâncias fora de seu controle, a utilizar a Alpha Pharma para produzir o Livero. O quão alinhada é a decisão de produzir o Livero utilizando a Alpha Pharma e com as capacidades da Alpha Pharma?**

Muito desalinhada   
 Desalinhada   
 Parcialmente desalinhada   
 Nem alinhada nem desalinhada   
 Parcialmente alinhada   
 Alinhada   
 Muito alinhada

**Levando em consideração que a Alpha Pharma está sendo utilizada, qual é sua percepção em relação ao risco de abastecimento do Livero no mercado?**

Muito baixo   
 Baixo   
 Relativamente baixo   
 Moderado   
 Relativamente alto   
 Alto   
 Muito alto

**Levando em consideração que a Alpha Pharma está sendo utilizada, qual é a sua percepção sobre os benefícios financeiros e operacionais para a Alpha Pharma?**

Muito baixo   
 Baixo   
 Relativamente baixo   
 Moderado   
 Relativamente alto   
 Alto   
 Muito alto

**Situação 2: Como gerente de compras, você é forçado por algumas circunstâncias fora de seu controle, a usar a XYZ Co. para produzir o Livero. O quão alinhada é a decisão de produzir o Livero utilizando a XYZ Co. e com as capacidades da XYZ Co.?**

Muito desalinhada   
 Desalinhada   
 Parcialmente desalinhada   
 Nem alinhada nem desalinhada   
 Parcialmente alinhada   
 Alinhada   
 Muito alinhada

**Levando em consideração que a XYZ Co. está sendo utilizada, qual é sua percepção em relação ao risco de abastecimento do Livero no mercado?**

Muito baixo   
 Baixo   
 Relativamente baixo   
 Moderado   
 Relativamente alto   
 Alto   
 Muito alto

**Levando em consideração que a XYZ Co. está sendo utilizada, qual é a sua percepção sobre os benefícios financeiros e operacionais para a Alpha Pharma?**

Muito baixo   
 Baixo   
 Relativamente baixo   
 Moderado   
 Relativamente alto   
 Alto   
 Muito alto

**Situação 3: Como gerente de compras, onde você escolheria o local de produção do Livero?**

Alpha Pharma   
 XYZ Co

**Levando em consideração sua escolha, como gerente de compras, qual a sua percepção em relação ao risco de abastecimento do Livero no mercado?**

Muito baixo   
 Baixo   
 Relativamente baixo   
 Moderado   
 Relativamente alto   
 Alto   
 Muito alto

**Levando em consideração sua escolha, como gerente de compras, qual é a sua percepção sobre os benefícios financeiros e operacionais para a Alpha Pharma?**

Muito baixo   
 Baixo   
 Relativamente baixo   
 Moderado   
 Relativamente alto   
 Alto   
 Muito alto



0%      10%      20%      30%      40%      50%      60%      70%      80%      90%      100%  
 Alpha   Alpha   Alpha   Alpha   Alpha   Alpha   Alpha   Alpha   Alpha   Alpha   Alpha  
 Pharma   Pharma   Pharma   Pharma   Pharma   Pharma   Pharma   Pharma   Pharma   Pharma   Pharma

**Levando em consideração a sua escolha, como gerente de compras, qual a sua percepção em relação ao risco de abastecimento do Livero no mercado?**

Muito baixo       Baixo       Relativamente baixo       Moderado       Relativamente alto       Alto       Muito alto

**Levando em consideração a sua escolha, como gerente de compras, qual é a sua percepção sobre os benefícios financeiros e operacionais para a Alpha Pharma?**

Muito baixo       Baixo       Relativamente baixo       Moderado       Relativamente alto       Alto       Muito alto

**Conte-nos um pouco a respeito de você e seu atual empregador. Suas impressões, respostas e sua identificação serão tratadas de forma anônima e com completo sigilo. Se alguma pergunta não se aplicar à sua realidade, deixa-a em branco. Obrigado por sua participação.**

**10. Qual seu atual ou mais recente cargo?** \_\_\_\_\_

**11. Quantos anos de experiência você possui na área de compras?** \_\_\_\_\_

**12. Quantos anos de experiência você possui no mercado de trabalho em geral?** \_\_\_\_\_

**13. Qual o seu nível de escolaridade? Por favor, marque a alternativa correspondente.**

Nível Médio       Tecnólogo       Superior completo       Mestrado       Doutorado

**14. Qual a sua idade?**

Até 20     21-30     31-40     41-50     51-60     61-70     71+

**15. Qual seu sexo?**                       Feminino                       Masculino

**16. Qual das opções abaixo melhor descreve o ramo de atuação da empresa em que você trabalha atualmente ou trabalhou recentemente? Selecione somente um.**

- a) Aeroespacial
- b) Automotivo
- c) Bens de consumo
- d) Alta tecnologia
- e) Indústria em geral
- f) farmacêutica
- g) Outro, favor especificar \_\_\_\_\_

**17. Qual é o número aproximado de empregados da unidade da empresa em que você trabalha atualmente ou trabalhou recentemente?**



0-250       251- 500       501-750       751-1000       1001+

**Por favor responda as questões abaixo com base em sua experiência:**

**18. Dada a sua experiência de trabalho qual é a sua impressão sobre contratos de manufatura?**

Muito Pobre     Pobre     Meio pobre     Neutra     Quase Boa     Boa     Muito Boa

**19. A situação de terceirização descrita neste exercício foi realista?**

Discordo fortemente     Discordo     Indiferente     Concordo     Concordo fortemente

**20. Eu levei meu papel neste exercício a sério.**

Discordo fortemente     Discordo     Indiferente     Concordo     Concordo fortemente

**21. Em meu atual ou mais recente trabalho vivenciei os assuntos discutidos neste exercício**

Discordo fortemente     Discordo     Indiferente     Concordo     Concordo fortemente

**22. Por favor indique o nível de conhecimento que você possui sobre o tema discutido neste estudo.**

Não tenho conhecimento     Pouco conhecimento     Algum conhecimento     Bastante conhecimento     Extenso conhecimento

**23. Por favor informe seus dados para contato:**

## APENDIX C - SAMPLE CARGO DESCRIPTION

### Cargo

Description	N	Percentual
Production Manager	23	10.9
Production Assistant	21	10.0
Intern	19	9.0
Quality Analyst	16	7.6
Industrial Maintenance	14	6.6
Administrative assistant	11	5.2
Production Egeeneering	10	4.7
Purchaser	9	4.3
PPCP Programmer	9	4.3
Sales	8	3.8
Students	8	3.8
Businessmen	7	3.3
Logistics	7	3.3
Planning	5	2.4
Research & Development	5	2.4
Process Analyst	4	1.9
Draftsman	3	1.4
Work Security	3	1.4
Cost Analyst	2	.9
Consultant	2	.9
Lab	2	.9
Petrochemical Technician	2	.5
Implementing analist	1	.5
Material and process analist	1	.5
Product Analyst	1	.5
Project Analyst	1	.5
Technical Analist	1	.5
Warehouse Assistant	1	.5

Pendencies Assistant	1	.5
Bank teller	1	.5
Commerce	1	.5
Designer	1	.5
Account Manager	1	.5
Quality Manager	1	.5
Hospital Clinner	1	.5
Modelist	1	.5
Budget officer	1	.5
Mechanical technician	1	.5
Secretary	1	.5
Metrology technician	1	.5
Chemistri Technician	1	.5
Process Technician	1	.5
Product Technician	1	.5
<b>Total</b>	<b>188</b>	<b>88.6</b>