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**The relationship between social and environmental practices with operational capabilities**

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*Abstract: In addition to the pressure for increasing operational performance, companies should develop sustainable policies. Based on the resource-based theory, the authors propose a theoretical model that analyzes the relation between operational and sustainable practices with operational capabilities in order to satisfy social and environmental objectives and winning orders competitive criteria.*

## **1 INTRODUCTION**

The beginning of the twenty-first century has been marked by the constant influence and demand from stakeholders – governments, unions, NGOs, shareholders, suppliers, customers, consumers, users and also the community - together with organizations, to satisfy social and environmental norms and standards in addition their role of being financially viable. That is, they must fulfill the three dimensions that make up the concept of corporate sustainability (DYLLICK & HOCKERTS, 2002; ELKINGTON, 1998; KLEINDORFER et al., 2005; LINTON et al., 2007).

Thus, with the control of management processes, an understanding of previously relegated organizational activities, such as knowledge of the byproducts of the production process, the possibility of reutilization of these as well as refurbishing and perhaps even recycling is required. Simultaneously, it is important to analyze not only the costs of inputs, but also total cost, as well as the need for deployment, management and control of environmental management systems and communication channels with stakeholders (CARTER & ROGERS, 2008; GOLD et al., 2010; LINTON et al., 2007; SEURING & MULLER, 2008).

In this scenario, the manufacturing strategy plays a key role in helping organizations achieve those criteria considered as “order winning” (HAYES & WHEELWRIGHT, 1984; SKINNER, 1969; VOSS, 1995). To this end, it is clear that to achieve the goals set by the organization to meet the needs of customers, the continuous development and improvement of

practices that lead to the development of operational capabilities should be performed (NARASIMHAN et al., 2005; VOSS, 1995).

In this way, the implementation of best practices and skill development promote the increase of organization operational performance and provide a competitive edge against competitors by presenting valuable, rare, irreplaceable and hard to imitate factors (HAYES & WHEELWRIGHT, 1984; HAYES & PISANO, 1996).

However, it is noteworthy that the investment required for the implementation of social and environmental practices may represent an increase in costs and decline in operational performance (CARTER & ROGERS, 2008; PAGELL & WU, 2009; PARMIGIANI et al., 2011; PULLMAN et al., 2009; SARKIS & CORDEIRO, 2001).

Therefore, the relevance of this work may be verified by the opportunity to evaluate and contribute, within the theme of manufacturing strategy, the relationships and synergies in operational practices, capabilities and operational performance within a socio-environmental context. The theoretical framework used is the Resource-Based Theory (RBT) to show the role of resources and capabilities in organizational strategy (BARNEY, 1991; SCHROEDER et al., 2002; WERNERFELT, 1984).

So the aim of this study was to conduct a research about the relation between operational and sustainable practices with operational capabilities in order to satisfy social and environmental objectives and winning orders competitive criteria and after that, presented a conceptual model. The research conducted can be classified as being of a descriptive and exploratory.

The following topics are offered: first at all, expose an organizational theory that will support the actions of managers. After that, show how to enhance performance and relate social and environmental practices to the operational capabilities of the manufacturing area. The third topic shows the framework and the hypotheses about the relationship between the

constructs of practices and operational capabilities and operational performance under social and environmental objectives. At the end, show implications for future research.

## **2 BACKGROUND**

Studies, in management area, use the organizational theories to judge the relationship along supply chain or into the organization about relationship, behavior or structures (KETCHEN & HULT, 2007; CARTER & ROGERS, 2008; SARKIS et al., 2011). Thus, this topic covers the Resource-Based Theory (RBT) and its extension, the Natural Resource-Based View (NRBV) of the organization, recognizing the assumptions, delimitations and the type of environmental analysis in the search for a sustainable competitive advantage.

### **2.1 Resource-Based Theory – RBT**

The study of resources and capabilities in the area of manufacturing strategy is anchored to the Resource-Based Theory (RBT). (BARNEY, 1991; GRANT, 1991; SCHROEDER et al., 2002; WERNERFELT, 1984; WU et al., 2010).

Studies on RBT arise from business strategy, which explains that resources influence the dynamics of the organization and may even limit its expansion when they are insufficient to achieve a particular goal (PENROSE, 1959).

In this context, the authors in the field of operation strategy report on the company's resources as elements that are owned or controlled by a company which represent the inputs to the manufacturing process. According to the studies, these features can be classified as tangible (financial and physical), intangible (technology, reputation and culture) or human (capabilities and expertise, communication and motivation) (AMIT & SCHOEMAKER, 1993; GRANT, 1991; WERNERFELT, 1984). In this sense, these features are idiosyncratic to the organization, i.e., they are private and independent from the sector and the scenario and it is precisely these features that determine the differences in competitiveness levels.

The next step is to recognize how to use these resources more efficiently than the competitors (AMIT & SCHOEMAKER, 1993; GRANT, 1991; TEECE & PISANO, 1994). Thus, capabilities are the capacity the company to improvement the resource and that are used in the process of transformation of resources (inputs for finished products), combining tangible and intangible processes and can be develop over a period (AMIT & SCHOEMAKER, 1993; GRANT, 1991; PARMIGIANI et al., 2011).

With this in mind, capabilities represent what is learned related to manufacturing processes and / or care for the coordination of suppliers in setting quality standards, shortest lead-time, development of new products and new technologies and the complex social interactions between the resources of a company (AMIT & SCHOEMAKER, 1993). Consequently, for these features to enable a sustainable competitive advantage for the organization, the capabilities should offer certain criteria, such as: (i) value, (ii) with few substitutes, (iii) rare, and (iv) difficult to imitate (BARNEY, 1991; GRANT, 1991; HART, 1995; WERNERFELT, 1984).

According to Barney (1991), for resources to be valuable, they should provide mechanisms to improve process efficiency and effectiveness of the organization - meet the needs of customers - and neutralize threats from competitors simultaneously.

As for the justification of the difficulty of replication, this is due to the fact that the development of these resources involves tacit knowledge, based on information generated by learning and practice, and may even be enhanced by experience, and thus considered intangible. Additionally, another factor that confirms difficulty of replication and replacement is the fact that these can be evaluated as socially complex as they involve a large number of people, or teams, who must work in coordination, since only few individuals are aware of the whole process (BARNEY, 1991).

Hence, these resources correspond to the strengths of a company against competitors, generating value that cannot be adopted by current and potential competitors, therefore, creating a competitive advantage (BARNEY, 1991; GRANT, 1991; WERNERFELT, 1984).

From this perspective, these authors challenge the proposal that differentiation between companies would be accomplished by establishing a framework for the industry and conduct of agents, ensuring superior performance (PORTER, 1980). Additionally, these studies adopt a generic strategic approach, examining criteria for cost leadership and differentiation strategies that produce above standard profits (WHITE, 1986).

Because of the greater complexity of the subject, this will be described the Natural Resource Based View (NRBV) of the organization evidencing the importance of environmental practices and impacts on the superior performance (HART, 1995; RUSSO & FOUTS, 1997; VACHON & KLASSEN, 2008).

#### **2.1.1.1 Natural-Resource-Based View of the firm (NRBV)**

In an assessment of the environment in which the organization operates, highlighting the pressures from various sectors - governments, unions, NGOs, shareholders, suppliers, customers, consumers, users and also the community - we show the development of the Natural Resource Based View theory (NRBV) of the organization based on the assumptions of the Resource Based Theory (RBT) of the organization (HART, 1995). Relying on assumptions of the RBT, whereby a company's competitive advantage stems from the presence of a valuable, rare, hard to replace and copy resource, it can be stated that environmental strategies can provide that opportunity (HART, 1995; RUSSO & FOUTS, 1997; VACHON & KLASSEN, 2008; ZHU & SARKIS, 2004).

To justify these assumptions, Hart (1995) argues that environmental technologies can be divided into two groups: first, about the mechanisms of pollution control, and the other on prevention practices. For instance, regarding pollution control, this group includes

investments in equipment for waste treatment and emission control from the production process (HART, 1995). Prevention practices include activities to reduce emissions and effluents, modification or adoption of environmentally sound practices, material substitution, recycling and innovations in the manufacturing process (HART, 1995).

Thus, in order to make empirical studies, the area of operations strategy has been based on RBT to evaluate how the heterogeneity in competitive performance of companies happens through knowledge of the degree of implementation of practices and capabilities in the area of manufacturing, such as total preventive maintenance (TPM), just-in-time (JIT), total quality management (TQM) and human resource management (HRM) (FLYNN et al. 1995; KETOKIVI & SCHROEDER, 2004; POWELL, 1995; SHAH & WARD, 2003). Teece and Pisano (1994) show that organizations should not be viewed only as resources, but as a collection of capabilities and skills that must be managed, evaluated, developed and built. This topic will be presented below.

## **2.2 Enabling superior performance**

The previous presentation of the Resource-Based Theory (RBT) proposes that organizations are a bundles of resources and capabilities, and, accordingly, in order to attain a competitive advantage, these elements must be valuable, rare, not imitable and not substitutable (VRIN) (BARNEY, 2001). However organizational theories are ambiguous in defining the ways to achieve these rare, valuable, non-imitable and not substitutable resources and therefore gain a competitive advantage (PRIEM & BUTLER, 2001).

In this scenario, still according to Priem and Butler (2001), they validate the relevance of the empirical approach to understanding the theories and make them generalized, and not a spurious event. In this sense, the authors state that the RBT does not expose the mechanisms that differentiate the strategic resources from non-strategic ones and does not distinguish between the concepts of "value" and "competitive advantage".

In this sense, practices and organizational capabilities are exposed, which represent ways to improve the coordination and promotion of the manufacturing area resources for them to be used in such a way that meets the desired conditions (VRIN) (FLYNN et al., 1995; GAGNON, 1999; KETOKIVI & SCHROEDER, 2004; POWELL, 1995; SHAH & WARD, 2003; WU et al., 2010). Thus, we seek to validate the paradigm of "best practices" which is directly related to the question of implementation of best practices to meet the performance of world-class organizations (GAGNON, 1999).

### **2.2.1 Operational practices**

Studies on manufacturing strategy (best practices and competing through manufacturing paradigms) seek to examine under what conditions the infrastructure and structure can offer better performance, and if it is possible, a sustainable advantage (VOSS, 1995).

Voss et al. (1997) validate the interest in studies on the practical and operational capabilities and the impact on operational performance are supported by the fact that other organizations may offer new strategies through prior learning and / or taking advantage of benchmarking. In this sense, the decisions of managers on investment and implementation of structural policies should seek competitive priorities that meet customer needs.

In this context, the seminal study on the operational practices of manufacturing is related to the work of Hayes and Wheelwright (1984), which relates six essential practices to achieve excellence in manufacturing and ensure superior performance compared to competitors, and termed as "best practices". They are: (i) develop the capabilities and competencies of the workforce, (ii) ensure management through technical competence, (iii) offer the products compliance standards, (iv) develop a culture of labor participation in management, (v) invest in proper equipment and preventive maintenance and, finally, (vi) ensure the continuous improvement of processes and meet customers' needs.

Thus, operational practices refer to specific activities, procedures and routines which aim to achieve a specific objective (FLYNN et al., 1995, p. 1326). Voss et al. (1997) set out the operational practices and procedures established by the organization to improve operational routine, ranging from organizational aspects such as encouraging team work and even incentives for the use of management techniques such as *kanban*.

However, operational practices and procedures stand out as standard elements with the possibility of being copied by competitors (SWINK et al., 2005). Thus, we cannot say that the operational practices provide better levels of performance than competitors and therefore a competitive advantage (DEAN & SNELL, 1996; POWELL, 1995).

### **2.2.2 Social and environmental practices**

From the perspective of stakeholders, companies considered as focal in the supply chain are responsible for the practices and for both environmental and social performance, not only of its own, but also of suppliers and customers such as wholesalers and retailers. Thus, meeting these social and environmental demands is still an emerging theme for the area of operations strategy (CARTER & ROGERS, 2008; LINTON et al., 2007; PAGELL et al., 2010; PARMIGIANI et al., 2011; PAULRAJ, 2011).

Corbett and Klassen (2006) confirm that the relationship between these topics – social and environmental practices and operations strategy – is due to the fact that the productive system makes use of resources and has in the process components - inputs, transformation, output of goods, services and waste - the mechanisms to achieve best practices and improve performance levels.

In this scenario, sustainability extends the concept of the production process to a larger system, that is, the management of the supply chain and not only the manufacturing a specific product stage (KLEINDORFER et al., 2005). In this condition, this article will use the concept of sustainability:

The design and operation of systems that ensure that mankind make use of natural resources as long as it does not lead to a decreased quality of life, be it by loss of economic opportunities or negative impacts on social conditions, human health and the environment (MIHELICIC et al., 2003, p. 5315).

It is worth noting that most studies on sustainability have addressed only the environmental and economic issues (SEURING & MULLER, 2008), neglecting the third pillar, the social aspect, which is also part of the Triple Bottom Line (3BL) (ELKINGTON, 1998). Therefore, this work will go into further details on the environmental and social practices below.

### **2.2.2.1 Environmental practices**

To meet the environmental demands, from a top-down perspective, decisions are made from the analysis of corporate strategy for structural investments in infrastructure as well as inter-functional and inter-organizational integration (KLASSEN & WHYBARK, 1999; ROSENZWEIG & EASTON, 2010; SARKIS, 1995; SHRIVASTAVA, 1995; VACHON & KLASSEN, 2008).

Accordingly, to meet part of these demands, environmental technologies are presented that can be divided into two groups: pollution control mechanisms and prevention practices (HART, 1995). These seek to limit or reduce the negative impacts of a product or service on the natural environment, exemplified by three topics: (i) Investments in best practices ranging from international standards, ISO 14001 for example, to collaborative activities with suppliers which propose changes to the products and also the process, researching technologies that prevent pollution (DARNALL et al., 2008); (ii) management systems, with investments characterized as infrastructure, with the intention of standardizing the disclosure of results to stakeholders, proposing innovations that meet their needs and expectations, such as the substitution of suppliers and implementation of new processes; (iii) Control of pollution sources as a way to integrate all company employees at all levels, which is important for the

sustainable chain, making investments to reduce the structural risks associated with products for use or consumption.

In this context, the main management practices exercised by the key firm within a supply chain refer to the guidance given to suppliers regarding performance in the environmental area, such as waste control, quality improvement, packaging improvement, storage and movement conditions development and proper use for transportation.

Among the practices for the assessment of sustainability, there is the life-cycle assessment (LCA) of a product or service that can provide information relating to the impact that these items may incur. An LCA considers the life stages, such as raw material extraction, material processing, manufacturing, distribution, use and disposal options (e.g. recycling) (CARTER & ROGERS, 2008; DARNALL et al., 2008; HART, 1995; SEURING & MULLER, 2008). In the next section, we discuss the social practices that are disseminated by the operations area.

#### **2.2.2.2 Social practices**

Hutchins and Sutherland (2008) reasoned that the definition of the reporting guidelines of social sustainability, such as the Sustainability Reporting Guidelines, was the result of joint efforts of several entities, for example, the NGO CERES (Coalition for Environmentally Responsible Economies) and the United Nations Environment Programme (UNEP) in 1997.

In this way, it becomes clear that studies of social practices in the area of operations involve challenges both inside and outside the organization (PULLMAN et al., 2009). Thus, it can be argued that social practices vary from one organization to another, since they depend on the level of effort required for their incorporation into the processes and also on the financial burden associated with their adoption (HUTCHINS & SUTHERLAND, 2008). In this sense, we have the following examples of social practices and the benefits that can be achieved:

(i) *Integration*: Promoting connectivity of the organization with the external environment, providing corporate governance mechanisms that may help in understanding the organization's impacts on the environment;

(ii) *Training*: Conducting training, retraining and employability testing are essential factors for assessing the well-being of employees. In this respect, the participation of employees in training has a direct correlation on improving environmental performance and quality of products and services;

(iii) *Level of satisfaction*: Continuously evaluating the level of employee satisfaction, the attitudes of employees in the organization and operational, environmental and social performance indicators. Against this background, we can evaluate the opportunity to develop capabilities and tacit knowledge that is difficult to copy, rare, valuable and socially complex,

(iv) *Operational safety*: Mapping manufacturing processes and critical points for operational safety, thereby promoting lower turnover in jobs and lower accident rates thus providing improved operational performance and reducing operational costs.

It is noteworthy that the empirical analysis shows that the relationship between operational practices and the highest levels of operational performance is considered imprecise, i.e., the successful implementation of best practices of an organization does not represent that this event will be repeated in other companies (BENNER & TUSHMAN, 2003; FLYNN et al., 1995; MACKELPRANG & NAIR, 2010; SWINK et al., 2005).

For these authors, organizations having such capabilities attain a differentiation of their products against competitors, because they develop an infrastructure which is difficult to imitate. Additionally, they stress that these capabilities are developed internally, are specific to the organization and are less related to technology or the physical structure, but to the employees, management and information systems, learning and focus. Narasimhan et al. (2005) argue that investments in operational practices alone do not constitute capabilities.

There is a way of learning, intensive and consistent with the operations strategy, as seen below.

### **2.3 Operational capabilities**

Studies in the area of manufacturing strategy (MS) constantly seek to identify the mechanisms that offer better performance, as well as sustainable competitive advantage (FINE & HAX, 1985; KETOKIVI & SCHROEDER, 2004; SKINNER, 1969; WHEELWRIGHT, 1984).

There two schools of thought in the studies of the 1970s on MS: first, the perspective related to Wickham Skinner in 1974, who claimed that organizations must decide the competitive priority to achieve a sustainable competitive advantage, also known as trade-off. Additionally, the author shows that efforts in more than one competitive priority promote the failure of the organization. Similarly, Hayes and Wheelwright (1984) state that design and infrastructure decisions must adapt the processes to the life cycle of the product, aided by the product-process matrix. Therefore, in these forms of strategy, the manufacturing system should reflect the company's competitive position.

Hayes and Pisano (1994) show that these two models no longer justified the successes and failures of organizations within the more dynamic view of the market. To prove their point, they presented the example of how Japanese manufacturing companies in the early 1980s overcame American organizations in more than one competitive priority, because their products had a lower cost, higher quality and a much faster cycle.

Likewise, Ferdows and De Meyer (1990) showed that more than one competence may be achieved in organizations, provided that the sequence is observed. In this context, these studies make an analogy to the figure of the "sand cone", in which the competence "quality" is the precursor of the other, forming the basis of the "cone", followed by reliability and speed of delivery - which translates in the flexibility of the service - and, finally, cost efficiency.

Thus, Hayes and Pisano (1994) describe that the competitive advantage of organizations, in a long-run vision, is not based on entry barriers (PORTER, 1980), but on the ability to do each process correctly and in a better way than competitors. In this scenario, they explain why the differences in performance are related to the capabilities of the organization (HAYES & PISANO, 1996; SWINK & HEGARTY, 1998; TEECE et al. 1997).

To this end, these capabilities should offer something of value through products and / or services that customers need, of unique and rare character, difficult to replicate, fleeing competition based on lower prices, thereby ensuring profits (TEECE & PISANO, 1994). Also according to the authors, the capabilities must support, by means of administrative and organizational structures, the productive activity.

Amit and Schoemaker (1993) define the capabilities as a learning processes relating to manufacturing, delivery, coordination of suppliers, establishment of quality standards achieving shorter lead times, new product development and also complex social interactions among the company's resources.

To Narasimhan et al. (2005, p.1014), *capabilities* is “the exploitation of specific practices to attain performance gains”. Flynn et al. (2010) claim that the operational capabilities should provide the unity, integration and direction to resources and operational practices so that they can generate results consistent with the desired results, helping the organization to develop solutions.

Therefore, these authors define that the operational capabilities enable both the explicit (e.g., resources and practices) and tacit elements (e.g., know-how and skill sets and leadership) can treat a variety of problems and / or deal with operational uncertainties. However, Narasimhan et al. (2005) validate that there is a learning path, which is associated to the intensity of the use of operational practices and improvements made, in line with the operations strategy.

To that end, this article will consider the following definitions:

**Resources:** It represents “the stocks of available factors” (AMIT & SCHOEMAKER, 1993, p.35) and symbolizes the basis of the organization. Wang and Ahmed (2007, p.6) argue that “it represents “the zero order” element of the hierarchy”. The author’s emphasis about the capacity of this instrument to gain a sustainable advantage for short time. In this way, they claim the difference resource to capabilities.

**Practices:** it represents bundles of systemic activities – for example, TQM, JIT, environmental and social practices –, with a specific goal, which the managers can or not use into their companies (FLYNN et al., 1995).

**Capabilities:** A set of skills which are within an organization, can be improved and developed over a period, are necessary to achieve a product differentiation against competitors and allow meeting the needs of customers through an infrastructure that is difficult to imitate.

Thus, at the end of the topics on practical and operational knowledge within a socio-environmental context, it is worth noting that companies that are able to transform the manufacturing function into a source of competitive advantage are those that know how to use the various improvement programs, such as JIT, TQM and TPM.

Additionally, the emphasis on operational capabilities for operations strategy reaffirms the important role of manufacturing in organizations and suggests new ways in which this can contribute to competitive success (HAYES & PISANO, 1996). In this sense, the measurement of operational performance is essential to assess the impacts of these practices and operational capabilities for the organization, as seen below.

## 2.4 Operational performance

This work seeks to establish, facilitate and measure the operational performance (OPE) to assist managers in the area of operations regarding management decisions.

Therefore, this article seeks contributions to structural and infrastructural decision making process, such as which practices offer improved efficiency of costs reduction processes, limit losses and waste of raw material and finished product in order to increase revenue.

About the OPE, Flynn et al. (1995) define that this is the result of the degree of implementation of JIT, TQM and infrastructure practices used by organizations. For Voss et al. (1997), the OPE represents the measurable aspects of the results of the organizational processes, such as reliability, production cycle time and inventory levels. For Cua et al. (2001) there are many ways to measure the OPE and the most prevalent approach in literature is the assessment of the criteria referred to as competitive priorities, such as cost, quality, delivery and flexibility, which are the four basic dimensions of manufacturing performance. Ketokivi and Schroeder (2004) elaborate that in empirical research, the proposed model must evaluate each performance variable (cost, quality, reliability, flexibility and speed) in a unique way.

Simultaneously, this work involves the relationship of social and environmental practices with operational capabilities. The purpose of the measurements of these variables is to assist in defining the choice of technologies for the prevention and control and also social policies regarding labor.

To evaluate the performance of environmental sustainability, the degree of implementation of practices to meet regulatory standards and / or contractual as well as public perception and / or a competitive advantage is validated (SARKIS, 1995). The recognition of the level of implementation of environmental activities on the lifecycle of the product or service in an attempt to understand the impacts of the environment is also noteworthy. The life cycle of the product or service considers the following stages: the extraction of raw materials, materials processing, manufacturing, distribution, use and disposal options (e.g. recycling) (HUTCHINS & SUTHERLAND, 2008; SEURING & MULLER, 2008).

Regarding indicators of social sustainability, according to the studies by Parris and Kates (2005), there is no set of indicators that is universally accepted and well supported by theories. In this sense, Hutchins and Sutherland (2008) explain that the choice of indicators for social sustainability must followed the impact that the company want to measure.

To assist in the selection of these indicators, the authors define the existence of two perspectives: the first was launched by the United Nations Division for Sustainable Development – UNDSO and the other refers to the Sustainability Reporting Guidelines from the Global Reporting Initiative Institution (GRI), which aims to disclose, in a consistent and global manner, information about the economic, social and environmental organizations to stakeholders (employees, communities, investors, customers and suppliers).

In this setting, this paper will use this second vision of sustainability as it seeks to evaluate, recognize and measure development initiatives, safety and health of employees as well as working conditions that provide for the dignity of labor (PARRIS & KATES, 2005). Accordingly, we present the next topic, which reports on the concept model and research hypotheses.

### **3 THE CONCEPT MODEL AND RESEARCH HYPOTHESES**

The conceptual model in Figure 1 illustrates the relationships between the latent variables: endogenous and exogenous variables that make up the research model and research hypotheses that we want to demonstrate in this article:

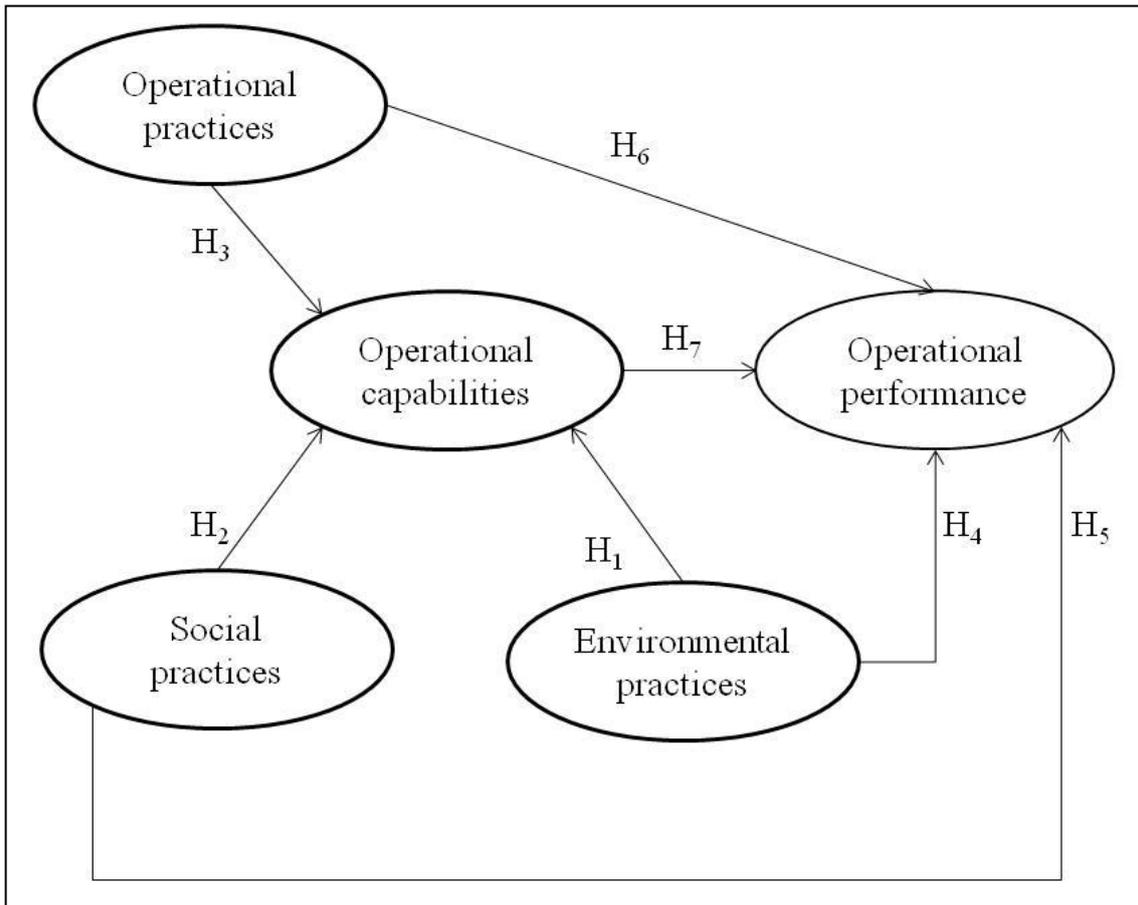


Figure 1: Conceptual Model and research hypotheses

The Figure 1 shows the main constructs (exogenous variables): social practices (SPR), environmental practices (EPR), operational practices (OPR), operational capabilities (OCA) and, finally, operational performance (OPE). In this context, we present the research hypotheses, and in addition, research reporting on prior empirical work:

**Hypothesis 1: The relationship between environmental practices and operational capabilities**

Using the theoretical frameworks of the Resource Based Theory (RBT), with the extension of the Natural Resource Based View of the organization (NRBV) (HART, 1995), one can notice that the heterogeneous resources of the organizations can provide operational capabilities considered valuable, rare, difficult to copy and socially complex, and thus

ensuring a sustainable competitive advantage (PAGELL & WU, 2009; PARMIGIANI et al., 2011).

Daily and Huang (2001) show that, between the establishment of certifications (e.g. ISO 9000, ISO 14000), and guidelines (NBR 26000) and the ensuring of environmental standards, an investment in training, development of teamwork and management support is required. Vachon and Klassen (2008) argue that there is a difference between the practices of control and prevention. In the case of investments for control, these can be considered as standard elements, easy to copy by competitors and also available in the market. However, the organizational capability for prevention enriches the discussion of the performance differences between organizations. This is because they relate to tacit knowledge, practice and learning which is developed internally by employees (HART, 1995; RUSSO & FOUTS, 1997). Thus, based on the RBT, specifically the NRBV, the establishment of an organizational culture for environmentally friendly practices, depends on resources that are not available in the market, the continued implementation of practices, tacit knowledge of employees involved and in constant learning (PAULRAJ, 2011).

*H1: The environmental practices are positively related to operational capabilities.*

## **Hypothesis 2: The relationship between social practices and operational capabilities**

Swink et al. (2005) validate that practices guided toward team development are positively and significantly associated with operational capabilities. Carter (2005) emphasizes that organizations prepared to demand socially correct practices from suppliers account for more proactive companies, and suggests that these organizations have greater capacity for learning. Paulraj (2011) asserts that the recognition of sustainable practices leads the organization to anticipate needs, because of the attitudes considered as pioneering, as well as to obtain greater legitimacy on the part of consumers. However, to Pullman et al. (2009), in

general, social practices also have indirect impacts on operational performance. For these authors, the indirect effects demonstrate the Natural Resource Based View (NRBV) of the organization, since intangible assets such as sustainability, know-how, culture and reputation are tacit knowledge and thus are often difficult to detect, such as operational capabilities.

*H2: Social practices are positively related to operational capabilities.*

**Hypothesis 3: The relationship between operational practices and operational capabilities**

Powell (1995) argued that TQM related activities such as training, process improvement and benchmarking generally do not offer a competitive advantage. That is, the generation of value is not true for all organizations. The author points out that tacit and behavioral characteristics and imperfectly imitable and factors such as culture, empowerment and management commitment can generate a competitive advantage. Thus, organizations should seek to develop an environment where the procedures themselves can thrive. Wu et al. (2010) confirm that the repetition of practices leads to the development of specific capabilities within the organization. Accordingly, Narasimhan et al. (2005) validate that certain capabilities are cumulative. Thus, the interface between resources and goals must be accomplished through the capabilities which are to be developed by the organization, known as operational capabilities (PAULRAJ, 2011; WU et al. 2010). Thus, the frequency in performing these practices stabilizes the routine and the connection between these constructs, leading to the development of capabilities specific to the organizations (BENNER & THUSMAN, 2003; SWINK & HEGARTY, 1998).

*H3: Operational practices are positively related to operational capabilities considered unique, rare, hard to copy by the competitors and sustained in the long run.*

#### **Hypothesis 4: The relationship between environmental practices and operational performance**

Investments to reduce losses and level of pollutants can bring an overall reduction in costs of the manufacturing process, but depending on the intensity of the investments in assets, efforts can have a negative impact on the operational performance (ANGELL & KLASSEN, 1999; SARKIS & CORDEIRO, 2001). As an example, Carter et al. (2000) ensure that environment friendly practices have a positive impact on the operational performance of the organization and that managers should focus more on the following practices: packaging recycling, (ii) improvement of resource transport as a way to reduce environmental impacts, (iii) involvement of the purchasing managers in product development projects for the recognition of the possibilities of reutilization of materials throughout the life cycle. That is, higher levels of environmental performance transcend to higher levels of financial performance (DERWALL et al., 2005; PORTER & VAN DER LINDE, 1995). Melnyk et al. (2003) point out that the adoption of formal mechanisms for certification of environmental and social management systems are positively correlated with the reduction of operational costs.

*H4: Environmental practices are positively related to higher levels of operational performance.*

#### **Hypothesis 5: The relationship between social practices and operational performance**

For Daily and Huang (2001), practices related to human factors, such as leadership initiatives, teamwork and operational safety assist in the adoption of strategies and thus improve performance. Additionally, Daily et al. (2007) evaluated the impacts of these social practices such as training, leadership and empowerment, along with the company's human resources for the implementation of Environmental Management Systems (EMS) and

performance perception and concluded that these initiatives are positive and help the development of the perception of better performance levels. Even in the context of internal environment, Pullman et al. (2009) state that the adoption of practices for the development of manpower impacts the perception of quality, but show no association with the environmental performance. Regarding external environment, Carter et al. (2000) indicate that the area of supplies may be responsible for the review and adoption of socially correct practices with suppliers, and through these, improve operational performance of the organization.

*H5: Social practices are positively related to higher levels of operational performance.*

#### **Hypothesis 6: The relationship between operational practices and operational performance**

Flynn et al. (1995) showed that the infrastructure practices - empowerment, management focused on equipment reliability, ensuring of communication between hierarchical levels and qualified labor guarantee management - are more important for good operational performance than JIT and TQM practices. However, they ensure that there is a positive relationship between the constructs of JIT and TQM practices and operational performance, but it is less relevant than the infrastructure practices. For Benner and Tushman (2003), this difference in the results - the implementation of best operational practices associated with higher levels of performance - is due to the failure of intervention by managers for not taking into account the need for cultural change, as well as in choices between JIT, TQM and infrastructure practices. In this scenario, these authors explain that the lack of standardization in the implementation of TQM practices provide the differences in operational performance. Terziovski et al. (1999) state that the operational performance improved with the implementation of TQM related practices. On the other hand, the implementation of ISO - 9000 did not represent an improvement in performance compared to

companies that were not certified. Westphal et al. (1997) fuel the discussion on the institutional factors that influence the relationship between operational practices and performance. That is, these authors state that the successful adoption of best operational practices is related to the fact that the organization is seen as a "pioneer" or simply as a "follower" of these standards. Narasimhan et al. (2005) suggest that if an organization is seeking specific performance gains, then it should focus on specific practices.

*H6: Operational practices are positively related to higher levels of operational performance.*

### **Hypothesis 7: Operational capabilities mediation of operational practices and performance**

The development of operational capabilities aims to assist in mediating between operational and socio-environmental practices and the level of operational performance, since it enables an environment of trust and opportunities for new scenarios seeking to leverage the operational performance (PARMIGIANI et al., 2011). In this way, Swink et al. (2005) point out that manufacturing strategy should enable the integration of operational practices between the internal and external environment in order to fulfill the requirements of the market. To do so, they confirm the role of operational capabilities in mediating the relationship between operational practices and operational performance, extending the view that manufacturing strategy is not simply linked to infrastructure, JIT and TQM practices. Likewise, if there are no such capabilities, the practices will not develop to levels considered best practices due to the environment of mistrust and lack of opportunities (PARMIGIANI et al., 2011; PAULRAJ, 2011). Bowen et al. (2001) also show that higher levels of performance and sales are not possible in short time intervals. In this context, the intensity of the practices implemented and the emphasis on improvements will enable the development of risk management capability and the meeting of market needs. This statement can also be found in the work of Swink et al.

(2005), in which the operational capabilities positively mediate the relationship between the set of operational practices conducted by the manufacturing function in order to meet the internal and external demands and operational performance.

*H7: Operational capabilities have a mediating role between operational, social and environmental practices and performance.*

#### **4 IMPLICATIONS FOR RESEARCH**

This conceptual model presented offer contributions for the level of manufacturing and operations strategy. First at all, the relation about environmental and social practices to operational capabilities means that the organizations have to be worried not only with operational practices into manufacturing. They need develop sustainable policies ant it depends not only for routines, we have the *path dependence* (DIERICKX & COOL, 1989), create conditions that their employees to do things on the right way.

So, the emphasis into environmental and social practices is important not only to become better performance, but the company has the opportunity to develop operational capabilities. In this way, Parmigiani et al. (2011) high lights the technical and relational capabilities.

About the relationship within the operational practices and environmental and social practices. As Zhu and Sarkis (2004) said, the first one - operational practices as TQM practices – can improve the environmental performance, but other one, as JIT practices, offer less conditions.

Another contribution, about operations strategy is how to get a sustainable advantage. Accordingly to the framework of Resource-based Theory (RBT), we can affirm that the resource is important, during a little time (WANG & AHMED, 2007). So the managers have the obligation to improve capabilities among their employee, especially about little

improvements and innovation. As Wang and Ahmed (2007) claim - the capabilities can offer VRIN conditions.

With the model of Voss (1995), we also offer a discussion to analyze how the two paradigms (best practices and competing through manufacturing) react with the new conditions – environmental and social issues. As Porter and Van der Linde (1995) discuss, we have now a dynamic world, with a lot of new conditions and the organizations should get it, not for a trade-off way, but offer innovations for new time.

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