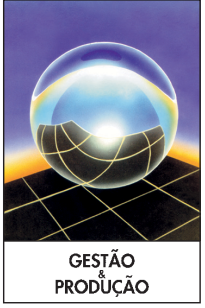
*Gest. Prod.*, São Carlos, v. 26, n. 2, e2480, 2019
https://doi.org/10.1590/0104-530X2480-19
(cc) BY

**Original Article**




ISSN 0104-530X (Print)
ISSN 1806-9649 (Online)

# Lean production from the perspective of the resource-based view: a study in an organization in the footwear industry

## *A produção enxuta sob a perspectiva da visão baseada em recursos: um estudo em uma organização do setor calçadista*

**Alline Thamyres Claudino da Silva**[1]
**Cláudia Fabiana Gohr**[1]
**Luciano Costa Santos**[1]

**How to cite:** Silva, A. T. C., Gohr, C. F., Santos, L. C. (2019). Lean production from the perspective of the resource-based view: a study in an organization in the footwear industry. *Gestão & Produção*, 26(2), e2480. https://doi.org/10.1590/0104-530X2480-19

**Abstract:** This study aims to analyze the strategic resources contribution to the implementation of lean production (LP) in an organization in the footwear industry, from the perspective of the resource-based view (RBV). Based on the theoretical assumptions of LP and RBV, an analytic procedure embracing 5 steps was developed: the description of the operations strategy, the identification of lean production practices, the description of the LP implementation path, the relationship between LP practices and resources, and the evaluation of resources according to RBV. Field research was carried out by a longitudinal case study in which the main data collection technique was the interview (semi-structured and structured) addressed to employees and managers of the industrial engineering department of the chosen plant as the unit of analysis. It was found that the company adopted 15 practices, in which 9 were implemented in all sectors. Subsequently, 17 resources that supported the implementation were identified. Through the analysis, it was found that the resources denominated operational workforce, qualified managers, heavy machinery, culture, and training were essential to LP, aspect confirmed by the assessment of the criteria of value, versatility and sustainability. Although LP is often advocated as a universal model, the case study raised the issue that the LP implementation process may have the difficulty of imitation because it is intrinsically linked to unique historical conditions and the causal ambiguity and social complexity of the resources.

**Keywords:** Lean production; Resource-based view; Footwear industry.

**Resumo:** *O objetivo deste artigo é analisar como os recursos estratégicos contribuíram para a implementação da produção enxuta (PE) em uma organização do setor calçadista, sob a perspectiva da visão baseada em recursos (VBR). Tomando como base os pressupostos teóricos da PE e da VBR, foi desenvolvido um procedimento de análise composto de cinco etapas: detalhamento da estratégia de operações; identificação das práticas de PE; descrição da trajetória de implementação da PE; relação das práticas com os recursos; e avaliação dos recursos. A pesquisa de campo foi realizada por meio de um estudo de caso longitudinal em que a principal técnica de coleta de dados foi a entrevista (semiestruturada e estruturada) dirigida aos funcionários e gestores do setor de engenharia industrial da fábrica escolhida como unidade de análise. Constatou-se que a empresa adotou 15 práticas, das quais 9 foram implementadas em todos os setores. Foram identificados 17 recursos que deram suporte à implantação. Por meio da análise destes, verificou-se que os recursos denominados mão de obra operacional, gestores qualificados, máquinas pesadas, cultura e treinamento foram fundamentais para a PE, aspecto que se confirmou na avaliação em relação aos critérios de valor, versatilidade e sustentabilidade dos recursos. Embora a PE seja, muitas vezes, defendida como um modelo de aplicabilidade universal, o caso estudado apontou que o processo de implementação da PE pode encontrar dificuldades de imitação, pois está intrinsecamente ligado às condições históricas únicas, à ambiguidade causal e à complexidade social dos recursos.*

**Palavras-chave:** *Produção enxuta; Visão baseada em recursos; Setor calçadista.*

[1] Departamento de Engenharia de Produção, Universidade Federal da Paraíba, Centro de Tecnologia, Campus I, Bloco G, Cidade Universitária, João Pessoa-PB, Caixa Postal: 5045, CEP: 58.051-970, João Pessoa, PB, Brasil, e-mail: allinethamyres@hotmail.com; claudiagohr@ct.ufpb.br; claudiafgohr@gmail.com; luciano@ct.ufpb.br; lucosantos@gmail.com

Received Sept. 16, 2017 - Accepted Apr. 13, 2018

Financial support: This study was partially funded by the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) – Brazil - Finance code: 130551/2012-0.

## 1 Introduction

The concept of lean production (LP) has been a subject of academic discussions for many years and it has been applied in companies from different sectors since the emergence of the Toyota Production System (TPS) (Duran & Batocchio, 2003). From the interest on the subject, it is possible to identify in the literature several benefits brought by the lean production system, as showed in different studies (Lewis, 2000; Shah & Ward, 2003; Bhasin & Burcher, 2006; Forrester et al., 2010; Bhasin, 2012; Deflorin & Scherrer-Rathje, 2012; Panizzolo et al., 2012).

However, despite the reports of improvements provided by the LP, it is worth noting that some companies, even knowing how to apply LP practices, cannot achieve the expected performance to obtain a competitive advantage. Thus, some questions arise, such as: what is the real impact that LP provides for companies? What are the mechanisms that sustain a competitive advantage through the LP implementation?

Some authors have sought answers to these questions. Bhasin (2012), for example, states that each company needs to find its way to implement LP and this is a continuous journey. Following this same reasoning, Lewis (2000) and Netland & Aspelund (2013) argue that some aspects of the internal organizational context, such as the lack of strategic resources that assist in the implementation of LP, can have a negative impact on competitive performance. Parry et al. (2010) agreed, and they developed a methodology for LP implementation that aims to protect the strategic resources since they are fundamental to lean implementation and competitive advantage.

Thus, performance differences in LP implementation can often be explained by internal factors of the organization, such as its resources and capabilities (Lewis, 2000; Forrester et al., 2010; Parry et al., 2010; Gibbons et al., 2012). Following this perspective, this article aims to analyze how the strategic resources contributed to the implementation of LP in an organization that operates in the footwear sector of the State of Paraíba, using as theoretical support the Resource-Based View (RBV). RBV is one of the most important currents of thought in the area of business strategy, as it highlights the role of business resources in building a sustainable competitive advantage and improving economic performance (Newbert, 2007, 2008; Maciel & Camargo, 2009; Wu, 2010; Pertusa-Ortega et al., 2010; Gruber et al., 2010; Netland & Aspelund, 2013; Lin & Wu, 2014).

For that, an analysis procedure was developed consisting of a sequence of steps. This procedure can assist managers to identify strategic resources that are important for lean implementation, facilitating in the process of decision making concerning the allocation of organizational resources, as well as in investment decisions. Previous studies related to strategic resources for lean implementation focus on human resources (Bonavia & Marin-Garcia, 2011; Alagaraja & Egan, 2013; Martínez-Jurado et al., 2014). Differently, this research considers all organizational resources that can contribute to lean implementation, and competitive advantages. In addition, this research concerns on recent theme with little research. However, developing competitive advantage require from the companies heterogeneous, imperfectly mobile, valuable, and rare resources (Wernerfelt, 1984; Barney, 1991, 2001; Grant, 1991; Peteraf, 1993; Barney & Hesterly, 2007).

The remainder of the paper is organized as follows. After reviewing the theoretical background, the study methods are described. Subsequently, the case study is presented, demonstrating how strategic resources assist in the implementation and maintenance of lean. Thereafter, we discuss the findings and present the conclusions, limitations and further research.

## 2 Lean production and resource-based view

LP is originated from the Toyota Production System (TPS), and this expression became known by the book "The machine that changed the world", written by J. Womack, D. Jones and J. Roos in 1990 and reprinted in 2004. The main objective of the TPS is to enable organizations to respond rapidly to the constant changes in market demand by effectively reaching the main dimensions of competitiveness: flexibility, cost, quality, service, and innovation (Shingo, 1996).

The basis of the TPS is the absolute elimination of waste, and its operation is structured through two pillars, Just in Time (JIT) and Autonomation (sometimes called *Jidoka*) (Ohno, 1997). JIT states that companies must produce products at the right time and in the right amount, combating waste and improving efficiency; while autonomy provides operators and machines the ability to detect problems and stop the production process immediately when abnormalities occur (Ohno, 1997).

LP is a combination of the best characteristics of craft production and mass production, seeking continuous improvement through the search for low costs, the absence of defective items, zero inventory,

and a large variety of products (Womack et al., 2004). This system works on the premise of eliminating the overproduction generated by inventory needs and costs related to workers, property, and facilities needed for inventory management. For that, LP adopts multifunctional teams of workers at all levels of the organization, as well as highly flexible and more automated machines, to produce products with a wide variety (Womack & Jones, 2003).

LP is operationalized by a set of practices from production management that work synergistically to achieve the desired results, as can be seen in Table 1. These practices complement each other, and the interaction between them should be considered as essential to the success of LP.

It should be noted that the LP system considers that some principles are fundamental to the perfect implementation, such as (Womack & Jones, 2003): value, value stream, flow, pull, and perfection. These principles indicate that LP is a continuous improvement process that cannot be easily or immediately copied (Lewis, 2000; Forrester et al., 2010). Following this reasoning, Lewis (2000) states that for the implementation of the LP system it is necessary: (i) to analyze the initial conditions of the implementation of the LP, that is, its historical trajectory, in order to recognize the resources used in the implementation and the path followed throughout the process; and, (ii) recognize external factors such as market, dominant technology in the sector, supply chain structure, etc.

Parry et al. (2010) recognized carefully the resources that help in the implementation of the LP. To successfully implement, LP cannot damage the company's main resources and competencies in order to lose competitiveness. Similar to the thought of Lewis (2000) and Parry et al. (2010), Gibbons et al. (2012) considered that it is necessary to understand what resources have been used in the LP implementation process. Through that, the resources can be aligned to maximize the value of their contribution (Gibbons et al., 2012).

Thus, it can be stated that the differences in performance between companies which implemented LP can be attributed to internal factors such as knowledge, experience and other strategic resources that have a strong impact on the company's performance and competitive advantage (Forrester et al., 2010). This

**Table 1.** Lean production practices.

| PRACTICES | CONCEPTS | AUTHORS |
|---|---|---|
| Autonomation (jidoka) | Providing operators and machines the ability to detect problems and stop the production process immediately when abnormalities occur. | Shingo (1996) |
| Zero defects quality control | Set of methods that prevent and eliminate defects by identifying and controlling the causes. | Womack & Jones (2003), Shingo (1996) |
| Visual management | A management approach that suggests the utilization of visual communication devices installed broadly on the work environment to transmit information about the process and its performance indicators. | Shingo (1996), Feld (2000), Womack & Jones (2003), Liker (2004), Galsworth (2004), Monden (2012) |
| Just in time (JIT) | A system that provides inventory reductions by producing and delivering only the necessary amount on the time required. | Shingo (1996), Ohno (1997) |
| Kaizen (continuous improvement) | Permanent and incremental improvement program that covers the whole organization and results in a continuous effort to solve problems. | Shingo (1996), Feld (2000), Womack & Jones (2003), Liker (2004), Monden (2012) |
| Total productive maintenance | Structured maintenance approach that gathers a set of techniques that avoid unexpected interruptions on production flow by autonomous and planned maintenance. | Ljungberg (1998), Feld (2000), Womack & Jones (2003), Liker (2004) |
| Value stream mapping (VSM) | Support tool for the implementation of lean production that maps material and information flows, helping the identification of activities that do not add value and driving the improvement of the value flow. | Barber & Tietje (2008), Chen et al. (2010), Chen & Meng (2010) |
| Production leveling (*heijunka*) | Heijunka means leveling the mix and quantity of production over a fixed period in order to reduce the variability of the production schedules. | Swanson (2008), Kasul & Motwani (1997), Womack & Jones (2003) |

**Table 1.** Continued...

| PRACTICES | CONCEPTS | AUTHORS |
|---|---|---|
| Standardized work | Establishment of precise procedures to execute tasks documented and exposed in the workstations. | Shingo (1996), Feld (2000), Womack & Jones (2003), Liker (2004), Monden (2012) |
| Kanban system | Pull production mechanism that controls the flow of materials and information using devices that inform the need of parts between two workstations. | Shingo (1996), Feld (2000), Womack & Jones (2003), Liker (2004), Monden (2012) |
| Multifunctional teams | Groups of workers trained to perform different tasks, allowing system flexibility to keep the production flow stable. | Åhlström & Karlsson (1996), Shingo (1996); Feld (2000), Womack & Jones (2003), Liker (2004), Monden (2012) |
| Single minute exchange of die (SMED) | Methodology for simplifying machine setups in order to reduce the time spent in this activity. | Shingo (1996), Feld (2000), Womack & Jones (2003), Liker (2004), Monden (2012) |
| 5S | A set of concepts and practices that have as main objectives the organization and rationalization of the work environment (housekeeping). | Shah & Ward (2003) |
| Pull production | A method of production control in which each workstation requests from the previous station the precise amount of products that is needed and when it is needed. | Womack & Jones (2003), Shah & Ward (2003) |
| *Poka yoke* | Devices incorporated into the production process to detect and prevent failures. | Womack & Jones (2003), Shingo (1996) |

view is consistent with the resource-based view (RBV), a theory from strategy management that considers organizations as a bundle of resources that allow the development of competitive differentials (Wernerfelt, 1984; Barney, 1991, 2001; Grant, 1991; Peteraf, 1993; Penrose, 1968).

Productive resources can vary considerably between firms, even from the same industry, assuming that firms are heterogeneous units possessing idiosyncratic resources (Penrose, 1968). Wernerfelt (1984), Amit & Schoemaker (1993) and Mills et al. (2002) stated that a resource is something that an organization owns or accesses and can be considered a strength or weakness. Wernerfelt (1984), Mills et al. (2002) and Gruber et al. (2010) considered that the resources could be categorized as tangible and intangible resources. Tangible resources are assets that can be seen and quantified, having a physical format; while intangibles can be defined as the most difficult to recognize since they are deeply rooted in the company's history, which has accumulated over time. Thus, for RBV, important (or strategic) resources are considered a source of competitive advantage (Barney, 1991, 2001; Grant, 1991; Peteraf, 1993).

Barney (1991) has made some contributions to the strategic value of resources since companies need to give more importance to their resources than to the competitive environment. The author considers two characteristics that are essential to the competitive advantage: (i) resources must be distributed in a heterogeneous way among companies; and, (ii) resources should be imperfectly mobile. Peteraf (1993), following the same reasoning as Barney (1991), added two more characteristics to ensure the permanence of sustainable competitive advantages: the limits to ex-post and ex-ante to the competition.

Recently, Barney & Hesterly (2007) gathered these characteristics and developed a framework called VRIO (Valuable, Rare, Inimitable and Organizational). Thus, to be strategic, a resource should (i) allows a company to exploit an opportunity or neutralize the impact of a threat (valuable); (ii) be accessible to few companies (rare); (iii) be difficult to copy, for

which the company needs to develop mechanisms to isolate resources, such as causal ambiguity, social complexity, develop resources under unique historical conditions and, if possible, protect them through patents (rare). Finally, a company should extract the maximum of the potential of the resources (organizational).

Similarly, Mills et al. (2002) stated that to be strategic, a resource must be valuable, sustainable and versatile (VSV). Valuable in the sense that the performance achieved by the resource provides a competitive advantage that is valuable to customers. Sustainable, because the advantage of resource performance must be sustainable, that is, the resource value can be maintained over time. Versatile is related to the possibility to transfer the valuable resource to other areas or even to new markets. Due to the relevance and practicality, both (VRIO and VSV) have been served as a framework for researchers, as can be seen in Mills et al. (2003), Kunc & Morecroft (2010), Arend & Lévesque (2010), Wu (2010), Netland & Aspelund (2013), Lin & Wu (2014), etc.

## 3 Research method

This paper seeks to explore how the strategic resources contributed to the implementation of LP in an organization that operates in the footwear sector, using RBV as a theoretical background. The case study was the most appropriate method at investigating "how" questions and analyzing in-depth field studies. The case study is also indicated when there is a need to develop exploratory research, in which the variables are not yet known, and the phenomenon is not entirely understood (Eisenhardt, 1989; Voss et al., 2002, Yin, 1994).

We developed longitudinal case study since it is appropriate for in-depth case studies (Voss et al., 2002). The longitudinal case study is also recommended when the phenomenon under investigation cannot be completely understood separated from its temporal context, and the relations are too complex to be analyzed using quantitative research methods (McCutcheon & Meredith, 1993).

**Table 2.** Interviewees on the field research.

| Interviewees | | Number of interviews |
|---|---|---|
| 1 | PPC Coordinator | 02 |
| 2 | Process Specialist | 05 |
| 3 | Lean Analyst | 03 |
| 4 | Support Analyst | 01 |
| **TOTAL INTERVIEWS** | | **11** |

We selected a company that operates in the footwear sector, delimited by its factory of rubber sandals. The reason for choosing this company was due to the existence of requirements for the development of this study, identified in a preliminary visit. First, the company has a well-defined business strategy, with previously established objectives to be fulfilled by the production department. Second, the company developed the lean philosophy in its organizational context. Third, the company started the LP implementation since 2011, having some experience with the LP system.

We conducted semi-structured and structured interviews through some forms with four employees from the Industrial Engineering department as shown in Table 2. In total, 11 individual interviews were conducted, each lasting approximately 1 hour and 30 minutes. The interviews were developed over 45 days. In addition to the interviews, documents were analyzed, such as records of the implementation process of LP practices. The direct observation was also made, in order to guarantee the reliability of the data analyzed, thus avoiding a biased view on the description and analysis of the results.

After analyzing the literature, it was possible to develop an analysis procedure composed of 5 steps (Figure 1) described in sequence.

a) **Step 1 - To detail the operations strategy**. It consists of detailing the operations strategy by the organization, encompassing the organizational objectives in order to obtain an overview of the strategy, the competitive priorities of the operations strategy and the actions to be taken to implement it.

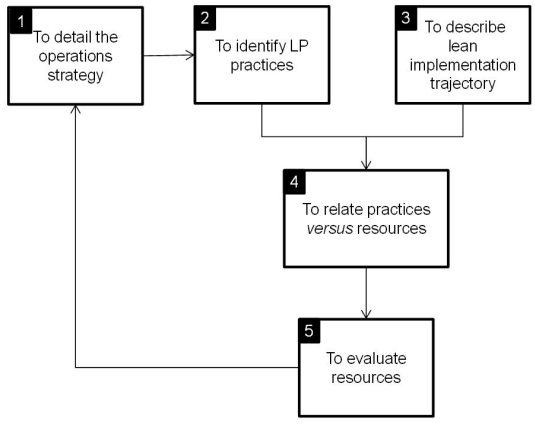



**Figure 1.** Steps of the analysis procedure.

b) **Step** 2 - **To identify LP practices**. It consists of identifying the LP practices that have been adopted by the company over time.

c) **Step 3 - To describe the lean implementation trajectory**. It aims to identify resources that influenced directly the implementation of LP. The lean trajectory is considered unique in each organization, in which resources are developed and shaped over time (Lewis, 2000). Thus, the data collected were organized into a form to assist in describing the "lean implementation path", filled with the information presented in Table 3.

d) **Step 4 - To relate practices *versus* resources**. To relate practices to the resources, a matrix was developed confronting these two categories of analysis. To identify the intensity of the relationship between practices and resources, three levels of relationship (strong, medium and weak) with corresponding numerical scales (strong = 3, medium = 2; weak = 1). In each practical-resource crossing, the score was assigned to the intensity of the relationship. It was also possible to consider any relation (without an attributed rating). Through the matrix of resources vs. practices, it was possible to verify the scores of all resources. Thus, the resources that were related more significantly to the practices would have the highest sum. Therefore, were selected for the development of the next step of the analysis procedure.

e) **Step 5 - To evaluate resources**. The resources were evaluated considering the criteria presented by Mills et al. (2002): value, sustainability, and versatility (VSV). According to the answers, a score was assigned (Tables 4, 5, and 6). If there were questions that were not applicable or of unknown response, proportionality was calculated of valid questions, as can be observed in the following Formula (1) (Santos et al., 2015).

$$\frac{\text{Total questions}(5)}{\text{Total valid questions}(n)} \times \text{Sum of scoring valid questions} \quad (1)$$

According to the scoring scale defined by Santos et al. (2015), the total score of the resource can vary from 5 to 25 points. With this interval, five different levels were established that denote the intensity of the evaluated resource, as shown in Table 7.

For the analysis, the concern was to obtain the information from the perspective of the individuals involved, as well as to interpret the environment in which the problem occurred (Barratt et al., 2011). Thus, according to the categories of research previously defined through the literature review and the operationalization of the analysis procedure, the information was analyzed through content analyze, since it is a technique that allows an objective and systematic description of the data content collected (Azevedo & Azevedo, 2008).

## 4 Results

The case study was conducted in a company that is part of a group that has been active in the footwear market since 1988. The company launches two collections of rubber sandals per year and currently has eight product families, segmented into four models, each with fifteen color combinations and eleven numbers. The main feature of its products is innovative design and durability.

The activities of the manufacturing process are divided into six sectors: cutting, silk, stitching, injection, kit, and assembly, for a daily production of 30 thousand pairs of sandals, in function of the current average demand. The aggregate production plan is made at the parent company and sent to the PPC (Production Planning and Control), which analyzes the availability of productive resources and communicates to the matrix. Once all planning is done, the company's PPC prepares the master production plan, the production schedule, and the order to the suppliers. In addition, the PPC draws up plans and send them to the warehouse.

The company started the implementation project of LP in 2011, motivated by the parent company. The company intended that the two factories (matrix and subsidiary) have the same production system. Thus, a consulting company was hired to assist in the implementation process. Initially, the process started by value stream mapping (VSM). Through the VSM the consulting company could learn about the company's manufacturing process. The consulting company managed the project for six months approximately. After that, the company followed the guidelines set by the consulting company to implement the remaining lean practices.

### 4.1 Step 1 – Detailing operations strategy

The first step of the analyses procedure was to detail the information about the company's operation strategy, as can be seen in Table 8.

By the strategic planning defined by the parent company, the subsidiary refines the information and, thus, defines the manufacturing goals. Based on the

**Table 3.** Information for the description of the trajectory of lean implementation.

| LEAN IMPLEMENTATION | |
|---|---|
| **When?** | When the practices were implemented. |
| **What?** | Which LP practice was implemented. |
| **How?** | How the practice was implemented. |
| **Why?** | Explain the reason the practice was implemented, to identify the needs of the company at the time of implementation. |
| **Necessary resources?** | To identify the resources needed to implement each LP practices, generating the final list of resources. |

**Table 4.** Form to evaluate the resource value.

| RESOURCE | | | | | |
|---|---|---|---|---|---|
| **QUESTIONS** | **SCORE** | | | | |
| | **1** | **2** | **3** | **4** | **5** |
| What is its effect on the organization's profitability? | Highly negative impact | Negative impact | Nil impact | Positive impact | Highly positive impact |
| What is its effect on the organization's ability to defuse threats? | Highly negative impact | Negative impact | Nil impact | Positive impact | Highly positive impact |
| What is its effect on the organization's ability to capitalize on opportunities? | Highly negative impact | Negative impact | Nil impact | Positive impact | Highly positive impact |
| How many competitors already have it? | All | Most | Half | Some | None |
| What level of performance does it offer compared to competitors? | Well below industry average | Below industry average | Average for industry | Above industry average | Indisputable leadership |
| **TOTAL SCORE** | | | **RANKING** | | |

Source: Adapted by Santos et al. (2015).

**Table 5.** Form to evaluate the resource sustainability.

| RESOURCE | | | | | |
|---|---|---|---|---|---|
| **QUESTIONS** | **SCORE** | | | | |
| | **1** | **2** | **3** | **4** | **5** |
| How easily can competitors recognize it? | Very easily | Quite easily | With some difficulty | Hardly | The resource is unique |
| How long would it take to get a payback on this resource? | < 1 month | 1 - 6 months | 6 - 24 months | 2 - 5 years | > 5 years |
| Was the resource acquired through interpersonal relationships, trust and culture, acquired over the long term? | Not at all | Hardly | Partly | Largely | Completely |
| Was the resource acquired through organizational learning? | Not at all | Hardly | Partly | Partly | Largely |
| Can the resource be replaced by another resource for a similar result? | Completely | Largely | Partly | Hardly | No way |
| **TOTAL SCORE** | | | **RANKING** | | |

Source: Adapted by Santos et al. (2015).

**Table 6.** Form to evaluate the resource versatility.

| RESOURCE | | | | | |
|---|---|---|---|---|---|
| **QUESTIONS** | **SCORE** | | | | |
| | **1** | **2** | **3** | **4** | **5** |
| Can the resource be transferred to other processes elsewhere in-house? | Impossible | With difficulty | With some effort | Easily | Very easily |
| How long would it take to reproduce elsewhere in-house? | > 5 years | 2 - 5 years | 6 - 24 months | 1 - 6 months | < 1 month |
| Does the organization recognize when there is a rare, valuable and difficult resource to be copied by competitors? | Not at all | Very weak | Partly | Largely | Completely |
| Are the company's policies and procedures organized to support the exploitation of its resources? | Not at all | Very weak | Partly | Largely | Completely |
| How deeply is it tied to its surroundings? | Total link | Strong link | Partial link | Weak link | No link |
| **TOTAL SCORE** | | | **RANKING** | | |

Source: Adapted by Santos et al. (2015).

**Table 7.** Resource intensity assessment.

| SCORE INTERVALS | INTENSITY OF RESOURCE |
|---|---|
| 5 to 8 points | Very low |
| 9 to 12 points | Low |
| 13 to 17 points | Medium |
| 18 to 21 points | High |
| 22 to 25 points | Very high |

Source: Adapted by Santos et al. (2015).

manufacturing goals, the company establishes the strategic actions.

The competitive priorities (Table 8) were presented in order of importance. Thus, the primary priority is "product quality" according to Interviewees 1 and 2. This priority is important due to the high added value that the company's products have. Regarding "flexibility," the company has a large quantity and variety of products, being eight families of products with four models, 15 combinations of colors and 11 numbers. "Dependability" and "speed" were highlighted by Interviewees 2 as challenges for the organization, since the demand is higher than the productive capacity and there is high employee turnover. Therefore, there is a delay in the delivery of products. However, the Industrial Engineering Department was mobilized trying to minimize this problem in 2013. Concerning the competitive priority "costs," the parent company does not seek raw materials with lower prices. However, it manufactures some of the product elements, in order to reduce costs through economies of scale.

## 4.2 Step 2 – Identifying LP practices

The LP practices adopted by the company can be seen in Table 9. The implementation of poka yoke, autonomation (*jidoka*) and kanban systems are in the initial phase, since they were recently implemented and adopted just in one sector (pilot test). The poka yoke and the kanban systems are only implemented in the packaging sector and the autonomation only in the assembly sector. Regarding pull production, Interviewee 2 argued that this practice was not properly implemented because there are still high levels of inventory in process.

Regarding just in time, Interviewees 2 and 3 presented some difficulties in the implementation process. For example, there is no involvement of the entire supply chain or support by experts from strategic, tactical and operational aspects. For this reason, the company still maintains large storage of raw material and finished product, since it does not have a just in time system in the supply chain.

## 4.3 Step 3 - Describing lean implementation trajectory

After identifying LP practices, we attempted to detail the lean implementation path (Figure 2 and Table 10). The longitudinal study was divided into semesters (cross-sections) to facilitate the identification of the events along the time, totaling six semesters since the beginning of the implementation process.

As can be seen in Figure 2, black box represents practices implemented in a specific time, gray boxes represent practices that were implemented and maintained in all departments, and white boxes represent practices implemented in a specific sector (representing a pilot test).

**Table 8**. Operations strategy details.

| Operations strategy details | |
|---|---|
| **Main objectives** | - Market leader |
| | - To invest in quality policies |
| **Competitive priorities** | 1. Product quality; |
| | 2. Flexibility; |
| | 3. Dependability; |
| | 4. Costs; |
| | 5. Speed. |
| **Strategic actions** | - To detail what is to be produced; |
| | - To define the time for production to be completed; |
| | - To maintain good relationships with suppliers; |
| | - To organize and develop training. |
| **Strategic Perspective** | Top-down, unfolding the parent's strategic planning for its subsidiary. |

**Table 9.** LP practices.

| IMPLEMENTED PRACTICES | PRACTICES IN THE TEST |
|---|---|
| - VPM | - Pull production |
| - Standardized work | - Poka yoke devices |
| - Production leveling (*heijunka*) | - Autonomation (jidoka) |
| - Multifunctional teams | - Kanban system |
| - Visual management | - *Just in time* |
| - Zero defects quality control | |
| - 5S | |
| - Kaizen | |
| - Single Minute Exchange of Die | |
| - Total productive maintenance | |

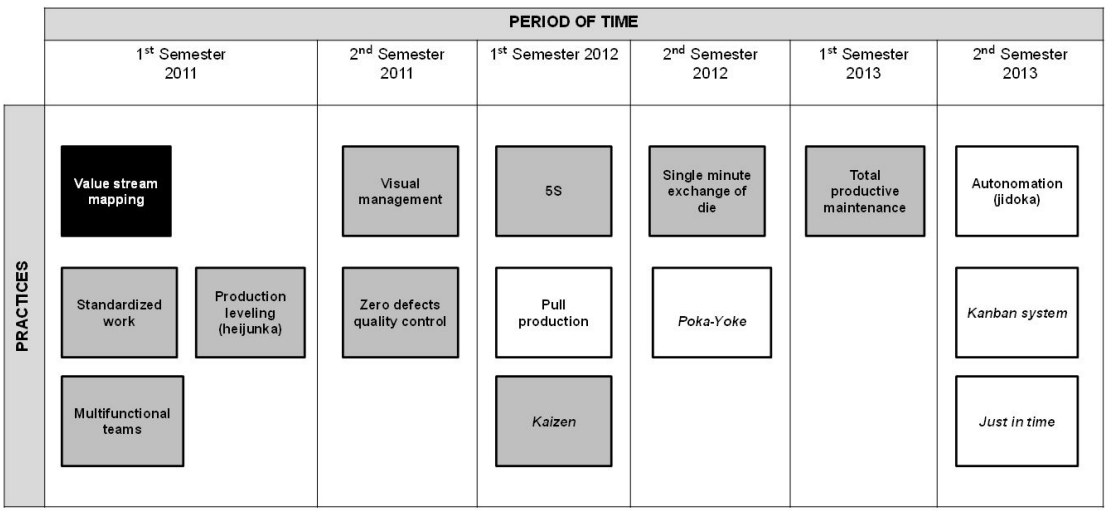



**Figure 2.** Practices implemented along the period. Source: field research.

Analyzing the LP implementation path assisted in identifying the necessary resources for each practice. Following the logic of the RBV, the resources are historical-dependent, and because of that we tried to associate them with the period in which they were necessary. This analysis allowed to extract the strategic resources directly from the longitudinal study and provided the basis for the evaluation of the intensity of the resource-practical relationship.

**Table 10.** Lean production implementation path.

| When? | What? | How? | Why? | Resources? |
|---|---|---|---|---|
| 1st semester/ 2011 | **Value stream mapping** | Hiring a consulting team. | Need to know the process and plan a future state. | Qualified managers; outsourced service; software. |
| | **Standardized work** | Definition of the working method based on time studies and, after, workforce training. | Assure the process consistency to keep the system stability. | Qualified managers; training; operational workforce; culture; heavy machinery. |
| | **Production leveling (*heijunka*)** | Board of directors' assistance and support from the PPC department. | Better utilization of workforce, balance the workload and assure the accomplishment of the takt time. | Qualified managers; training; culture; operational workforce, support equipment. |
| | **Multifunctional teams** | Performing a pilot study in a specific department before the complete implementation. | Increase the versatility of the operator and reduce the fatigue at work. | Qualified managers; training; operational workforce; culture; heavy machinery; support equipment. |
| 2nd semester/ 2011 | **Visual management** | Fixing visual devices through the factory. | Enable queries to inform the accomplishment of goals and document information and instructions established during training. | Qualified managers; training; operational workforce; culture; organizational climate. |
| | **Zero defects quality control** | Personnel training and definition of quality standards and tools. | Solve problems related to product quality. | Qualified managers; brand; relationship with suppliers; experience; training; strategic alliances and partnerships; raw material; heavy machinery; culture; customers; support equipment; operational workforce. |
| 1st semester/ 2012 | **Kaizen (continuous improvement)** | Improvement teams and periodical Kaizen events. | Promote continuous improvement with the participation of workers, also to implement the best practices and stimulate innovation management. | Qualified managers; experience; training; relationship with suppliers; culture; operational workforce; organizational climate. |
| | **5s** | Through the gradual implementation of each sense. Lectures were made on the implementation of each sense. | To have a favorable, clean and healthy working environment and to disseminate a positive organizational culture. | Qualified managers; experience; operational workforce; culture; training; organizational climate. |
| | **Pull production** | Reduced inventory in process. | Avoid large amount of inventory. | Qualified managers; experience; software; training; relations with suppliers; culture; customer data; raw material; heavy machines; support equipment. |

**Table 10.** Continued...

| When? | What? | How? | Why? | Resources? |
|---|---|---|---|---|
| 2nd semester/ 2012 | **SMED** | Through the partnership between the production and maintenance areas | Enable the reduction of production batches and increase the availability of equipment. | Qualified managers; operational workforce; training; heavy machines; culture; support equipment; software. |
| | ***Poka yoke*** | Through jigs and use of ready sandal patterns to assist in the visualization of the final product. | Avoid operational errors or failures and guarantee product quality and standardization. | Qualified managers; operational workforce; experience; training; culture; heavy machines; support equipment. |
| 1st semester/ 2013 | **Total productive maintenance** | Partnerships between production and maintenance areas. | Assure availability and functioning of equipment. | Qualified managers; operational workforce; training; heavy machinery; culture; support equipment; organizational climate; experience; raw material. |
| 2nd semester/ 2013 | **Autonomation (*jidoka*)** | Studies to grant operators autonomy to detect problems and stop the production line. | For everybody to realize the notion of quality and assure process reliability. | Qualified managers; experience; operational workforce; training; culture; organizational climate; support equipment. |
| | **Kanban system** | Pilot implementation in a department, based on the consultant's instructions. | Assist the synchronization activities and keep intermediate inventory levels under control. | Qualified managers; experience; software; training; relationship with suppliers; customers data; culture; raw material; operational workforce. |
| | **Just in time (JIT)** | Still in its initial phase; lacks the training of strategic, tactic and operational personnel, also to expand the system to the supply chain. | Assure the least process lead-time and minimize inventory. | Qualified managers; experience; training; relationship with suppliers; operational workforce; culture; organizational climate; software; customers data; raw materials; strategic partnerships and alliances; heavy machinery; support equipment; location. |

## 4.4 Step 4 - Practices *versus* resources

After identifying resources to implement LP practices, the Practice *vs.* Resource matrix (Table 11) was used to analyze the intensity of the relationship between them. For that, we divide the global levels of influence (weak, medium and strong) determined by the sum and classified as shown in Table 12. To evaluate the resources (step five - presented in the next section), we considered those resources that had a sum that would result in a level of "medium" or "strong" influence.

Through Table 11 it is possible to observe that the company has five resources which demonstrated strong relevance in the LP practices implementation: operational workforce; qualified managers; heavy machines; culture and training. It should be noted that the "culture" obtained a relevant sum, but was still classified as "medium" regarding the level of influence. This may have occurred because "culture"

**Table 11.** Practice *vs*. resources.

| PRACTICES | RESOURCES | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Operational workforce** | **Qualified managers** | **Raw material** | **Customers** | **Heavy machinery** | **Location** | **Support equipment** | **Culture** | **Organizational climate** | **Strategic partnerships and alliances** | **Training** | **Brand** | **Software** | **Customers data** | **Relationship with suppliers** | **Outsourced services** | **Experience** |
| Value stream mapping | | 2 | | | | | | | | | | | 1 | | | 2 | |
| Standardized work | 3 | 3 | | | 2 | | | 2 | | | 3 | | | | | | |
| Production leveling (*heijunka*) | 3 | 2 | | | | | 1 | 1 | | | 2 | | | | | | |
| Multifunctional teams | 3 | 2 | | | 2 | | 1 | 3 | | | 3 | | | | | | |
| Visual management | 2 | 3 | | | | | | 3 | 2 | | 3 | | | | | | |
| Zero defects quality control | 2 | 3 | 3 | 1 | 1 | | 3 | 2 | | 3 | 2 | 1 | | | 3 | | 3 |
| 5S | 3 | 3 | | | | | | 3 | 3 | | 3 | | | | | | 3 |
| Pull production | | 2 | 2 | | 1 | | 1 | 1 | | | 1 | | 2 | 1 | 1 | | 1 |
| Kaizen | 3 | 3 | | | | | | 3 | 3 | | 3 | | | | 3 | | 1 |
| SMED | 2 | 2 | | | 3 | | 1 | 1 | | | 3 | | 1 | | | | |
| *Poka yoke* | 2 | 3 | | | 2 | | 1 | 2 | | | 3 | | | | | | 1 |
| Total productive maintenance | 1 | 2 | 2 | | 3 | | 1 | 2 | 1 | | 3 | | | | | | 1 |
| Autonomation (*jidoka*) | 3 | 3 | | | | | 2 | 2 | 2 | | 3 | | | | | | 1 |
| Kanban system | 2 | 1 | 2 | | | | | 1 | | | 3 | | 1 | 1 | 1 | | 1 |
| Just in time | 2 | 2 | 3 | | 2 | 2 | 2 | 2 | 3 | 3 | 3 | | 1 | 3 | 1 | | 3 |
| **TOTAL** | **31** | **36** | 12 | 1 | **16** | 2 | 13 | **28** | 14 | 6 | **38** | 1 | 6 | 5 | 9 | 2 | 15 |
| Strong relation = 3 Medium relation = 2 Weak relation = 1 | | | | | | | | | | | | | | | | | |

Source: field research.

**Table 12.** Score intervals for the Practice vs. Resource Matrix.

| SCORING INTERVALS | LEVEL OF INFLUENCE |
|---|---|
| 1 to 15 points | Weak |
| 16 to 30 points | Medium |
| 31 to 45 points | Strong |

is an intangible resource and therefore difficult to identify because it depends on the perception of each interviewee since it is rooted in the organization's history and trajectory. Considering the resources identified in this step, these were analyzed to verify their potential to provide a competitive advantage, as shown in the following section.

## 4.5 Step 5 – Evaluating resources

Among the resources analyzed as most important for the implementation of LP practices, three are tangible (operational workforce, skilled managers, and heavy machinery) and two are intangible (culture and training). Operational workforce and qualified managers are the resources that have demonstrated strong importance for the implementation and maintenance of LP practices since the company recognizes that through them the practices are well implemented.

The heavy machinery is part of the company's facilities; it is fundamental to a manufacturing organization. Therefore, some practices, such as zero defects quality control, single minute exchange of die, and total productive maintenance, have been

implemented in order to guarantee superior operational performance. These practices are helping to produce sandals according to the production goals to keep the product quality, an important competitive priority defined by the operations strategy, which demonstrates the alignment of LP and operation strategy.

Culture and training were the most difficult resources detected by the interviews because they are complex and difficult to identify. However, once considered important, respondents stated that they were adapted and improved over time according to lean implementation. Thus, the organizational culture was fundamental to the implementation and success LP and, throughout the implementation process, the LP system itself influenced management and organizational culture. In addition, training for LP was intensified and improved through studies. The training aimed at improving and nowadays is a routine in the Industrial Engineering Department.

Training and culture are resources that act in an integrated way in the organization, demonstrating that the resources interaction is essential for their value and sustainability. Therefore, intangible resources have strongly influenced in the improvement of tangible resources, operational workforce and qualified managers.

Table 13 synthesizes the results from resources evaluation according to the value, sustainability, and versatility criteria. Regarding the value of resources, only "operational workforce" received a "medium" rating. For the Interviewees 1, 2 and 3, workforce is a resource that on the one hand is characterized as important, because it exerts influence on the company's profitability and allows threats' reduction. However, on the other hand, the level of performance of this resource compared to competitors is in the "medium" rate. The value criteria of the resources qualified managers, heavy machinery, culture and, training, were evaluated as "high", since they are considered with a strong impact on the company's profitability, and only some competitors have the same resources. Besides, these resources are important in relation on minimizing threats and exploiting opportunities, since the company has an organizational structure capable of directing the internal resources to obtain an expected result, even if this direction happens unexpectedly.

The value of the training resource is highlighted once again, which was evaluated as highly positive regarding the exploration of market opportunities, since the culture of continuous learning is intrinsic in the behavior of managers, especially when there is a need training. As benefits, the company ensured greater agility to change, more significant practical skill related to the handling of the machines, greater knowledge about LP practices and, therefore, better quality of the final product.

The sustainability criteria results reflected the characteristics of the company context. For example, operational workforce and heavy machinery presented a "medium" sustainability, since they are resources that can be easily copied and acquired by competitors. In addition, the sustainability of the operational workforce is described as an obstacle due to the large turnover of employees. The managers qualified are resources that also presented a "medium" result for sustainability, because even having some difficulty to be acquired by other competitors, this resource is not exclusive to the company under study. However, the learning developed over time has enhanced this resource.

The culture presented a "very high" result for sustainability since it is a resource considered unique and cannot be substituted or copied by another organization since there is causal ambiguity, as well as social complexity. In addition, the company considers culture and training as resources that cannot be replaced by other resources because no other resource would be able to provide a similar result.

Finally, concerning versatility, qualified managers, organizational culture, heavy machinery, and training are recognized by the company under study as relevant ("high" result), as the company seeks to elaborate policies and procedures to support resources in the organization. Therefore, the company has some degree of explicit knowledge to reproduce this resource in other parts or units.

The empirical data has confirmed the strong influence that resources related to the organization's people (operational workforce, qualified managers, and training) exert on the success of the LP implementation,

**Table 13.** Evaluation summary of selected resources.

| | CRITERIA | | |
|---|---|---|---|
| **RESOURCES** | **VALUE** | **SUSTAINABILITY** | **VERSATILITY** |
| Operational workforce | Medium | Medium | Medium |
| Qualified managers | High | Medium | High |
| Heavy machinery | High | Medium | High |
| Culture | High | Very high | High |
| Training | High | High | High |

Source: field research.

something that has already been highlighted in the literature of the area (Alagaraja & Egan, 2013; Martínez-Jurado et al., 2014). Similarly, the strong emphasis on the formation of lean culture as an essential resource corroborates with recent research (Bortolotti et al., 2015; Wiengarten et al., 2015), which point to culture as one of the main critical success factors for LP implementation.

## 5 Conclusion and discussion

When analyzing the results obtained from empirical evidence, the first conclusion that emerges is that the main goal of analyzing how the strategic resources contributed to the implementation of the LP, using as theoretical support the Resource-Based View (RBV) was reached. The case studied represented a real example of how the success of the LP depends heavily on the development of strategic resources, as highlighted in Lewis's pioneering work (2000).

The LP practices are aligned with the competitive priorities of the operations strategy. Fifteen practices implemented by the company were identified, although some of them are still in the initial phase, since (i) they were recently adopted, such as the poka-yoke, autonomation, and kanban systems; and, (ii) the company does not have sufficient organizational resources for completely implementation, such as pull production and just in time. Among the resources considered most important for lean implementation, we highlight the operational workforce, qualified managers, heavy machinery, culture, and training. Based on RBV's theoretical lens, they presented significant results concerning value, sustainability, and versatility.

Thus, the organization's resources were central to LP implementation, defining the elements that made this process viable and successful. Although the LP is advocated as a widely applicable management model (Womack & Jones, 2003), the case demonstrated that the implementation of the system could not be easily or immediately imitated, being considered unique to the company. It was possible to verify that the implementation process evolved from the abilities that it acquired, being influenced mainly by:

- Unique historical conditions: initially the company sought to implement practices that would aid in the process of operational workforce training. This fact was exclusive to the company and supported the implementation of other practices since the employees had training for the awareness of the importance of lean philosophy.
- Causal ambiguity and social complexity: some resources considered important for the LP implementation are not easily identified by competitors since there is ambiguity in their development process (it is not known exactly what are the factors that form them) as well as social complexity (people and relationships of the organization). The interaction between the resources helped in the adoption and maintenance of the improvements achieved, and the competitive advantage. In addition, resources have been improved throughout lean implementation, especially learning developed over time.
- As a theoretical contribution, an analysis procedure composed of five steps was developed to analyze how the strategic resources contributed to the LP implementation and to the competitive advantage. This procedure is considered easy to use and applied since it is composed of several forms that help in the information collection. All the steps in the analysis procedure generated relevant outputs since they presented useful information for subsequent analyzes. The instruments of data collection and analysis were also developed in a self-explanatory way so that they could be understood by the interviewees and perhaps used by the company itself.

Regarding practical contributions, this research can provide support to managers to understand the relevance of the resources for the LP implementation in order to identify and develop the key resources for this system. In particular, identifying the resources that have contributed to the successful implementation of LP can help decision-makers to signal the improvements and investments needed to improve such resources, as well as improvement of certain practices that need these resources to be fully implemented, such as pull production, poka yoke, autonomation, kanban systems and just in time.

Also regarding practical contributions, the steps of the analysis procedure acted as signals to the organization about the subject importance. For example, in the third stage of the procedure, when respondents needed to list the resources that were required for LP implementation, some of them became aware of the strong dependency ratio between practices and resources. The high level of detailing draws attention to the resources that may be representative for the organization.

In the scientific field, researchers that demonstrate the relationship between LP and RBV are still scarce, highlighting the following works: Lewis (2000), Forrester et al. (2010), Parry et al. (2010) and Gibbons et al. (2012). Thus, this paper contributes to enriching the literature on the subject and proposes a relevant analysis procedure. As the developed

procedure integrated the concepts of LP and RBV for a more structured analysis of the contribution of resources to lean production, these aspects became another differential of this research.

Further research could include in the evaluation analysis the maturity degree of the implemented practices since this aspect could contribute to the best use of the resources that are considered important for LP. In addition, since the data collection was done individually with each interviewee, it is suggested to apply the analysis procedure through focus groups, in order to stimulate the development of ideas in a collective context, involving a larger number of respondents, including other company's departments. Further research can also apply the analysis procedure in other organizations of the footwear sector in order to increase its applicability. As a final suggestion for future research, the analysis procedure should be comparatively applied in multiple case studies, highlighting the importance of resources for LP in different organizations.

## References


Åhlström, P., & Karlsson, C. (1996). Change processes towards lean production: the role of the management accounting system. *International Journal of Operations & Production Management*, 16(11), 42-56. http://dx.doi.org/10.1108/01443579610131447.

Alagaraja, M., & Egan, T. (2013). The strategic value of HRD in lean strategy implementation. *Human Resource Development Quarterly*, 24(1), 1-27. http://dx.doi.org/10.1002/hrdq.21155.

Amit, R., & Schoemaker, P. J. H. (1993). Strategic assets and organizational rent. *Strategic Management Journal*, 14(1), 33-46. http://dx.doi.org/10.1002/smj.4250140105.

Arend, R. J., & Lévesque, M. (2010). Is the resource-based view a practical organizational theory? *Organization Science*, 21(4), 913-930. http://dx.doi.org/10.1287/orsc.1090.0484.

Azevedo, C. A. M., & Azevedo, A. G. (2008). *Metodologia científica: contributos práticos para a elaboração de trabalhos acadêmicos* (9. ed.). Lisboa: Universidade Católica Editora.

Barber, C. S., & Tietje, B. C. (2008). A research agenda for value stream mapping the sales process. *Journal of Personal Selling & Sales Management*, 28(2), 155-165. http://dx.doi.org/10.2753/PSS0885-3134280204.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120. http://dx.doi.org/10.1177/014920639101700108.

Barney, J. B. (2001). Is the resource-based "view" a useful perspective for strategic management research? Yes. *Academy of Management Review*, 26(1), 41-56.

Barney, J. B., & Hesterly, W. (2007). *Administração estratégica e vantagem competitiva*. São Paulo: Pearson Prentice Hall.

Barratt, M., Choi, T. Y., & Li, M. (2011). Qualitative case studies in operations management: trends, research outcomes, and future research implications. *Journal of Operations Management*, 29(4), 329-342. http://dx.doi.org/10.1016/j.jom.2010.06.002.

Bhasin, S. (2012). An appropriate change strategy for lean success. *Management Decision*, 50(3), 439-458. http://dx.doi.org/10.1108/00251741211216223.

Bhasin, S., & Burcher, P. (2006). Lean viewed as a philosophy. *Journal of Manufacturing Technology Management*, 17(1), 56-72. http://dx.doi.org/10.1108/17410380610639506.

Bonavia, T., & Marin-Garcia, J. A. (2011). Integrating human resource management into lean production and their impact on organizational performance. *International Journal of Manpower*, 32(8), 923-938. http://dx.doi.org/10.1108/01437721111181679.

Bortolotti, T., Boscari, S., & Danese, P. (2015). Successful lean implementation: organizational culture and soft lean practices. *International Journal of Production Economics*, 160, 182-201. http://dx.doi.org/10.1016/j.ijpe.2014.10.013.

Chen, J. C., Li, Y., & Shady, B. D. (2010). From value stream mapping toward a lean/sigma continuous improvement process: an industrial case study. *International Journal of Production Research*, 48(4), 1069-1086. http://dx.doi.org/10.1080/00207540802484911.

Chen, L., & Meng, B. (2010). The application of value stream mapping based lean production system. *International Journal of Business and Management*, 5(6), 203-209. http://dx.doi.org/10.5539/ijbm.v5n6p203.

Deflorin, P., & Scherrer-Rathje, M. (2012). Challenges in the transformation to lean production from different manufacturing-process choices: a path-dependent perspective. *International Journal of Production Research*, 50(14), 3956-3973. http://dx.doi.org/10.1080/00207543.2011.613862.

Duran, O., & Batocchio, A. (2003). Na direção da manufatura enxuta através da J4000 e o LEM. *Revista Produção*, 3(2), 1-23.

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, 14(4), 532-550. http://dx.doi.org/10.5465/amr.1989.4308385.

Feld, W. M. (2000). *Lean manufacturing: tools, techniques, and how to use them*. Boca Raton: CRC Press. http://dx.doi.org/10.1201/9781420025538.

Forrester, P. L., Shimizu, U. K., Soriano-Meier, H., Garza-Reyes, J. A., & Basso, L. F. C. (2010). Lean production, market share and value creation in the agricultural machinery sector in Brazil. *Journal of Manufacturing*

*Technology Management*, 21(7), 853-871. http://dx.doi.org/10.1108/17410381011077955.

Galsworth, G. (2004). The value of vision: the language of lean production is self-ordering and self-improving. *Industrial Engineering (American Institute of Industrial Engineers)*, 36(8), 44-50.

Gibbons, P. M., Kennedy, C., Burgess, S. C., & Godfrey, P. (2012). The development of a lean resource mapping framework: introducing an 8th waste. International. *Journal of Lean Six Sigma*, 3(1), 4-27. http://dx.doi.org/10.1108/20401461211223704.

Grant, R. M. (1991). The resource-based theory of competitive advantage: implications for strategy formulation. *California Management Review*, 33(3), 114-135. http://dx.doi.org/10.2307/41166664.

Gruber, M., Heinemann, F., Brettel, M., & Hungeling, S. (2010). Configurations of resources and capabilities and their performance implications: an exploratory study on technology ventures. *Strategic Management Journal*, 31(12), 1337-1356. http://dx.doi.org/10.1002/smj.865.

Kasul, R. A., & Motwani, J. G. (1997). Successful implementation of TPS in a manufacturing setting: a case study. *Industrial Management & Data Systems*, 97(7), 274-279. http://dx.doi.org/10.1108/02635579710191707.

Kunc, M. H., & Morecroft, J. D. W. (2010). Managerial decision making and firm performance under a resource-based paradigm. *Strategic Management Journal*, 31(11), 1164-1182. http://dx.doi.org/10.1002/smj.858.

Lewis, M. A. (2000). Lean production and sustainable competitive advantage. *International Journal of Operations & Production Management*, 20(8), 959-978. http://dx.doi.org/10.1108/01443570010332971.

Liker, J. K. (2004). *The toyota way: 14 management principles from the world's greatest manufacturer*. New York: McGraw-Hill.

Lin, Y., & Wu, L. Y. (2014). Exploring the role of dynamic capabilities in firm performance under the resource-based view framework. *Journal of Business Research*, 67(3), 407-413. http://dx.doi.org/10.1016/j.jbusres.2012.12.019.

Ljungberg, Õ. (1998). Measurement of overall equipment effectiveness as a basis for TPM activities. *International Journal of Operations & Production Management*, 18(5), 495-507. http://dx.doi.org/10.1108/01443579810206334.

Maciel, C. O., & Camargo, C. (2009). Competências e desempenho de organizações varejistas: um estudo na visão baseada em recursos. *Revista Brasileira de Gestão de Negócios*, 11(32), 308-321. http://dx.doi.org/10.7819/rbgn.v11i32.164.

Martínez-Jurado, P. J., Moyano-Fuentes, J., & Jerez-Gómez, P. (2014). Human resource management in Lean Production adoption and implementation processes: success factors in the aeronautics industry. *BRQ Business Research Quarterly*, 17(1), 47-68. http://dx.doi.org/10.1016/j.cede.2013.06.004.

McCutcheon, D. M., & Meredith, J. R. (1993). Conducting case study research in operations management. *Journal of Operations Management*, 11(3), 239-256. http://dx.doi.org/10.1016/0272-6963(93)90002-7.

Mills, J., Platts, K., & Bourne, M. (2003). Applying resource-based theory: methods, outcomes and utility for managers. *International Journal of Operations & Production Management*, 23(2), 148-166. http://dx.doi.org/10.1108/01443570310458429.

Mills, J., Platts, K., Bourne, M., & Richards, H. (2002). *Competing through competences*. Cambridge: Cambridge University Press. http://dx.doi.org/10.1017/CBO9780511754692.

Monden, Y. (2012). *Toyota production system: an integrated approach to just-in-time* (4th ed.). Boca Raton: CRC Press.

Netland, T. H., & Aspelund, A. (2013). Company-specific production systems and competitive advantage: a resource-based view on the Volvo production system. *International Journal of Operations & Production Management*, 33(11-12), 1511-1531. http://dx.doi.org/10.1108/IJOPM-07-2010-0171.

Newbert, S. L. (2007). Empirical research on the resource-based view of the firm: an assessment and suggestions for future research. *Strategic Management Journal*, 28(2), 121-146. http://dx.doi.org/10.1002/smj.573.

Newbert, S. L. (2008). Value, rareness, competitive advantage, and performance: a conceptual-level empirical investigation of the resource-based view of the firm. *Strategic Management Journal*, 29(7), 745-768. http://dx.doi.org/10.1002/smj.686.

Ohno, T. (1997). *O sistema Toyota de produção: além da produção em larga escala*. Bookman: Porto Alegre.

Panizzolo, R., Garengo, P., Sharma, M. K., & Gore, A. (2012). Lean manufacturing in developing countries: evidence from Indian SMEs. *Production Planning and Control*, 23(10-11), 769-788. http://dx.doi.org/10.1080/09537287.2011.642155.

Parry, G., Mills, J., & Turner, C. (2010). Lean competence: integration of theories in operations management practice. *Supply Chain Management*, 15(3), 216-226. http://dx.doi.org/10.1108/13598541011039974.

Penrose, E. T. (1968). *The theory of the growth of the firm*. Oxford: Basil Blackwell.

Pertusa-Ortega, E. M., Molina-Azorín, J. F., & Claver-Cortés, E. (2010). Competitive strategy, structure and firm performance: A comparison of the resource-based view and the contingency approach. *Management Decision*, 48(8), 1282-1303. http://dx.doi.org/10.1108/00251741011076799.

Peteraf, M. A. (1993). The cornerstones of competitive advantage: a resource-based view. *Strategic Management*

*Journal*, 14(3), 179-191. http://dx.doi.org/10.1002/smj.4250140303.

Santos, L. C., Gohr, C. F., Cruz, I. K. H., & Cunha, H. S. (2015). Como dar suporte às estratégias de empresas hoteleiras? Uma análise segundo a visão baseada em recursos. *Production*, 25(2), 403-415. http://dx.doi.org/10.1590/0103-6513.036612.

Shah, R., & Ward, P. T. (2003). Lean manufacturing: context, practice bundles, and performance. *Journal of Operations Management*, 21(2), 129-149. http://dx.doi.org/10.1016/S0272-6963(02)00108-0.

Shingo, S. (1996). *O sistema Toyota de produção: o ponto de partida da engenharia de produção*. Porto Alegre: Bookman.

Swanson, R. E. (2008). A generalized approach to demand buffering and production levelling for JIT make-to-stock applications. *Canadian Journal of Chemical Engineering*, 86(5), 859-868. http://dx.doi.org/10.1002/cjce.20093.

Voss, C., Tsikriktsis, N., & Frohlich, M. (2002). Case research in operations management. *International Journal of Operations & Production Management*, 22(2), 195-219. http://dx.doi.org/10.1108/01443570210414329.

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5(2), 171-180. http://dx.doi.org/10.1002/smj.4250050207.

Wiengarten, F., Gimenez, C., Fynes, B., & Ferdows, K. (2015). Exploring the importance of cultural collectivism on the efficacy of lean practices: taking an organisational and national perspective. *International Journal of Operations & Production Management*, 35(3), 370-391. http://dx.doi.org/10.1108/IJOPM-09-2012-0357.

Womack, J. P., & Jones, D. T. (2003). *Lean thinking: banish waste and create wealth for your corporation*. 2nd ed. New York, NY: Free Press.

Womack, J. P., Jones, D. T., & Ross, D. (2004). *A máquina que mudou o mundo*. Rio de Janeiro: Elsevier.

Wu, L. Y. (2010). Applicability of the resource-based and dynamic-capability views under environmental volatility. *Journal of Business Research*, 63(1), 27-31. http://dx.doi.org/10.1016/j.jbusres.2009.01.007.

Yin, R. K. (1994). *Case study research: design and methods*. 2nd ed. Thousand Oaks: Sage.