International Journal of Industrial Engineering and Management (IJIEM), Vol. 8 No 2, 2017, pp. 77-89
Available online at www.iim.ftn.uns.ac.rs/ijiem_journal.php
ISSN 2217-2661

UDK: 658.5(81)

Strategic Materials Positioning Matrix: an Application in the Automotive Industry in Southern Brazil

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Received (14.06.2016.); Revised (12.12.2016.); Accepted (24.03.2017.)

Abstract

The purpose of this article is to describe the application of the Strategic Materials Positioning Matrix (SMPM) in two families of items (bolts and plastic finishing) purchased by a focal company of the automotive industry in Southern Brazil. SMPM is a tool to manage the reception of materials required from suppliers in a supply chain. The research method was the case study. SMPM classifies materials according to their impact on the results and according to the risk of shortage involved in the supply process. SMPM organizes materials in four classes: non-critical, strategic, risk, and competitive materials. The main results of the analysis were a significant reduction in the number of shortages observed in the assembly line, and the number of storage facility units required for warehousing. The study details the actions that produced such results.

Keywords: *Inventory Management, Material Management, Material Strategy, Strategic Materials Positioning Matrix.*

1. INTRODUCTION

The primary objective of a purchasing strategy is the supply of materials or services with adequate quality, amounts, and prices, contributing to the company's operation strategy. It is a strategic activity able to help reduce costs, speed up deliveries, increase quality and flexibility, adding value to the supply chain with direct influence on the profitability of the entire supply chain [1]. In general, the purchasing strategy connects with manufacturing and corporate strategies [2] and, combined with the production strategy [3], can provide a sustained competitive advantage to a supply chain [4]. Many times, purchasing and supply management assumes a more strategic role in organizations, based mainly on outsourcing, globalization and information technology, which turns companies more intertwined each other [5].

Usually, a reliable suppliers´ network, with a stable materials´ flow, at a reasonable cost, can positively influence organizational performance [6] [7]. In short, the performance of companies, especially manufacturers, has depended on the performance and the degree of development of their suppliers, which increases the importance of a strategy for the management of the supply network [8]. The importance of purchasing processes reflects the interest and dependency of companies and industries of materials obtained through a chain of suppliers, given that these interfere directly in the quality of the final product or service offered by the buyer company [2]. In the manufacturing industry, on average, more than 50% of the costs are due to the acquisition of materials, components, and services, varying according to the nature of the business [2]. Eventually, this share can reach 70% of the cost of a finished manufactured product [1].

In a purchasing strategy, one of the most important functions is the control of stocks of items available as raw materials for manufacturing. According to [9], the inventory management and the correct communication between the actors of the supply chain can increase the frequency of deliveries, reducing the size of the lots and the inventory required for production. Such increase of responsiveness can at the same time improve profitability, by reducing inventory, and protect against shortage risks, by calculating a safety inventory [2] [10].

In practice, a company can control accurately neither all inventory nor individuals items [11], which requires methods of classification of materials and various policies of resupply and stocks for each material. One of these methods is the ABC curve. The ABC represents a first analysis tool, which allows starting the process of prioritization of materials and services [12]. Despite being one of the more employed techniques in organizations, due to its simplicity [13], the ABC analysis has limitations and sometimes may not be able to provide a useful classification of inventory items [14]. Chu et al. [11] consider the ABC a limited method because it deals with a single criterion. They suggested an improvement, with their ABC-fuzzy classification (ABC-FC).

Sometimes, methods more sophisticated than the ABC may be required [15] [16]. Klippel et al. [12] proposed more elaborate alternatives, as the SMPM (Strategic Materials Positioning Matrix). SMPM classifies materials according to their impact on the results and according to the risk of shortage involved in the supply process. Instead of the unidimensionality of the ABC, SMPM is two-dimensional, requiring two variables for the classification: risk of shortage, and impact on results.

In the risk dimension, SMPM examines aspects related to the provision of materials (bargaining power, replacement materials, potential rivalry and market potential). In the impact dimension, the process of value creation based on the supplied item is considered. Inventory items are then classified according to the situation of the two variables, evaluated on two levels, high and low. Therefore, quadrants of materials are formed: non-critical, strategic, risk, and competitive materials. In particular cases, intermediate levels are required, increasing the number of classes. Some subjectivity is still present in the method, due to the necessity of judgment by experts. The analysis requires a group decision to reduce subjectivity.

The way to improve responsiveness and to qualify the processes involving the SMPM are to make more empirical studies and explore the results [12]. In this context, the purpose of this article is to describe the application of SMPM in two families of items (bolts and internal plastic finishings) purchased by a focal company of the automotive industry. The research method was the case study. The specific objectives are: (i) to describe the construction of the SMPM; and (ii) to evaluate the results based on the following variables: mean value of inventory, the number of materials shortages on the assembly lines; and the number of storage units occupied by studied items.

The literature involving methods of materials management presents many studies related to this article. Among many others, we highlight some. On ABC approach with multiple criteria, we highlight Ng [17], Chen et al. [18], Ravinder and Misra [19], among others. On qualitative approaches, we highlight Pereira et al. [20]. On methods encompassing both qualitative as quantitative criteria, we stress Flores et al. [21], Cakir and Canbolat [22], Motadel et al. [23], among others. On materials management to managing supply chain risks, we highlight Manuj and Mentzer [24], and Tummala and Schoenherr [25].

The remainder of this article presents a theoretical review of materials management techniques, the research methodology, results, discussion, and conclusion.

2. REVISION: MATERIALS MANAGEMENT TECHNIQUES

2.1 ABC Curve

Due to the simplicity, ease of implementation and positive results, the ABC method is the most widely used approach to classifying stock-keeping units (SKU) in industrial enterprises [18]. The ABC has its conceptual origin related to the theories proposed in the 19th century by the Italian economist and sociologist Vilfredo Pareto [13]. Pareto realized that 80% of the world's wealth concentrate in the hands of an elite group of about 20% of the population, and that is why his theory is known as "80-20 Law" [26].

The Pareto principle, however, is not restricted only to the field of Economics and has been applied in various sectors of human knowledge [27], including inventory management [28]. The ABC analysis refers to the 80-20 principle, in which about 20% of the items purchased by a company represent about 80% of the financial value spent [12] [23].

The ABC curve, therefore, allows prioritizing the management of materials and services purchased by a company, concentrating their efforts on the higher added value items [8] [12] [19]. The ABC curve sorts the items into three categories: A, the most important; B, intermediate; and C, the less valuable items, according to their capacity of add value to the final product [23] [16] [19].

The ABC method has some weaknesses. According to Teunter et al. [15], no clear guidance in the literature helps to determine the level of added value for each group. This lack makes unclear the distinction between the priorities of groups of items. If the groups are formed before the determination of the level of added value, the interaction between each group will not have been adequately exploited [16]. Klippel et al. [12] cite as disadvantages the facts that neither quality nor the strategic relevance of the received items is considered. According to Ramanathan [13], the ABC analysis is only successful when the inventory to be sorted is fairly homogeneous and the main difference between items is at its annual usage value (calculated from the unit price and the volume of demand, by the classical economic order quantity expression), which does not match reality in many cases.

2.2 **Kraljic Matrix**

The purchasing model presented by Kraljic [29] is one of the most used in industrial activities, and have inspired scholars in their research about purchasing management [30] [31] [32]. The purchasing strategy of a company depends on the results and on the impact of the risk of supply, leading to the construction of a 2 x 2 matrix that classifies the materials in four categories: leverage items, items of routine, strategic bottleneck items and items, as shown in (Fig 1) [29].
Figure 1 shows some characteristics of items and suggestions for actions on the management of materials of each quadrant, always considering the level of impact on financial results and the level of uncertainty in the supply. Leverage items allow the buyer to benefit from the competition between suppliers, provided that there is low uncertainty. Routine items require systems of electronic data interchange (EDI) since they are in large numbers and do not present any risk or high added value in the results. Bottleneck items are more complex because they present a high risk, preventing the buyer from a bargain with the supplier, and at the same time forcing suppliers to develop redundant sources and alternative solutions. Finally, the most complex and important class, the strategic items´ class. In this quadrant, the development of partnerships with the supply network is recommended because there is the consistent uncertainty of supply and the items represent a large part of the financial results of the company.
At least two sources of subjectivities in the Kraljic model were identified. The first is how to evaluate the supply risk dimensions and impact on results without influence of external factors [31]. The second is how to find the correct place of the items in the quadrants of the matrix [33].

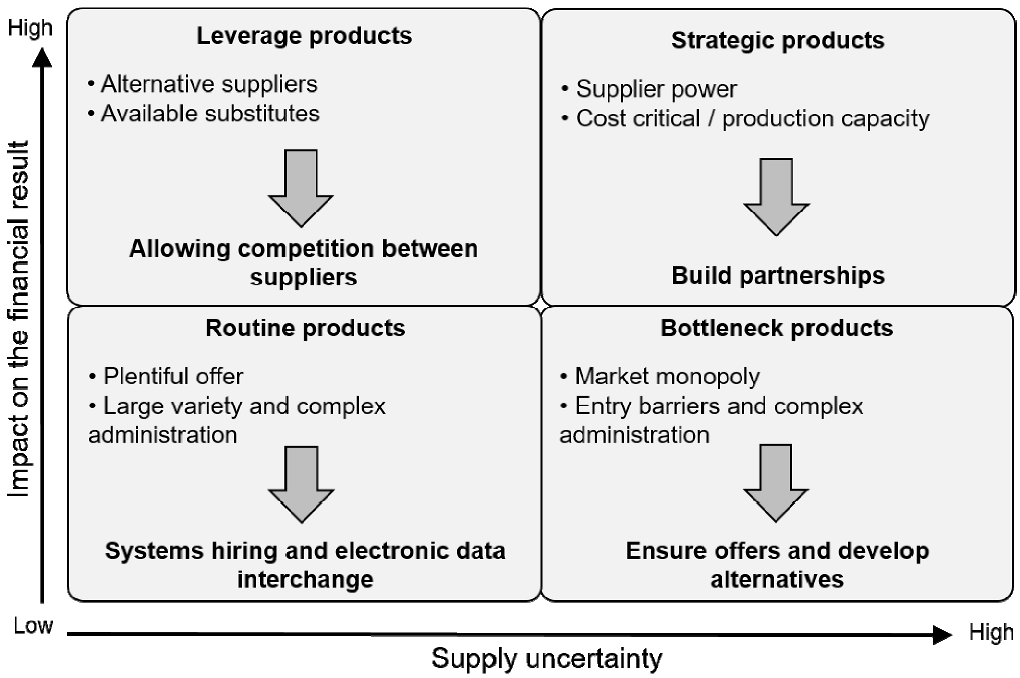

Figure 1. Kraljic Matrix
Source: [29] [32].

2.3 **Suppliers Segmentation Matrix (SSM)**

In the SSM, proposed by Cavinato and Kauffman [34] and presented in (Fig 2.), the considered variables are the cost of the item and risk of a shortage of the item. According to the same two-level classification, four classes result: tactical, leverage, critical, and strategical items.

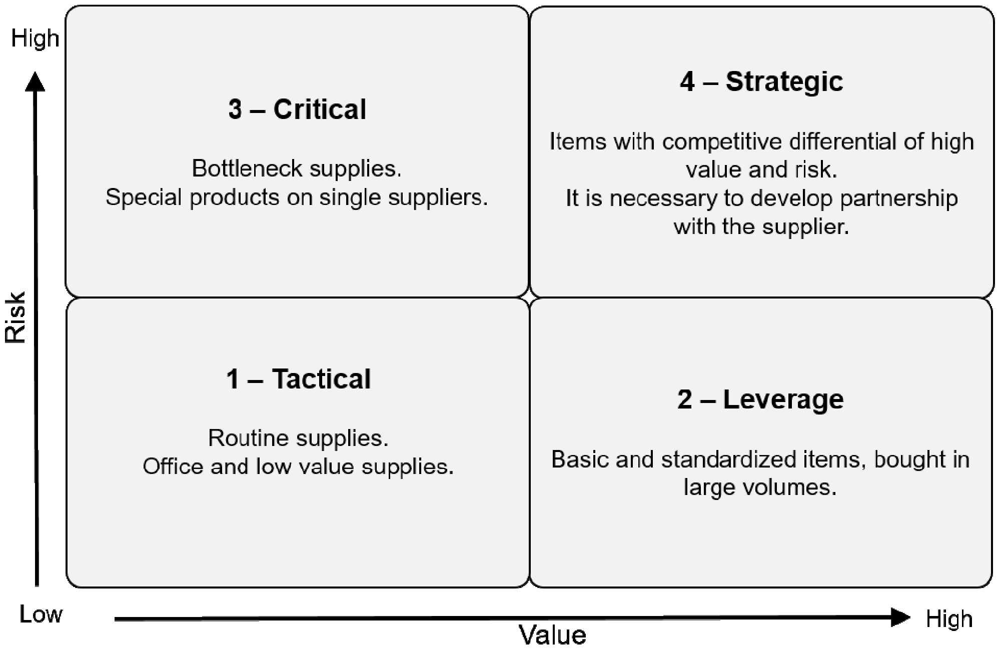

Figure 2. SSM
Source: [34].

Tactical suppliers represent those who supply the common materials, characterized as low-cost and which do not imply complex problems in case of lack of input. Those are suppliers that can be easily replaced. The strategy for these suppliers is a permanent bargain for advantages, such as lower lead-times, lower prices, and inventory reduction. Leverage vendors are responsible for providing high-value inputs that don't stop the production in case of lack. Usually, the availability of these suppliers is high. However, it is recommended to concentrate orders on a single supplier in order to lower costs of acquisition. Critical suppliers are those that supply low-cost materials with vital importance for the company, usually hi-tech materials. Usually, this class of suppliers shows low reliability in deliveries, which arises from the characteristics of the materials. In these cases, it is essential to seek new suppliers or substitute materials, to reduce shortages. Finally, the strategic suppliers offer high-cost and high-risk materials. This item is categorized as high added value and is differentiated materials that are provided by competitors. Companies must make long-term contracts and long-term develop partnerships with the vendor for this class of suppliers.

2.4 **Strategic Materials Positioning Matrix (SMPM)**

There are not many incidences of the SMPM in academic research. We explore those we found. The study published by [12] is the basis for the references regarding the SMPM in this article. SMPM has been developed based on the Kraljic matrix, to improve the model. SMPM embraces two theories. The horizontal axis relies upon the notion of competitive forces proposed by Porter [35], involving the entry of new products, threat of substitutes, bargaining power of suppliers, bargaining The power of buyers; and rivalry among existing competitors. The vertical axis relies on the so-called dimensions of production strategy: quality; cost; customer service; flexibility; innovation; and time to deliver. Dealing with the dimensions quality, cost, time, and innovation, Grieco [36] and Carter [37] built the global dimension value added of materials to identify the influence of each item in the result of the company. This is the basis for the vertical axis of the matrix.

To classify items according to their risk of shortage (horizontal) and according to their capacity of influence on the results of the company (vertical axis), the SMPM distributes purchased materials into quadrants, as shown in (Fig 3).

Competitive components, with high influence on the results and low risks of supply, enable reducing costs. Non-critical components have low influence on the results and are low risk and should be organized in such a way as to reduce the number of suppliers and increase their revenues. The risk components have little influence and high risk and should be managed by engineering and product design, to be modified and replaced in the matrix. Strategic components have a high degree of influence on the results and high risk. They should be handled by top management, because they involve strategic actions and decisions, as long-term contracts.

Some of the decisions required in the SMPM construction contain subjectivities. Regarding the impacts of risk and influence dimensions, which depend on the perception of the company or its employees, [12] used cumulative voting or multi-voting. Several practitioners of different areas participate in the decision. Another point of subjectivity is the determination of the cut-off of the quadrants of the matrix, which depends on and can affect the

The strategy adopted by the company. Depending on the cutting point, there may be many or few items requiring greater attention (those belonging to the strategic quadrant, for example). The suggestion given by Klippel et al. [12] is the adoption of a reasoned court Pareto principle, with 45% of their materials supply classified previously as low-risk.

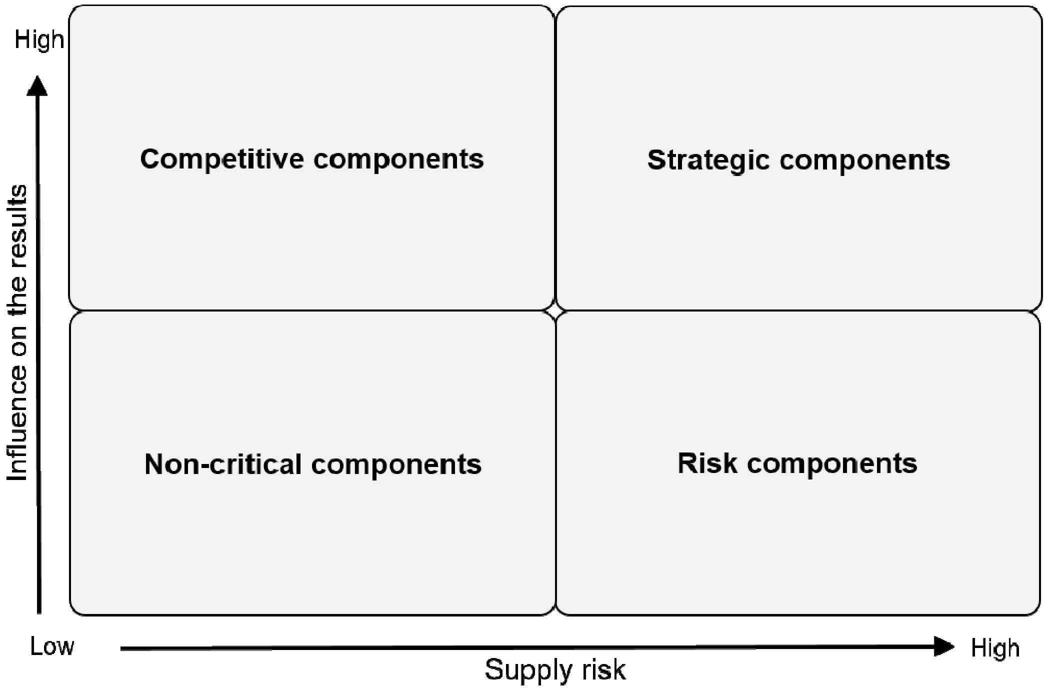

Figure 3. SMPM
Source: [12]

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3. METHODOLOGY

The research methodology is the case study. The main techniques of research were the documental analysis permitted by the company and semi-structured interviews with key managers. The case study is an empirical approach and aims to study in-depth an object (in this case, the inventory control of a company in the automotive industry), providing knowledge, fundamentals and explanations of facts or phenomena of reality. This is descriptive and exploratory research. The main approach is qualitative because the achieved results originate from judgments of practitioners.
The unit of analysis was a bus company in Brazil. The company has customers in different segments including Highway buses, urban, micros, and specials, distributed in 30 countries. The company has 28 years in the market and has about 3,000 employees producing on average 20 vehicles per day. Its annual turnover is greater than R$ 500 million, and its share in the Brazilian market is approximately 15%. It is portfolio features seven lines of vehicles with several particularities intended to meet the vast majority of options demanded by the market. The company has grown about 45% in an absolute number of vehicle production in the last ten years, and it requires an expansion of 25% during the same period.
The construction of the SMPM followed the steps proposed by Klippel et al.[12]:

Step 1: Presentation of the methodology for the Group Manager;
Step 2: Definition of the Working Group (WG);
Step 3: Definition of products and materials to be treated;
Step 4: Training of methodology;
Step 5: Polls aimed to classify the materials;
Step 6: Processing the data from the polls;
Step 7: Critical analysis of the results;
Step 8: Preparation of strategic proposals;
Step 9: Presentation of results to the directors;
Step 10: Action plan for consolidation and management forms;
Step 11: Implementation of the action plan;
Step 12: Action plan for control of the results; and
Step 13: Redesign of the actions.

All the steps were followed and deployed successfully, allowing the impact of the analysis to be evaluated in two families of items in the company. SMPM was implemented along twelve months. Results were identified and measured by monitoring information system of the company, as well as by reports from the purchasing area.

4. RESULTS AND DISCUSSION

Each manufactured bus requires over 1,000 items, from 15 different families of materials. Each of these families comes from a different supply chain, with distinct characteristics. The importance of the respective items in the production process is linked to the position where each vehicle is on the Assembly line. No vehicle reaches completion without all components properly installed. Purchases of raw materials are planned based on some concepts widely used by the automotive industry. All demands arise from the composition of the products. These structures are prepared by the engineering sector, in the same way, that the projects, specifying the quantities of each material to be used in their vehicles, the basic characteristics of the composition of each material, and projects by defining the geometry and other constructive aspects of the product.

Such material relationships become part of a database, which is analyzed and classified by sector, responsible for separate items according to their composition classes (steel, aluminum, plastics, electronics, etc.) put in sequence, do the prospecting and development of suppliers, quotes, plan logistics and supply contracts. In this step, the prospected volumes of purchases are also identified and the classification is made for each item, where purchases of the same shall be programmed as PP (Purchase Point) or MRP (Material Requirement Planning). The items classified as Purchase Point (PP) are those regularly used in most vehicles produced, while the items programmed as MRP are sporadic use items or utilized in specific models of vehicles.

For items classified as PP, purchases are made in specific lots, which ensure the supply of assembly lines for a certain period, enabling the company to purchase batch optimization, freight, storage, and supply. On the other hand, this form of programming impacts in increased inventory and does not guarantee the supply, and in the case of fluctuating demand outside the limits, the reaction time of the suppliers may be higher than necessary, resulting in a lack of materials.

In the case of the MRP items or items of material requirements planning, stock values are already below the point of analysis. However, the supply risk is greater. Such factors occur for several reasons, the main ones being: the supply lead time, compounded by the difficulty of making early predictions based schedules; parts with quality problems identified in inspections of deliveries; and items damaged during the assembly process in the lines and need of replacement. Another challenge for the items purchased through this programming model is the characterization of each kind of item, that is, some families of items require unique raw materials and low volume of purchases, or due to being items supplied exclusively for the company studied, no servicing is in stock from suppliers. In these cases, the company chooses to run the risk of shortages or delaying production of the vehicles.

The choice depends on two aspects: the importance of the item in the construction of the vehicle and delivery to the customer. If the item does not arrive in time to be mounted within the production line but does not prevent the construction of the vehicle, as is the case with some finishing details, and there are tight deadlines for deliveries, the vehicle is put on the assembly line and waits for the arrival of materials creating delays. However, if the item essential to the construction of the vehicle, as some structural components, it is not possible to start manufacturing.

However, although additional alternatives for the supply of materials exist, these two forms of programming are not able to fully eliminate risks of shortages of materials or problems with their supply process, which continuously contribute to the increase of the volumes of stocks volumes. Such factors justified the adoption of SMPM, aiming at improving its performance in the face of the risks of each product family and the need to reduce inventories, to reduce costs.

The company, with the application of the matrix, ranked all product families properly in the quadrants of the matrix, and subsequently elaborated actions to each of the families following the general approach to the quadrants of the matrix suggested by Klippel et al. [12], pointing in this chapter only to aspects relating to families of bolts and internal plastic finishings.

Table 1 shows the weighted influence on the results and the supply risk for each family of materials. These indices are the result of voting processes of the Working Group (WG) designated for the construction of the SMPM, and followed the steps as outlined in (Fig 4.) The WG was formed by factory managers (an internal division of the plant), line production supervisors, quality control representatives, supply developers, programming and production control, logistics, procurement, costs and product engineering.

Table 1. Classification of items

Items	Weighted influence on the results	Supply risk	Final Score	Final Classification
Passenger elevator	1,00	0,55	1,55	Competitive
Electronic itineraries	0,95	0,45	1,40	
Monitors and TV screens	0,90	0,45	1,35	
Cameras and sensors	0,85	0,30	1,15	
Audio video systems	0,85	0,30	1,15	
Bolts	0,30	0,30	0,60	Non-Critical
Fasteners	0,35	0,35	0,70	
Hinges	0,40	0,35	0,75	
Market optional	0,55	0,30	0,85	
Headlights	0,95	1,00	1,95	Strategic
Lanterns and flashers	0,90	1,00	1,90	
Multiplex command	0,80	0,95	1,75	
On-board computer	0,80	0,90	1,70	
Internal plastic finishings	0,60	0,90	1,50	Risk
Other internal items	0,60	1,00	1,60	
Fabric coverings	0,50	0,90	1,40	
Glass	0,65	0,80	1,45	

The weighted influence on results derives from a voting process of the WG, in which members voted on the relative weight of the products and the influence of each material, taking into account four factors: cost, quality, use of time, and technology.

For the weight of the product, each practitioner distributed weights according to the importance it gives to each factor, into the product under review, adding 1.0. To evaluate the influence of the material, the voter must assign from 0 to 5 (0 represents little influence and five great influentials) for each item. In this case, the WG should consider each material according to their relevance about a particular product. The multiplication of these results creates the weighted Influence.

The supply risk also results from a process of voting. However, the materials are scanned regardless of the final product. The factors considered were: bargaining power (bargaining power, which may be the buyer or the supplier, having intensity of 0 to 5, respectively); (possibility of substitution of the material, where 0 for easy replacement and 5 for very difficult substitution); rivalry (competition between suppliers, where a large number of suppliers reduces the risk, getting close to 0); and barriers to entry (possibility of development of a new supplier, 0 to 5 vote).

With the indexes of the weighted influence and supply risk, the final score determines to which quadrant the material belongs. The definition of the cut-off points that define the quadrants is also the target of voting and consensus of the WG. Polls and analyses of results were made by family, with no vote per item: once classified in the family, all that compose it will have the same configuration, the same treatment, and the same supplier. This management method is to choose the company and aims to better conditions for negotiating with suppliers, as well as the standardization of vehicle components mounted elements.

Figure 4 shows the SMPM with the families of items in each quadrant, with italicized names for the families analyzed in this article. The number of items in each quadrant relates to items belonging to the families so classified, also listed in their respective quarters.

The bolts´ family was classified in the quadrant of non-critical components and the strategy adopted for it was the reduction in the range of suppliers.

With this strategy, the revenues of each supplier increased as with the increase in the volume of purchases. To this family, a bid was made between the main suppliers. A single vendor, who presented the best prices and terms of payment, won the bid and held the supply of all items used in the factory.

Then, the vendor took over the full supply and remaining stocks in the company were exhausted, passing these to be the responsibility of the supplier. Being the material supplied in the Assembly lines only paid to the supplier when the triggering of a kanban card, that is, when the full use of the material, which contributed to maintaining virtually zero stock items within the company, remaining only the material used in the production lines.

The family of internal plastic finishings, was classified as a component of risk, and actions taken were (i) increased partner development, in order to ensure and maintain stocks of raw materials with purchase guarantees within a given period; (ii) development of alternative projects to meet any specific raw materials shortages without subtracting from the quality of vehicles; and (iii) reduction of the amount of raw materials used, through standardization of designs, and simultaneously improving the conditions for suppliers stock regulation.

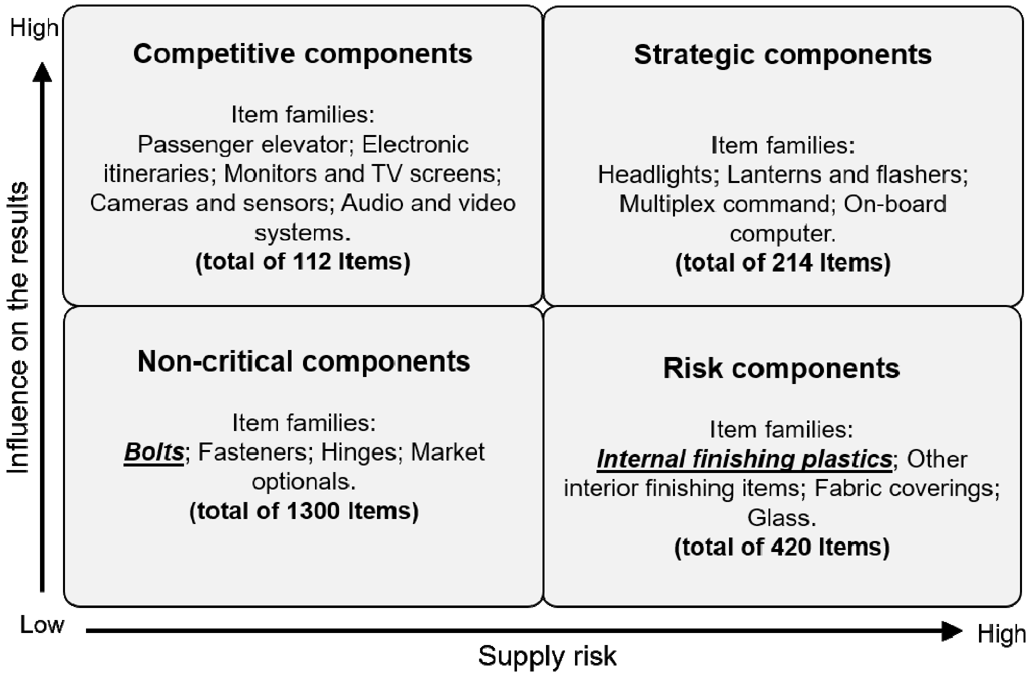

Figure 4. SMPM for the studied items

The criteria adopted for assessing the results of the implementation of the SMPM in the families, in a monthly basis, were: i) average value of stock of each family; ii) number of shortages on assembly lines; iii) average number of storage units-UAs-occupied in the warehouse. We used number of shortages instead of cost of shortage because the higher loss in setting up the production line whenever a shortage occurs. The cost of a shortage is usually the same, regardless the type of shortage. The analysis considered a period of six months before the SMPM and twelve months after this construction. The values shown are percentages, to preserve the original information of the company studied. However, it is possible to make accurate assessments of the results of the deployment.

The results obtained after the implementation of the SMPM on the family of bolts are presented in (Fig. 5, 6 and 7). As the values are expressed in percentages, 100 the period presented the highest incidence in the parameter analyzed, and all the other percentages are about this period of increased incidence.

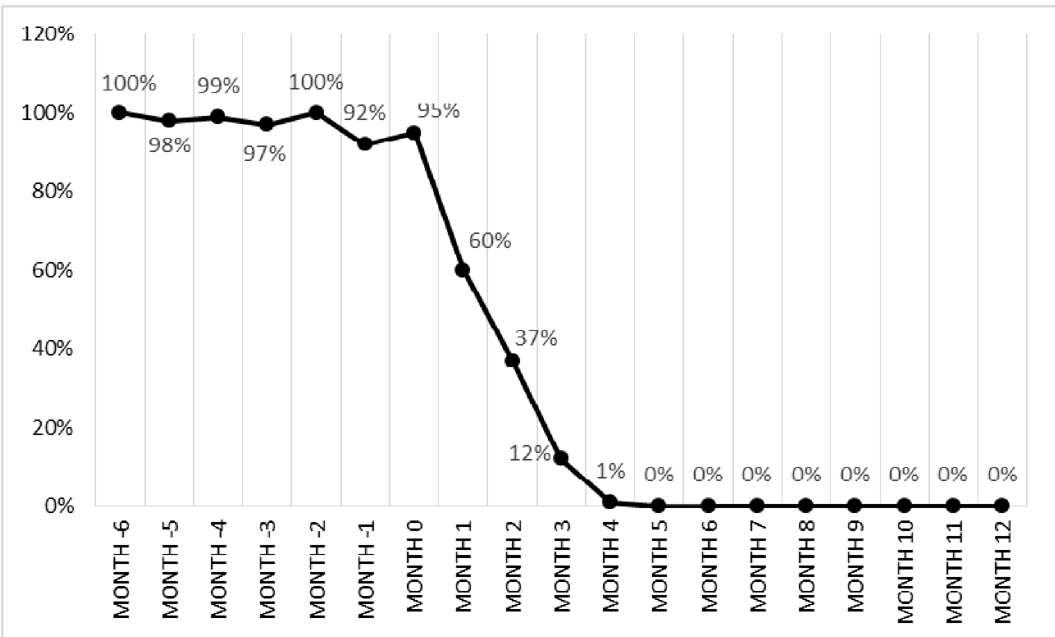

Figure 5. Mean monthly value of inventory of bolt families

During the four months of implementation, the inventory mean value fell from 92% of the maximum value to such a low value that can be considered null (0%). The drop is related to the supply system adopted by the company. The number of bolts needed for the Assembly lines is supplied in the form of consignment by the supplier, and the values of those items are only paid when triggered by the factory for kanban cards for new supplies, being all the stock held by the supplier.

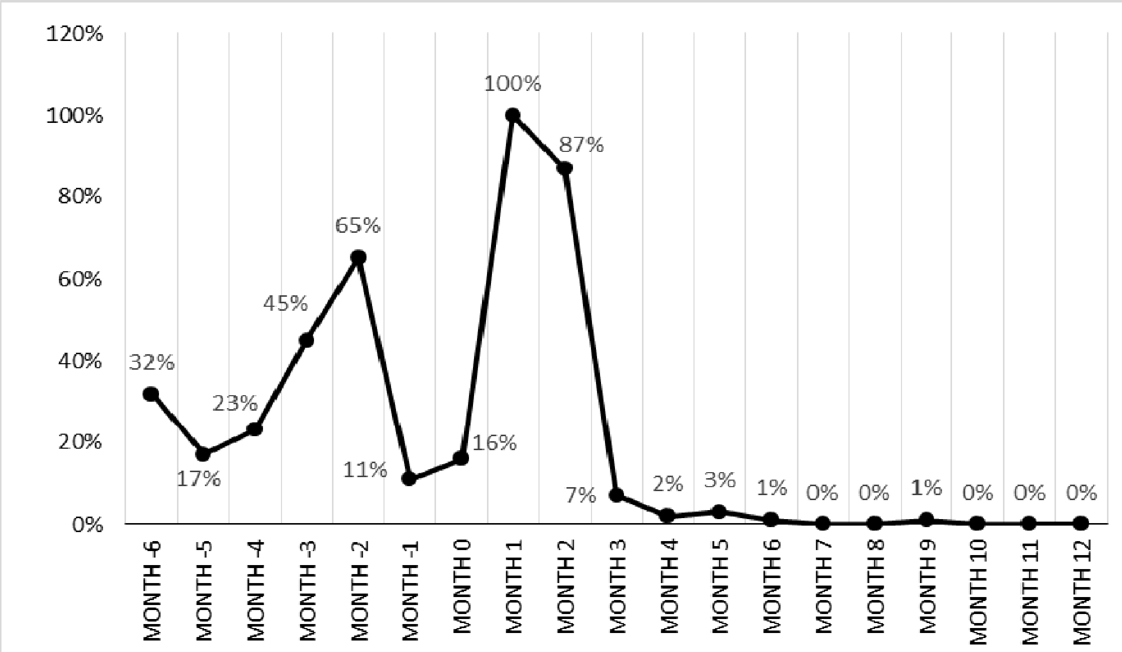

Figure 6. Number of monthly faults of items of the family of bolts on assembly lines

The number of shortages before implementation had erratic behavior, ranging from 65% to 11%. The standard deviation before month zero was 20%. In the first two months after the implementation of the project, the shortages had increased, mainly due to the need for physical space adjustments to provision of materials in assembly lines and kanban cards configuration to the drives of refills left. However, after the first two months, shortages have reduced showing five months without the absence of this family items. After the implementation (from month 3), the calculated standard deviation reduced to 1.06. This reduction demonstrates the significant fall in the variability of the process.

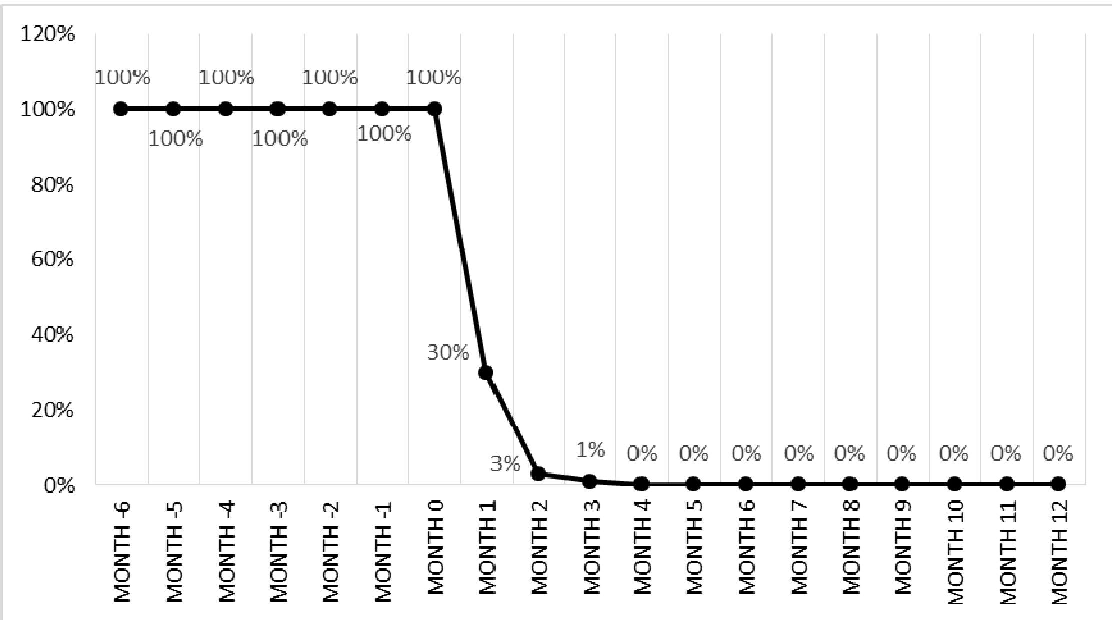

Figure 7. Number of storage units occupied by items from the family of bolts in the warehouse

Another parameter evaluated was the use of the physical space in the warehouse of the company. As shown in (Fig 7.), three months after the implementation of the actions defined for this family of items, a 100% reduction was observed in the use of the storage space reserved for the bolts. This area could be used to improve the storage conditions of other items used by the company without the need for investments.

The same criteria were adopted to measure the results obtained with the family of internal plastic finishings. The biggest problem with the components items of this family was the lack of products, i.e. the lack of items on assembly lines, causing delays in product deliveries to final customers. The results are shown in (Fig. 8, 9 and 10).

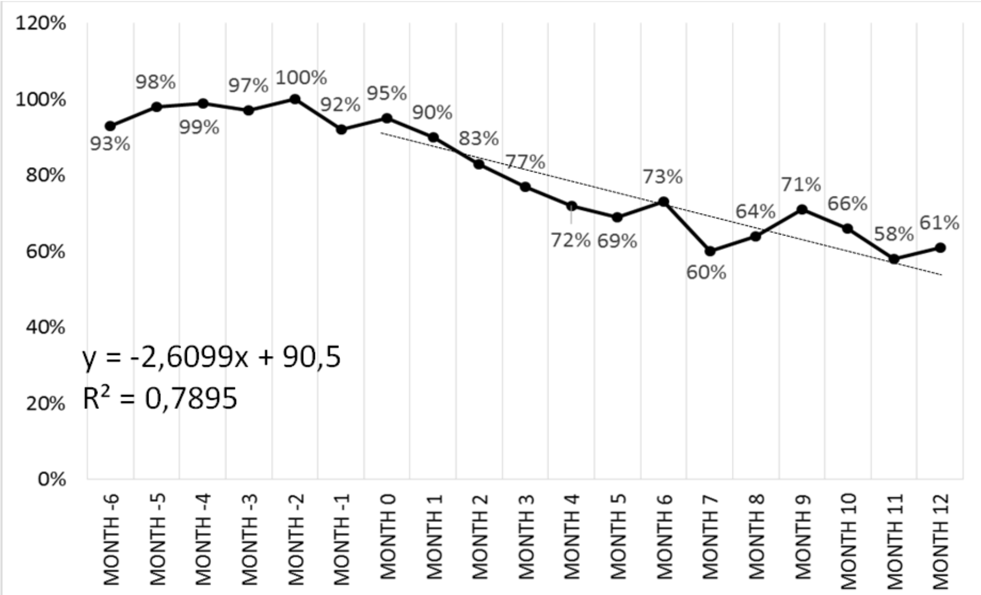

Figure 8. Mean monthly value in inventory of plastic family of internal finishes

After the SMPM, the mean value of the inventories of the items of the family of internal plastic finishings decreased by 26%. In the month zero, the mean value was 95%. After the SMPM, the mean value fell according to an average rate of 2.6% per month, with an R^2 of 0.78. This occurred because of the strategies adopted by this family of items, that reliability in the supply system, decreasing inventory volumes of internal security.

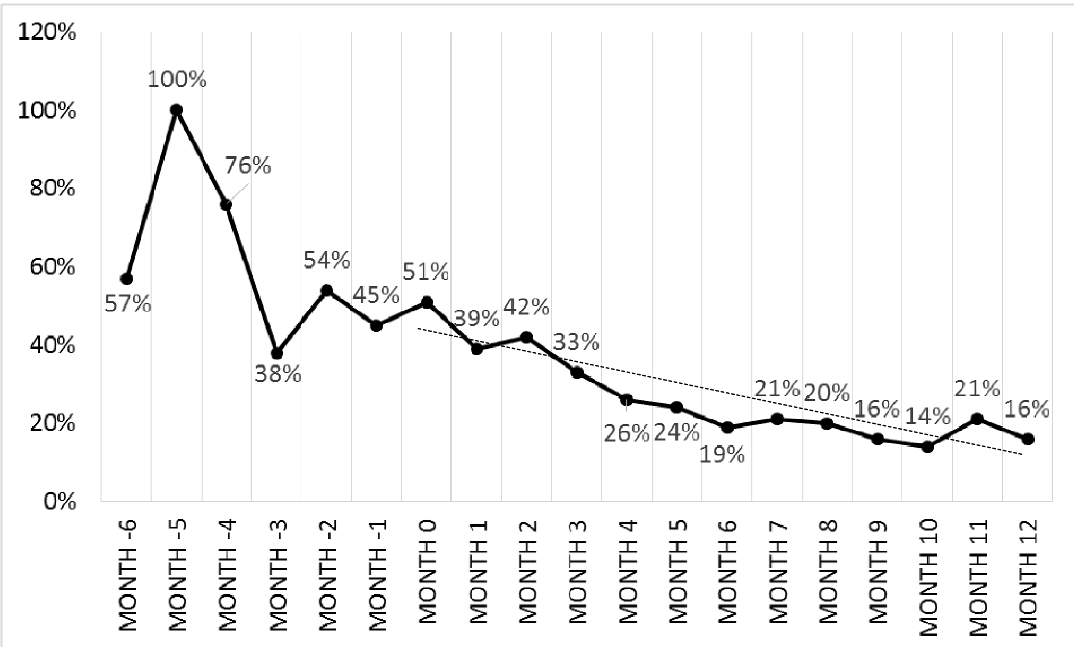

Figure 9. Number of monthly faults of the items of the family of internal plastic finishing

The number of faults in this family was 51% in the month zero. This number reduced, as shown in (Fig 9.), at an average rate of 2.62% per month, with R^2 of 0.79. This reduced is caused by the reduction of types of raw materials used to manufacture these components. This reduction was one of the strategic actions taken by the company's engineering departments studied, to improve inventory management in suppliers. With fewer varieties of raw materials, shortages of items for suppliers fell and can meet the deadlines.

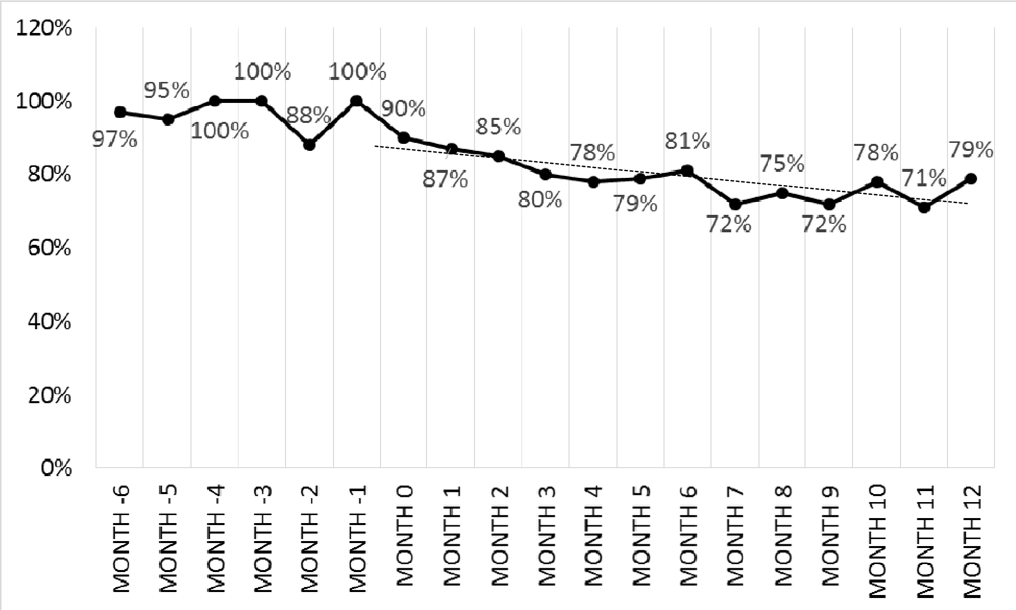

Figure 10. Number of storage units occupied by items of the family of plastic finishing

The number of storage units in the warehouse, used for the items of the family of internal plastic finishings reduced from 90% to 79%, due to the reduction of inventories by improving the reliability of vendors´ deliveries. The reduction occurred according to an average rate of 1.15% per month, with R2 of 0.6.

5. CONCLUSIONS

The observed results were obtained only by the implementation of the SMPM. No substantive changes have been carried out in the materials structure or the schedule of purchases.

The improvements obtained were provided solely by the application of management strategies for the components of each quadrant of the SMPM, as well as for the supply chain. The positive results are due to the correct division of the items in families, which occurred under the light of the SMPM and of the methodology used for their implementation, proposed by Klippel et al. [12]. Appropriate separation of items in SMPM provided appropriate strategies that enable better management of purchases and inventory. The methodology presented by Klippel et al. [12], combined with the concepts of strategic positioning of materials proved to be efficient in the studied case. The savings generated by this application can roll back into a competitive advantage for the company providing you with better opportunities to gain business in the marketing of their products.

This study has limitations. As a case study, the strategies adopted by these two quadrants of the matrix and these families of items can be applied specifically to the company, replicating the results in other situations is not possible by now. The study encompassed only two families of two quadrants of the matrix. Finally, the risk factors vary according to the context and analysis concerning the introduction of new factors in the management of the company's materials as economic, political and geographic issues. Therefore, there is a need for a periodic review of the risks to which the company is submitted, and the factors presented here are inherent to this survey.

For further research, one can point new empirical applications of the SMPM, preferably in other industries, also sorting by inventory item, not only by the family of items. In this case, the results of the SMPM may be different. As another suggestion, one can investigate if materials remain in the same quadrant over the years.

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Matrica pozicioniranja strateških materijala: Aplikacija u automobilskoj industriji u južnom Brazilu

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Apstrakt

Cilj ovog rada je da pruži detaljan opis primene matrice pozicioniranja strateških materijala (SMPM) u dve grupe predmeta (vijci i zavrtnji i plastična završna obrada) koje je kupila fokusna kompanija automobilske industrije u južnom Brazilu. SMPM je alat za upravljanje prijemom materijala potrebnih od dobavljača u lancu snabdevanja. Metod istraživanja bazira se na studiji slučaja. SMPM klasifikuje materijale prema njihovom uticaju na rezultate i prema riziku od nedostatka uključenog u proces snabdevanja. SMPM organizuje materijale u četiri klase: nekritični, strateški, rizični i konkurentni materijali. Glavni rezultati analize bili su značajno smanjenje broja nedostataka na liniji montaže kao i na jedinicama za skladištenje. Studija detaljno opisuje akcije koje su proizvele takve rezultate.

Ključne reči: *Upravljanje zalihama, upravljanje materijalima, strategija materijala, matrica pozicioniranja strateških materijala*