Journal of Business and Economics, ISSN 2155-7950, USA
October 2023, Volume 14, No. 10, pp. 457-466
DOI: 10.15341/jbe(2155-7950)/10.14.2023/002

http://www.academicstar.us

The Use of Performance Indicators as a Tool to Support Supplier Management in Large Companies in the Metal-mechanic Sector of Santa Catarina

Narjara Goerttmann[1], Diego Milnitz[2], Maria Eduarda Silva[3], Luene Tamara Martins[3]
(1. Fundação Universidade Regional de Blumenau, Brazil; 2. Universidade Federal do Paraná, Brazil; 3. Sinergia College, Brazil)

Abstract: This article aims to analyze the use of performance indicators in the evaluation of suppliers in large companies in the Metal-Mechanical sector of Santa Catarina and their impact on the relationships between the companies involved. Firstly, a theoretical review was performed showing the importance of the supplier throughout all the production chain and then reports the results, which were collected from field research in a sample of 41 companies. With the results, it was possible to verify the number of indicators that companies usually use, which indicators are considered most important, and which improvements were perceived with this supplier evaluation tool.

Key words: metal-mechanical sector, suppliers, performance indicators
JEL codes: M

1. Introduction

With increasing competition in the current market, companies had to find new ways of managing to remain competitive and profitable. Among these forms of management, the search for strategic partnerships with suppliers stands out, as the market demands increasingly higher quality of the goods and services offered (Cavalcanti et al., 2010).

Currently, the purchasing function is no longer responsible for the simple act of purchasing; this function has increasingly taken on the role of developing mutual relationships with suppliers, to build a satisfactory result for both parties involved in the process (Barros, 2012).

According to Baily et al. (2010), “organizations spend 80% of their budget with 20% of suppliers”. Considering this data, the development process and constant monitoring of suppliers through performance indicators becomes essential to avoid expenses related to delays, partial deliveries, and poor quality of products supplied.

Narjara Goerttmann, Fundação Universidade Regional de Blumenau; research area: production engineering. E-mail: narjara.g@gmail.com.br.
Diego Milnitz, Ph.D., Universidade Federal do Paraná; research area: production engineering. E-mail: dmilnitz@gmail.com.
Maria Eduarda Silva, Graduation Student, Sinergia College; research areas: operational excellence, quality, process engineering. E-mail: Duda.eduarda1@hotmail.com.
Luene Tamara Martins, Graduation Student, Sinergia College; research areas: operational excellence, quality, process engineering, ergonomic. E-mail: luene_tamaraa@hotmail.com.

In front of the context presented, this article aims to analyze the use of performance indicators in the evaluation of suppliers in large companies in the metal-mechanical sector in Santa Catarina and their impact on the relationships between the companies involved. In this regard, an objective questionnaire developed based on a literature review on the researched topic will be applied to a sample of 41 companies in the metal-mechanical sector in the state of Santa Catarina, and subsequently, a descriptive statistical analysis of data will be carried out to enable the carrying out of proposed analyses.

To this end, in addition to this brief introduction, the article presents a literature review on supply chain management, supplier evaluation, and performance indicators related to supplier management, in section 2, then presents the methodological procedures, in section 3, in sequence presents the research results in section 4 and, finally, the research conclusions where opportunities for future research are also suggested, in section 5.

2. Bibliographic Review

2.1 Supply Chain Management

For Lambert and Enz (2016) a supply chain definition must be made from a company, called "focus company", where the members of the supply chain comprehend, in this view, all the organizations with which the company operates. The focus relates directly or indirectly, forming a system as shown in Figure 1.

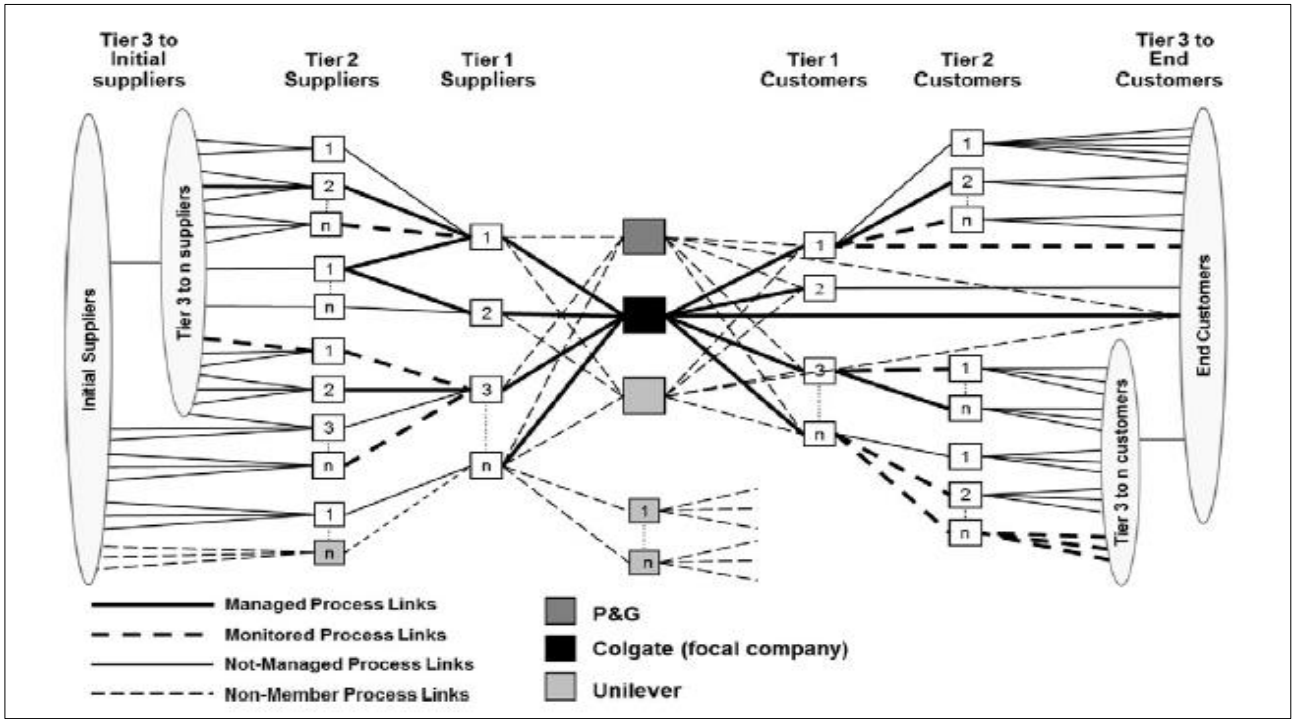

Figure 1 Supply Chain Management

Source: Lambert (2014)

According to Ritzman and Krajewski (2004), the supply chain is a network that connects material suppliers and service providers. It involves the process of converting raw materials into products and services that are made available to a company's customers. To remain competitive, companies need to identify suppliers who can offer them excellent service.

2.2 Suppliers Evaluation

The objective of suppliers evaluation, according to Gurgel and Francischini (2002), is to prove the supplier's ability to offer products with the requested specifications, thus creating a quality assurance system.

Suppliers evaluation is part of a very important process of controlling and implementing flow of information and materials. The company must seek to efficiently control this flow of information so that it knows which types of suppliers it is dealing with. This information must also be passed on to suppliers to assist them in investigating the causes of their problems and shortening the corrective action process (Christopher, 2002).

For Juran and Gryna (1992), evaluating supplier performance can bring many competitive advantages to organizations, such as helping to make decisions about whether or not the partnership between the organization and supplier should be maintained. Also according to Juran and Gryna (1992), not all suppliers should be evaluated due to the availability of time and other resources that are necessary for evaluation activity. According to the authors, companies should preferably focus on suppliers of the main components of their products.

2.3 Performance Indicators Related to Supplier Management

According to Nunes (2008), a performance indicator is used to measure and analyze the results obtained in certain periods. For Takashina and Flores (1996), indicators are quantifiable ways of representing the characteristics of products and services. Indicators are used to control and improve supplier performance and, according to the authors, it is important to monitor them so that tendencies can be seen and results compared. Bandeira and Brunstein (1997) agree, and state that measurement is only justified when there is the objective of improving what was measured.

In order to have reliable results when measuring supplier performance, Meyer (2000) states that indicators should not be used in isolation, but rather a combination of indicators. According to the author, a good supplier evaluation system must have a limit of 15 performance indicators to be considered effective. The use of many indicators makes the evaluation process very time-consuming and expensive.

To carry out supplier evaluation, each company must define the indicators that best adapt to its needs. According to Ching (2001), the performance indicators related to supplier management and their respective measurement units are:

Table 2 Indicators Related to Supplier Management

Indicator	Metric
Quality of product received	Number of approved batch in relation to the total of lots received
Deadline	Number of batches received on time in relation to the total batches received or number of days late/advance
Quantity	Number of batches received in the right quantity
Price	Competitiveness in relation to market prices
Cost	Amount of cost reduction presented in relation to the total cost involved
Service level	Number of perfect deliveries in relation to the total number of deliveries
Bureaucracy	Level of ease of communication and speed in solving problems

Source: Adapted from Ching (2001).

According to Barros (2012), performance indicators are dynamic and must follow the development of organizations. For the author, in addition to the organization defining which indicators should be consider, it must also observe how the supplier reacts to the possibilities for improvement.

3. Methodological Procedures

The article in question can be classified as applied research, to generate knowledge about the application of performance indicators to solve supply problems. The problem approach is characterized as quantitative, where the aim is to measure the level of indicators used. As for the procedures, it is characterized as field research due to the application of a questionnaire to those responsible for acquiring inputs from companies to obtain data.

The questionnaire used in the research was previously developed by Rinckus (2014). It was sent via email to those responsible for purchasing inputs from large companies in the metal-mechanical sector in Santa Catarina. The 41 participants companies were chosen from the list prepared by FIESC in 2016 of companies in Santa Catarina. After receiving the completed questionnaires, analysis was carried out to understand and subsequently present the data obtained.

4. Results

4.1 Quantity and Types of Indicators

According to Figure 2, it is possible to observe that all companies interviewed use at least 1 indicator to measure the performance of their suppliers. Most of them, 41%, use between 3 and 4 indicators, and only 7% use 9 or more indicators. The data obtained meets the limit proposed by Meyer (2000), which argues that companies should use fewer than 15 performance indicators in their supplier evaluation process.

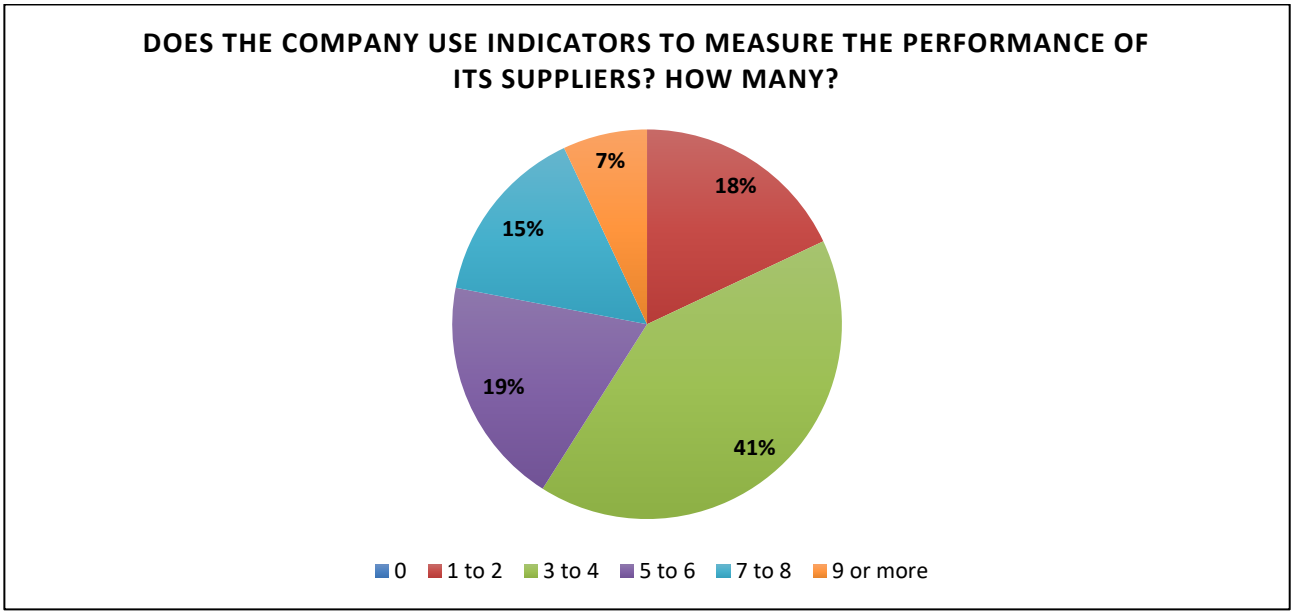

Figure 2 Number of Indicators Used by Companies

When asked about the types of performance indicators used, companies were able to indicate more than one answer. The three indicators most highlighted by the companies interviewed were: time/delivery period, quality, and cost/price. The time/delivery deadline indicator was highlighted by all interviewed companies, whereas quality and cost/price indicators were chosen by 89% and 67% of the companies respectively.

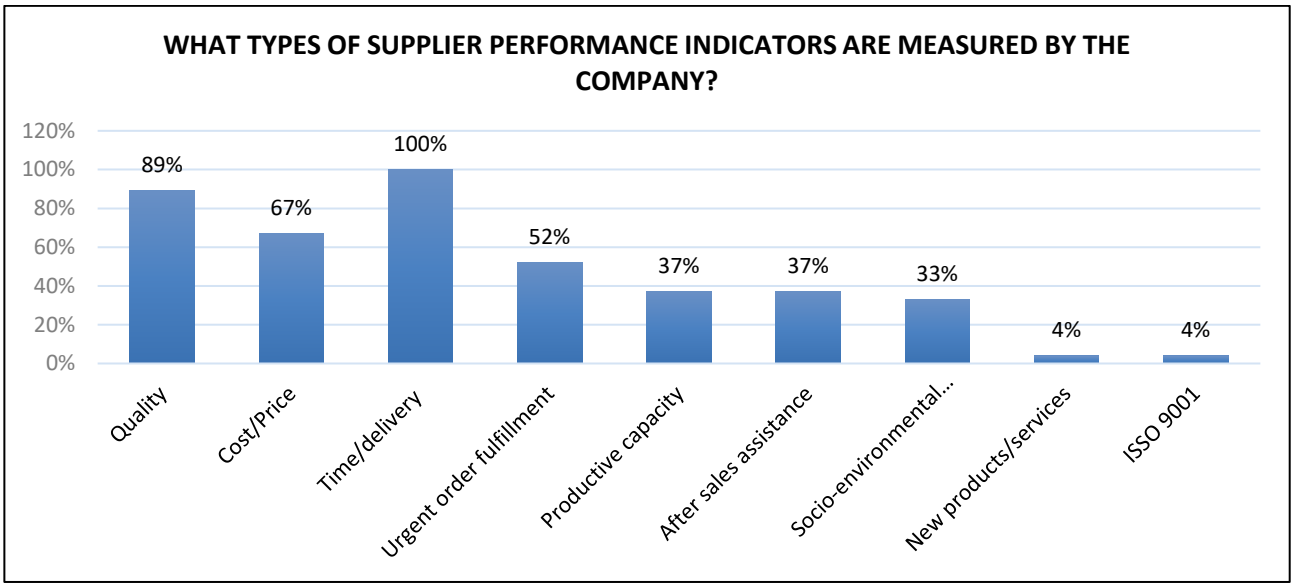

Figure 3 Types of Indicators Used by Companies

One of the companies interviewed, in addition to highlighting the indicators suggested in the question, also responded using the "others" field, which they completed by stating that they take into account the ISO 9001 certification of their suppliers.

4.2 Supplier Training Program

When asked about having a supplier training and development program, only 22% of companies completely agree with the question, 26% have an indifferent position and the rest disagree or completely disagree. The results are presented in Figure 4.

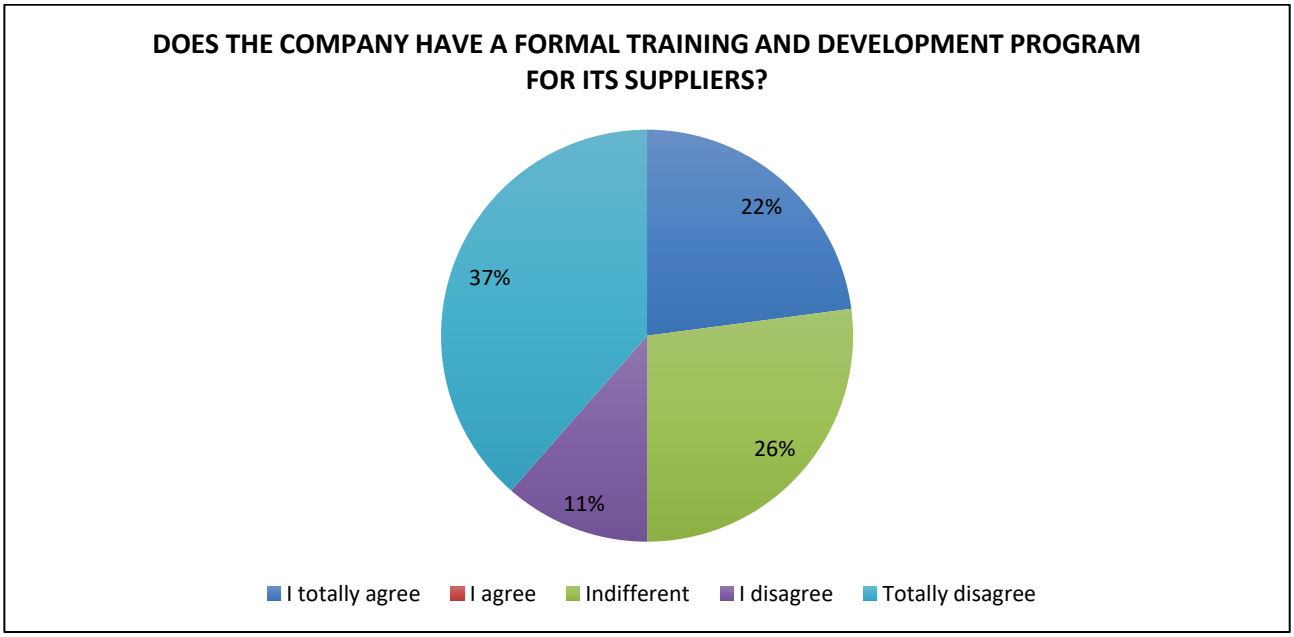

Figure 4 Supplier Training Program

4.3 Practices of Partnerships With Suppliers and Application of Bonuses/Penalties

An important issue to be analyzed is the existence of a partnership relationship between the company and its suppliers. As shown in Figure 5, the companies interviewed had a wide variety of responses regarding partnership practices.

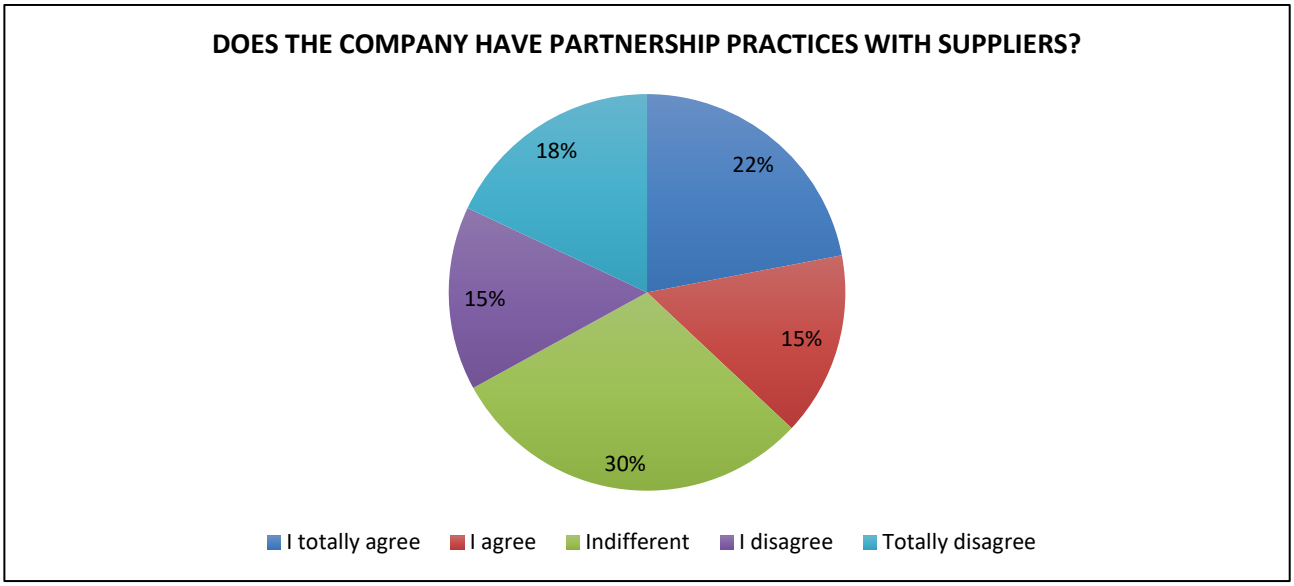

Figure 5 Practices of Partnerships With Suppliers

Companies were questioned regarding the application of bonuses/awards to suppliers with good performance and the application of penalties to suppliers with poor performance. The results can be seen in Figure 6.

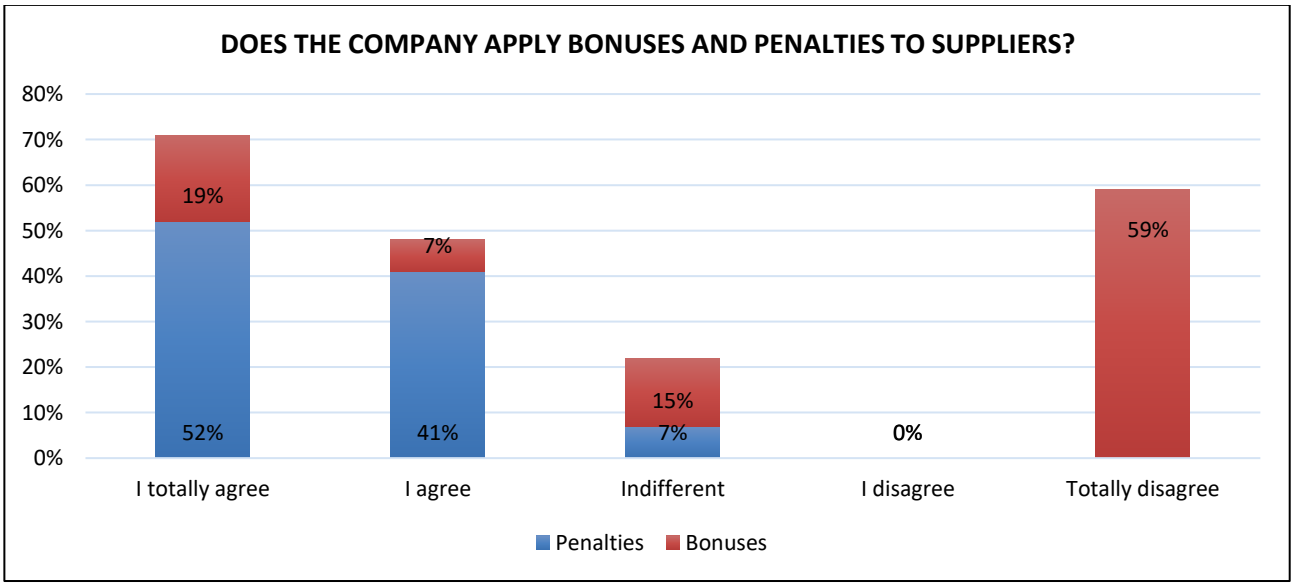

Figure 6 Application of Bonuses/Penalties

When analyzing Figure 6, it can be seen that most companies apply penalties to their suppliers who do not perform as expected and few claim to give bonuses to suppliers who offer good performance. These data, when compared with the results in Graph 4, show that some companies that claim to have a partnership relationship

with their suppliers do not establish an alliance between the parties, but rather, show that they still have an individualized form in their strategy of work.

4.4 Current Performance Information

Regarding the flow of information established between organizations, 63% of companies participating in the survey say they completely agree with informing suppliers about their current performance and 15% agree.

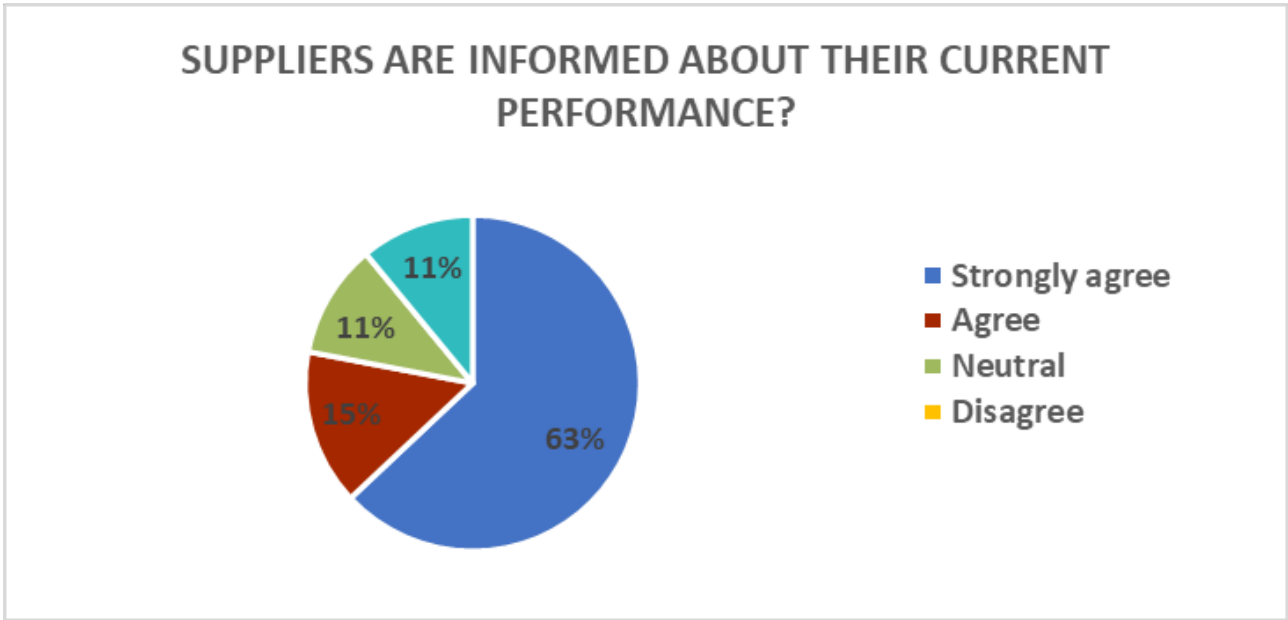

Figure 7 Current Performance Information

As was seen before in the bibliography review, Christopher (2002) defends that to get improvements through suppliers' Performance Assessment is required that those suppliers have had knowledge about their currently performance. According to the results obtained by virtue of the research, the majority of the companies interviewed gives importance to spreading information related to the Assessment to their suppliers, and only 11% claim to disagree with the inquiry and the other 11% disagrees completely.

4.5 Establishing Goals and Plans of Action

One of the questions asked to the companies was related to the establishment of goals according to the levels of performance to be still accomplished and also if the results obtained with the use of performance indicators lead the company to elaborate plans of action and effective seek for improvement. Data is represented by Figure 8.

Analyzing Figure 6, it is remarkable that the data obtained regarding the goals and plans of action are similar. The majority of the companies claim to establish goals according to the levels of performance and elaborate plans of action seeking improvement, and only 19% position themselves as indifferent to those questions, and none of the companies disagree or disagree completely.

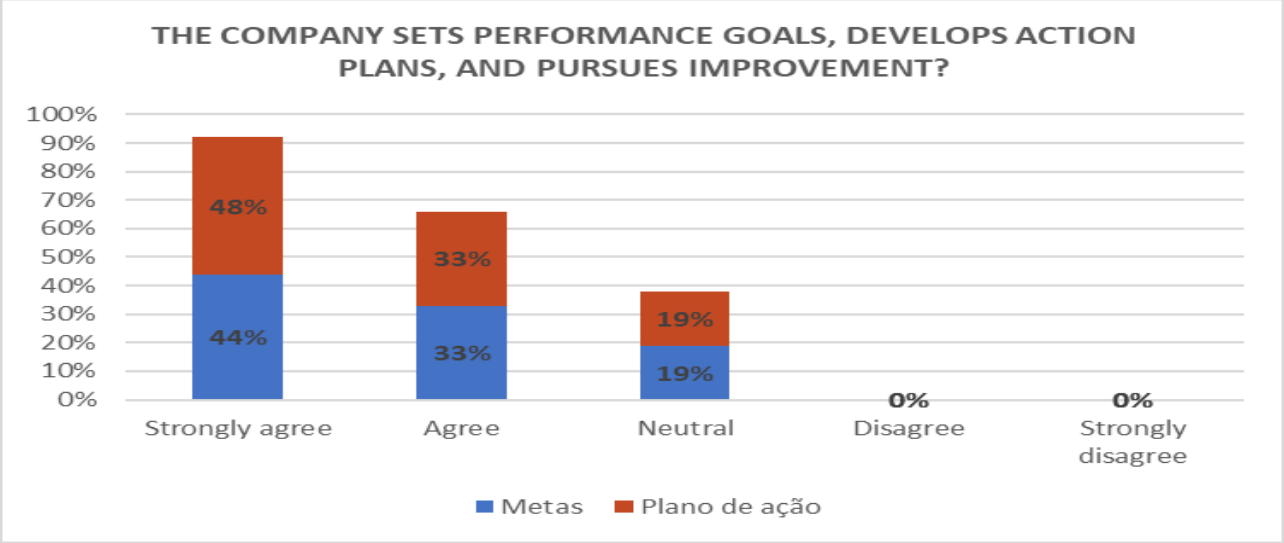

Figure 8 Setting Goals and Action Plans

4.6 Improvements in Quality, Prizes and Prices Through Indicators

The last questionnaire made to the companies referred to the improvements obtained through the use of suppliers' Performance Assessment indicators. The companies were questioned about the quality increase, delivery deadline increase and decrease of the product's price and cost.

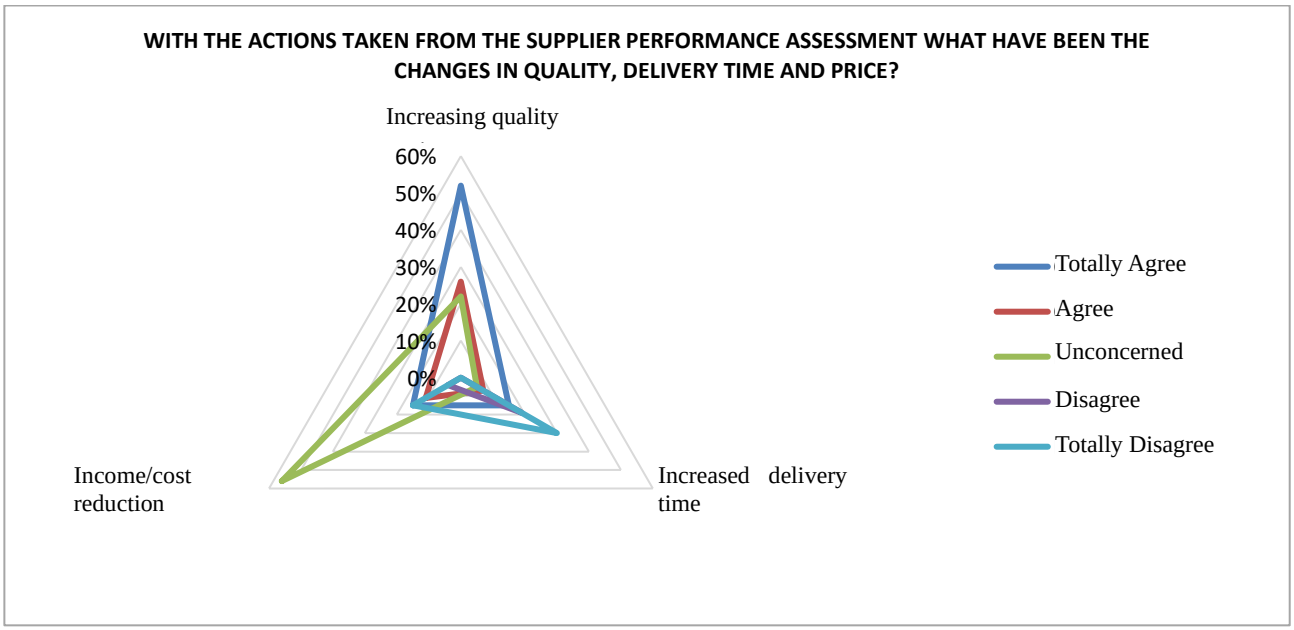

Figure 9 Improvements in Quality, Delivery Time and Price

Source: Elaborado pela autora (2017)

In terms of quality, 52% of the companies claim to agree completely with the improvements and 22% position themselves as indifferent. There was a great variety of responses relating to the increase of delivery deadlines, but the majority of companies fully disagrees (30%) or disagrees (19%) with the questionnaire. That shows how delivery deadlines kept or decreased indicators.

Lastly, about the decrease of the product's price and cost, it is noted that the majority of the companies position themselves as indifferent, without realizing an effective change in the product's price after using performance indicators.

5. Conclusions

With this study it was possible to analyze the use of suppliers' Performance Assessment indicators on a sample of 41 metal-mechanic large companies in the state of Santa Catarina.

It can be emphatically stated that the majority of the companies use between 3 to 4 suppliers' Performance Assessment indicators, pointing the most used as time/delivery deadline, quality and price/cost. Besides that, some other indicators such as flexibility to assist urgent demands, production capacity and socioambiental responsibility also state as important.

The majority of the companies interviewed don't have any formalized programs to train and develop their suppliers, what may complicate, somehow, the suppliers' performance in their assessment, since this program integrates with the company's organizational culture with the suppliers, making companies closer, with compromise and trust. When it comes to partnership practices, the majority of the companies position themselves as indifferent, claiming once again that the companies still do not prioritize the partnerships and harmony between organizations. Besides that, another element that may affect the client-supplier relationship is the fact that companies apply more penalties than bonuses.

According to obtained data, the companies aim to inform their suppliers about their current performance, establish goals to their desirable performance levels and also elaborate plans of action seeking improvements when the goals are not accomplished.

At last, the greatest improvement with the usage of suppliers' Performance Assessment indicators is the increase of products quality/service offered. Furthermore, it might of course be said that time/delivery deadline kept itself or had a slight decrease, and the decrease of the product's price/cost or service was not clear, since the majority of the companies (56%) claim to have different positioning.

For future papers, it can be suggested to apply this same research in different industry segments and also in small and medium-size businesses, aiming to verify if there were changes in the results and elaborate a study comparing those two segments and sizes.

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