

The use of indicators to measure the performance of logistics services in a steel industry

Maurício da Silva Moitinho

Universidade Santa Cecília – UNISANTA - Santos – SP / Brasil

Hellen Xavier das Chagas

CEETEPS – Centro Paula Souza, São Paulo – SP / Brasil

hellen.xavier@gmail.com

Maria Cristina Pereira Matos

Universidade Santa Cecília – UNISANTA - Santos – SP / Brasil

Renata Maria Nogueira de Oliveira

CEETEPS – Centro Paula Souza, São Paulo – SP / Brasil

Jair Francisco de Souza

Serviço Nacional de Aprendizagem Comercial - SENAC - Santos – SP / Brasil

Valmir Adelino de Moura

CEETEPS – Centro Paula Souza, São Paulo – SP / Brasil

Abstract:

This article aims demonstrate, through a literature, documental research and a case study in a steel industry, the importance of performance indicators, particularly OTIF, to assess the procurement process. The results show that suppliers' performances were improved after adoption of OTIF indicator, not only reaching but exceeding the set target.

Keywords: Performance indicators, OTIF, Logistics services, Steel industry

INTRODUCTION

As Bowersox and Closs (2001 p. 561) said, "The combination of a slower economic growth and an increased competition has forced companies in all sectors to focus on effective and efficient appropriation of logistical resources." Thus, the reliable and accurate relationship between customers and suppliers is becoming increasingly essential in leveraging the competitive advantage in business operations, not only for the success but also for the survival of enterprises, because competition improve itself every day, aiming stand to out in the fierce global market.

In this sense, it is observed that in order to achieve maximum efficiency, companies need to diagnose their situation before the market attempt to identify the things that can affect their productivity. For this, there are the so-called Performance Indicators, which aim to measure processes and activities seeking to assess their assertiveness, to any adjustments that may be necessary because, as the father of modern management stated: "One does not manage what is not measured" (Drucker, 1998, p. 32).

In this context, the main supply logistics challenges related to the process of obtaining materials and inventory control at various locations, and, in many cases, the success or failure of the company is determined by the efficiency, effectiveness and mastery to perform this management which directly reflects to the level of service provided (FARIA AND COSTA, 2005). And according to Chopra and Meindl (2006), the existence of a supply chain has as its main goal, the customer satisfaction in a profit-generating process.

Nowadays customer satisfaction is measured by the so-called Service Level which is a method used to measure the degree of customer satisfaction with the service provided, based on performance indicators. "In essence, the service level is the fulfillment of the specificity and needs by the customer, with a pre-established goal of generating value for these ones" (FARIA AND COSTA, 2005, p. 43).

As Notteboom said (2006), waiting times and delivery delays may pressure the company and compromise the reliability of the agreed deadlines, which can result even in logistics costs for the customer. In this sense, the performance indicators are presented therefore as reliable tools to measure the quality of service provision by stakeholders. When properly applied, they can be strong allies for a broad view of management processes and may also indicate constraints and use of resources that promote better management, providing thus other benefits to the company as productivity gains and cost savings with non-waste.

THEORETICAL FRAME OF REFERENCE

Initially, you can define logistics as the process of planning, implementing and controlling the flow and storage of goods, raw materials, work in process, finished products and services as well as information relating to them in an efficient and cost-effective manner from the point of origin to point of consumption, with its goal as attending customer needs and requirements (Novaes, 2004 and Ballou, 2001). In order to achieve success in accomplishing this goal, it is necessary that such activities are performed synchronously and accurately through all links in the chain, i.e., it is necessary that each stakeholder provide his service in an impeccably way aiming at the success of the entire chain.

According to Chopra and Meindl (2006), the term "supply chain" refers to products or supplies that move along the following chain: suppliers, manufacturers, distributors, retailers and customers. Thus, it's possible to say that starting from the supplier, the service should already start well structured, planned and properly measured with an effective monitoring of the performance of suppliers.

Coelho (2010) emphasizes this statement when he says the logistics performance depends not only on costs and time, but also reliability and predictability of supply chains. And to get that confidence and predictability about the supplier's services, it is necessary that the company gather a lot of information on his activities.

In this sense, to Biazzi et al (2006) it is necessary to define, measure and monitor indicators to improve the competitive performance, then identify the variables that should be measured and, if possible, improved, because reinforcing Drucker's thought, you cannot manage what is not measured.

Several authors point out that the attention given by logistics service providers regarding response time to their open calls is recognized as differentiation to the logistics activity (BOWERSOX, CLOSS AND COOPER, 2006; BALLOU, 2005; NOVAES, 2001 and

CHRISTOPHER 1997). Today, however, this concern is no longer a difference and became an intrinsic and essential activity of the process for the company's survival in the market. Therefore, it can be said that the response time is an important factor in performance analysis and hence the satisfaction of one's customers.

Nowadays, achieving the desired term is not the only quality indicator since it does not help if shipment arrives on time but in the wrong amount or faulty due to rough handling for example. So in order for the customer to feel satisfied it is necessary that besides the quantity (delivery time), the quality of delivery is also measured, that is to say, if the application is received with no defects and the desired specificity.

There are several performance indicators used in logistics, as illustrated in Tables below, with the main indicators used to assess the provision of services of a company.

Table 1 - Key performance indicators in customer order assistance

CUSTOMER SERVICE PERFORMANCE			
Performance Indicator	Description	Calculus	Best Practices
Perfect Order Measurement	Calculates the error-free order rate in each customer's order stage. You should consider each step in the "life" of the order.	% Accuracy in Orders Registration x% Accuracy in Separation x % On Time Delivery x% free of damage Delivery x % Properly Billed Orders	Around 70%.
% of Completed Orders and On Time or % OTIF - On Time in Full	Corresponds to on time deliveries and meeting the quantities and specifications of the order.	Perfect delivery / Total Deliveries Performed	For Customers Groups A, the index ranges from 90% to 95%; in general it reaches values close to 75%
% of On Time Delivery (OTD)	Dismemberment of OTIF; it measures the % of deliveries made within an agreed time with Customer	On Time Deliveries / Total Deliveries Performed	They range from 95% to 98 %
Order Fill Rate	Dismemberment of OTIF; it measures the % of orders in quantity and specifications requested by the Customer.	Orders Fully Met / Total Requests Expedited	99,50%
Order Cycle Time	Time between the completion of the order by the customer and the delivery date. Some consider as the deadline date for providing the order at the shipping dock.	Delivery Date minus the date of the Order Accomplished Date	Less than 24 hours to nearby locations or to a limit of 350 km.

Source: Adapted from documents of the company Tigerlog Consulting and Training in Logistics Ltd [2005].

Table 2 - Key performance indicators in Inventory Management

INVENTORIES MANAGEMENT PERFORMANCE			
Performance Indicator	Description	Calculus	Best Practices
Dock to Stock Time	Time between dock to storage.Receiving dock Custom Merchandise time to their physical storage. Others consider from the dock to their physical storage and its registration in the stocking controlling system that is available for sale	Time from dock to stock or availability of the item for sale	2 hours or 99,9 % on the same day.
Inventory Accuracy	Is the difference between the physical stock and stocking accounting information.	Physical Current stock by SKU / Accounting stock and stock Reported in System	In Brazil, 95 %. In Japan they reach 99,95 % e in the USA between 99,75 % to 99,95%.
Stock outs	It corresponds to the quantification of lost sales due to the unavailability of the requested item.	Revenue not held due to the unavailability of the item in stock (R\$)	Variable.
% Sales Stockout	It corresponds to the stock that is unavailable due to damage resulted from the handling storage, expiration date or obsolescence.	Unavaible Stock (R\$) / Total Stock (R\$)	Variable.
Storage Utilization	It measures the volume use or the number of bays available for storage in a warehouse.	Average occupancy in m ³ or Allocated Storage Positions / Total capacity storage in m ³ or Number of Positions	To be above 100% is a poor indicator because it probably indicates that aisles or other inappropriate areas for storage are being used.
Inventory Visibility	It measures the time for availability of stocks of the materials recently received in the company's systems.	Date / Time of the Information Registry of when the material was delivered in Company systems - Date / Time of Physical Delivery	Maximum two hours.

Source: Adapted from documents of the company Tigerlog Consulting and Training in Logistics Ltd [2005].

Table 3 - Key warehouse productivity performance indicators

WAREHOUSE PRODUCTIVITY			
Performance Indicator	Description	Calculus	Best Practices
Orders per Hour	It measures the amount of separate and packed orders / packed per hour. It can also be measured in rows or items.	Separated orders / Packaged / Total of hours worked in the Warehouse	They vary by type of business.
Cost per Order	Apportionment of warehouse operational cost by the number of shipped orders.	Total cost of the Warehouse / Total Expedited Requests	They vary by type of business.
Warehousing Cost as % of Sales	It reveals the share of operating costs of a warehouse in the sales of a company.	Total cost of the Warehouse / Total Sales	They vary by type of business.
Average time of loading/unloading	It measures how long the transporting vehicles need to stay at the shipping and receiving docks.	Dock Check Out – Dock Check In.	They vary according to type of vehicle, load and operating conditions.
Truck Turnaround Time	Besides time spent at the dock, it also measures the maneuvering time, internal transit, the Gatehouse authorization, inspections, etc..	Gatehouse Check Out –Gatehouse Check In.	They vary according to company procedures.
Utilização dos Equipamentos de Movimentação	It measures the usage of the available handling equipment in a moving and storage operation.	Operating hours / Hours Available for Use	In intensive use, with a dedicated operator, minimum of 95%.

Source: Adapted from documents of the company Tigerlog Consulting and Training in Logistics Ltd [2005].

Table 4 - Key warehouse productivity performance indicators

TRANSPORTATION PERFORMANCE			
Performance Indicator	Description	Calculus	Best Practices
Freight Costs as % of Sales	It shows the transportation costs share in total sales of the company.	Total Cost of Transport (R\$) / Total Sales (R\$)	They vary by type of business.
Freight Cost per Unit Shipped	It reveals the freight cost per unit shipped. It can also be calculated by transportation modal.	Total cost of transport (R\$) / Total units shipped	They vary by type of business.
On Time Pickups	It calculates the % of pickups taken within the agreed time.	On time Pickups / Total Pickups	They range from 95% to 98%.
Truckload Capacity Utilized	It evaluates the use of the load capacity of the transport vehicles used.	Total Issued load / Total Theoretical Capacity of Used Vehicles	It depends on several variables, but best practices are around 85%.
Damages	It measures damages share due to transportation in total shipped.	Damage to Transportation (R\$) / Total Shipped (R\$)	Variable.
Nonconformities in Transportation	It measures the extra freight cost share due to re-deliveries, returns, delays, etc. for various reasons in the total cost of transportation.	Surcharge Freight with nonconformities (R\$) / Total Cost of transport (R\$)	Variable.
Freight Bill Accuracy	It measures the errors shares verified through the knowledge in freight related to the total cost of transportation.	Errors in the Freight Billing (R\$) / Total Cost of Transport (R\$)	Mínimum of 98,5 %.

Source: Adapted from documents of the company Tigerlog Consulting and Training in Logistics Ltd [2005].

Therefore, with the various performance indicators, according to Christopher (2009), one of the measures to have a perfect order is the On Time, In Full (OTIF), that is, meeting all the specifications required by the customer.

And as Oliveira (2009), OTIF is an indicator that monitors the quality of delivery of goods and services, having as the main goal the enhancement of customer satisfaction. Soon, this indicator was chosen in this study to be analyzed in this case study.

This study aims to demonstrate the relevance of the use of performance indicators, and particularly the OTIF indicator to assess the delivery of logistics services in the procurement process, based on a case study in the steel industry.

Thus, the specific objective is to identify the contribution of the OTIF indicator to increase the selection and evaluation of suppliers.

The procurement process covers a range of activities related to the steps needed to acquire goods and services in order to meet the goals of a company such as: the quality of the supplier and the entire logistics operation inherent to the acquisition.

METHOD

This article is guided in exploratory study with qualitative and quantitative treatment, since the performance evaluation, especially regarding the OTIF indicator covers the quantity but also the quality of service.

So, this article will make use of the literature search method and documentary research, based on access to business reports and other documents evidencing the facts in order to report the case example, held in 2014, considering the results obtained in the years 2012 and 2013 (simple arithmetic average), and analysis after the implementation of the OTIF in the year 2014.

The locus of the research takes place in a steel company in the mechanical metal line. The OTIF indicator measured the performance of service providers, from the date of the orders placed, given the lead time manufacturing and time in transit.

It also assessed the quality and quantity of the materials and so, those who have met all the requirements (both deadline and quality) were evaluated with grade one and those who had irregularities were evaluated with grade zero.

RESULTS

The results show that in 2012 the assessment was below average (75%) and in 2013 it also decreased by 2 percentage points. We could not identify the real reason. After the adoption of the OTIF, it is noted that the goal was achieved in almost every month of 2014, as can be seen in Figure 1.

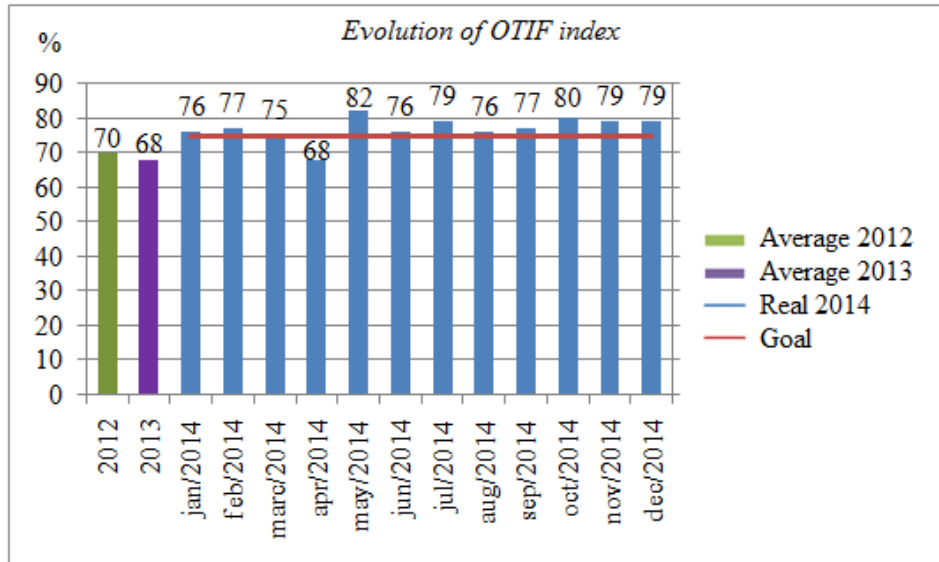


Figure 1 - Evolution of OTIF index
Source: Authors from the documentary research

Interpreting the Figure 1 we can see that the average in 2014 was 77%, it not only reached the goal as well as it exceeded it by two percentage points.

The graph in the Figure 2 considers the difference between 100% (which would be the best result of the OTIF) and the results achieved in the year 2014. For example, in January the difference between the result achieved and 100% was 24% and so the results were combined and the reasons that caused the OTIF to not reach 100% of efficiency was analyzed.

It can be noted that with the implementation of the OTIF indicator it was possible to monitor, through the monitoring of the most recurring failures, the main problems that affected the results of this indicator, so that one can improve the process of procurement and choice of the Supplier.

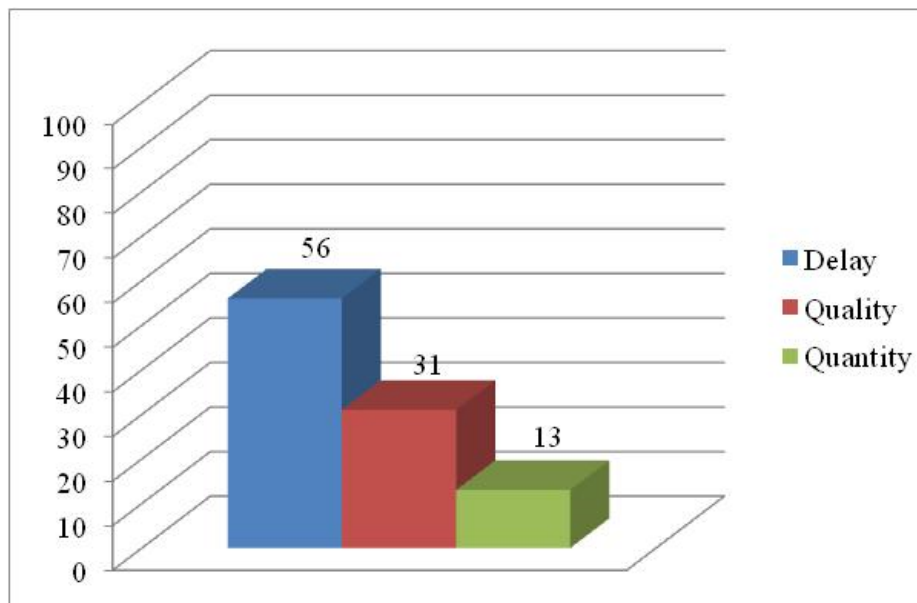


Figure 2 - Impacts on OTIF in 2014
Source: Authors from documentary research

Figure 2 allows the understanding that through the OTIF indicator, especially considering the last two letters of its abbreviation, in full (completely), it was possible to identify the amount of late submissions (delays), wrong quantity, and quality problems checked and measured by this indicator. These problems, once identified, serve as a basis to improve the procurement process, including them as contract clauses to be respected by providers, for example.

DISCUSSION

The results obtained highlight the relevance of using the right tool and indicator according to the purpose and need of the company. An operation compatible with the strategy is substantially influenced by the monitoring indicators that monitor the activities that add value to the business. Therefore, it can be said that performance indicators are means to analyze the fulfillment of the objectives previously outlined by the strategic planning (ÂNGELO, 2005).

In this case study the company had a supplier performance below the set target of 75% of efficiency from suppliers in the years 2012 and 2013. After the adoption of the OTIF performance indicator in 2014 it is noted that the supplier performance improved considerably through an average of 68 to 77 in 2014, above the desired target.

In this context, Novaes (2001, p. 65) stresses that "The modern supply chain management is concerned not only with the streamlining of the process as well as the reduction [and good administration] of overall costs" and in this case study, considering the significant increase of performance of logistics services provided after the adoption of the OTIF indicator, it can be said that improving the quality of supplier performance, the number of products delivered with disagreements tends to decrease and this factor impacts directly on the order cost, maintenance and inventory management reducing the need for spare deliveries and consequently all global costs that impact on the final price of products may contribute to the increased competitiveness of the company on today's fierce market.

Thus it is observed that the indicators are not only tools to monitor the partner supply chain service for possible negotiation, but they are also essential for defining policies and internal processes that depend on the performance of its partners (ÂNGELO 2005).

CONCLUSIONS

When taking in consideration that the current Brazilian economic momentum is slowing, and adding to this fierce global competition, as validated by the literature, it is clear that these factors mean that companies seek to work with the highest degree of trust between stakeholders of the supply chain and in this sense this article sought to demonstrate the relevance of the use of performance indicators, and particularly the OTIF indicator to assess the provision of logistics services in the procurement process of the steel industry branch.

The documentary research allowed us to identify the results were greatly improved by comparing the supplier performance before and after the adoption of the OTIF indicator, since this indicator makes it possible to analyze not only the compliance with the deadlines as well as the accuracy and quality of service request.

It is also important to note that the results of this study consider some limitations, such as: data manipulation (which can be influenced by human error when filling in the system or systemic failure both in results and in the evaluation of it; for a more accurate search a sensitive integrated cost information system is needed, there may be conflict acceptance of the results by suppliers, mainly negative, and, one last important limitation of the study is that there may be resistance from suppliers about the model of practiced indicator, making the relationship and measurement of their performance more difficult.

Finally, it is expected that this article will contribute to scientific knowledge, raising future further research of the applicability of logistics performance indicators.

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