A STUDY OF DELIVERY PERFORMANCE SYSTEM MEASUREMENT AT END CUSTOMER

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În lucrarea de față este prezentat un studiu comparativ al sistemelor de măsurare a performanței de livrare la client pentru doi agenți economici din categoria societăților cu răspundere limitată existente la ora actuală în România. Fiecare din aceste întreprinderi au propriul sistem de măsurare a satisfacției clientului cu axarea pe anumiți indicatori de performanță strategici. Aspectul original este conferit de cele două sisteme diferite de măsurare a performanței de livrare şi de inexistența unui studiu similar pentru România.

A comparative study between two existing measuring performance systems is presented which belong to two of the small and medium enterprises currently performing in Romania. Each of these small enterprises have its own measuring system focusing on certain key performance indicators (KPY's). We think that the originality of the article comes from the two different measurement systems as well as the non-existence of a similar study for Romania small and medium enterprises.

Keywords: key performance indicators, OTTR, final client satisfaction, supply chain.

1. Introduction

The actual status of operational, logistic, management and production systems researches regarding the delivery performance indicators is pretty elusive due to the fact that most of companies focus on internal and operational substitutes rather than end customer satisfaction. [1]

The purpose of the present paperwork is to analyze some of the key performance indicators used in Honeywell Garrett SRL and to propose an improved model of the performance indicators for a local small and medium enterprise called ICPEST, so that this last institution can focus both on the internal activity and on operational in correlation with obtaining satisfaction at the end customer.

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2. Content

Both organizations mentioned above are manufacturing plants and operate with different structures, sizes and functions supply chains.

By definition the supply chain represents a part of an organization – its centers, functions and activities – which are involved in the production and delivery of a product and / or service. The chain is first composed of the raw material or casting supplier up to the end customer. The centers are comprised of warehouses, plants, work centers, distributors, dealers and offices. The functions and activities include forecasting the demand, quality control, planning, production, distribution, deliveries and client services.

The correct functionality of the chain with advantages in both sides requires creating developing, implementing, monitoring and continuously improve the performance indicators for measuring all the activities from the upstream and downstream.

The purpose of the chain is focused on the client, because the goal of all activities is to sell as much as possible to the final customer, by reaching certain quality conditions requested on his side.

Earlier studies on those indicators focused on measuring customer satisfaction reveals three themes which help translating client receptivity into practice. These are presented in table 1 [1]:

Table 1

Defining Customer Receptivity

Customer Focus	**Visibility**	**Co-operation**
To meet customer requirements; To anticipate customer needs and over-deliver against their expectations; To be customer centric; To meet the needs of the customer.	To enable customers to look inside, transact and have visibility of product in real time until receipt, thus having the effect of reducing workload, and increasing service levels and customer confidence. It's understanding the demand variability that you've got for each of your segments, and it's being able to put in place a structure …that allows you to meet that demand variability...	To communicate the desire to build business together and to take full advantage of the opportunities that this presents.

We chose to use a case study design in order to explore the concept of customer responsiveness present in two of the small and medium enterprises currently operational in Romania. Some brief contextual remarks about the selected two organizations are:

- Honeywell Garrett SRL (HGR): manufacturer of turbochargers for customers in Northern, Central and West Europe and also Asia and South America. HGR acts like part of a larger corporate structure, is one of its production centers, placed in Bucharest . Its main activity is the assembly of turbochargers and exporting the final product to the final customer. The local company structure is operational and focused on implementing lean manufacturing techniques to increase its flexibility and agile adaptability to its customers demand and needs.
- ICPEST SRL: small and medium enterprise founded in 1991 mainly in charge of manufacturing tools, devices and verifiers. The institution has mainly a functional structure which leads to lacking of integration and coordination and less flexibility than HGR.

A detailed review was made of all customer-focused KPI's in use in the organizations concerned, based on the collection of interviews.

A summary of our findings for each of the two case study organizations is as follows:

HGR: Part of an American multinational with lots of subsidiaries around the world. The virtual structure of the corporation is similar to one „mother" enterprise and its prerogatives and necessary IT structure.
There are four manufacturing plants in Europe and one central unit based in Switzerland. The plant in Bucharest is producing and exporting turbochargers to its customers all over the world.

HGR supply chain is comprised out of local and world wide suppliers which send components based on delivery schedules requested by the plant. Ultimately, the supply part of the chain goes through a implementing certain suppliers in what is called *Vendor Managed Inventory* system, which means certain and mutual conditions needs to be in place and agreed between the two parties (sister systems: SAP, ERP and also a close HGR-supplier relationship)

The lead times to bring in material is different (and depends mainly on where is the supplier located, lead times for raw materials, lead times for preparing or machining the casting until is gets to a semi-final stage) and the act itself must be flawless with no major interruptions in the production cycle.

The components are supplied from all over the world with around ten transporters. The goods are collected into a main warehouse based in Europe from which they are sent by truck to the plant in Bucharest.

The supplier performance indicators are presented in table 2 [2]:

Table 2

Supplier performance indicators in Honeywell

Indicators	Definition
OTTR – on time to request	Measures our suppliers' ability to deliver based on Honeywell's request. An order is considered "delivered" when it arrives at our dock.
Lead Time	Is measured based on the stated lead time by item as defined in our planning parameters. The LT is accumulated and averaged based on receipt activity. An order is considered "received" when it arrives at our dock.
PPM (parts per million)	Measures product quality through the number of defective products (non-conformance) per each million units
Productivity	Value

The formula for some of the above indicators can be found below:

$$OTTR = \frac{Nb\ \ of\ \ Units\ \ Received\ \ On-\ \ time}{Total\ \ Nb\ \ of\ \ Units\ \ Received} \times 100 \tag{1}$$

$$LT = \frac{\sum (Spend \times LT)\ per\ receipt}{Total\ Spend} \tag{2}$$

$$PPM = \frac{Nb\ \ of\ \ Units\ \ Rejected}{Total\ \ Nb\ \ of\ \ Units\ \ Received} \times 1,000,000 \tag{3}$$

The production system is structured like assembly line type (step-by-step flow) where the product goes from one operation to the other until is finally put together.

Other data for this case were collected in order to investigate the way HGR customer satisfaction is measured. The indicators are presented as follows:

Table 3

Customer performance indicators in Honeywell

Indicators	Definition
OTTR – On Time To Request	Measures HGR' ability to deliver based on customer request. An order is considered "delivered" when it leaves from our dock.
PPM (parts per million)	Measures product quality through the number of defective products (non-conformance) per each million units
Voice Of the Customer	Customer survey

where:

$$OTTR = \frac{Nb\ of\ Units\ Delivered\ on\ Time}{Total\ nb\ of\ customer\ orders} \times 100 \quad (4)$$

VOC started as part of Six Sigma (set of practice initially developed by Motorola in order to continuously improve its processes through elimination of nonconformity in parts or service), a comprehensive discipline for eliminating defects in any process, originally for manufacturing and production engineering, and later extended to product design and customer service. The Six Sigma methodology, DMAIC - Define, Measure, Analyze, Improve, and Control - is a step-by-step process for eliminating such defects. [3]

Table 4

VOC steps in DMAIC process

Steps in DMAIC Process	**Voice Of the Customer (VOC) Role**
Define	• Define the problem or improvement requirement from customer's point of view • Identify customer needs
Measure	• Gauge customer satisfaction and perceptions by attribute • Establish performance baselines
Analyze	• Quantify customer requirements • Link operational data with VOC data
Improve	• Prioritize areas for improvement • Select key actions for improvement
Control	• Monitor satisfaction and perceptions on a ongoing basis

VOC includes qualitative and quantitative data like: focus groups, on line dialog and open questionnaires and quantitative questionnaires which are made of evaluating questions.

Very recently, VOC has evolved to mean all of the programs and initiatives that an enterprise uses to be customer-centric, perhaps with the objective of transforming the culture of the enterprise. In this sense, VOC has become broader than Six Sigma, which tends to focus internally. Honeywell, led by a Six Sigma Black Belt, moved its program from Six Sigma to Voice of the Customer over the last three years.

Honeywell refers to their enterprise-wide customer feedback system as the Voice of Customer/Voice of Market (VOC/VOM) system. It provides a central repository for both customer and market surveys conducted internationally in seven languages. It now goes far beyond measuring, managing, and improving the customer experience and a basic Six Sigma approach. Driven by both quantitative and qualitative customer feedback and market intelligence, its repository, analytics, and actions deliver tremendous value to the enterprise. Among other things, VOC/VOM program::

- provide a company-wide memory;
- support company-wide learning and continuous improvement;
- help coordinate action across the entire enterprise;
- deliver tactical and strategic insights that have affected the company's branding, competitive positioning, external and internal communications.

Hearing and acting upon the voice of the customer is a true differentiator for world-class, customer-centric enterprises who realize that their customers' experience drives their profitability..

One can conclude that HGR indicators are both internal and customer oriented with central focus on customer satisfaction at a high standard. The way to measure this is by correlating both VOC and OTTR.

ICPEST enterprise was established in 1991. Its activity is in general mechanical operations and includes:

- boring, turning, milling, eroding, planning, lapping, broaching, leveling, sawing, grinding, sharpening, welding, splicing, etc. of metal work pieces;
- laser cutting and writing of/on metals by means of laser beams;
- general mechanical maintenance and repair of machinery.

The company started as small and medium enterprise and mainly functions based on its customer orders. The orders received can be delivery schedule type of orders with visibility for a longer period of time or spot orders – one time order received via e-mail, fax or other type of writing communication. The order of prioritization is imposed by the customer.

The main delivery performance indicator used by ICPEST is Delivery On Time (DOT)

We present in fig. 1 an example of delivery schedule used by ICPEST to process and organize internal production and to deliver to the final customer [4]:

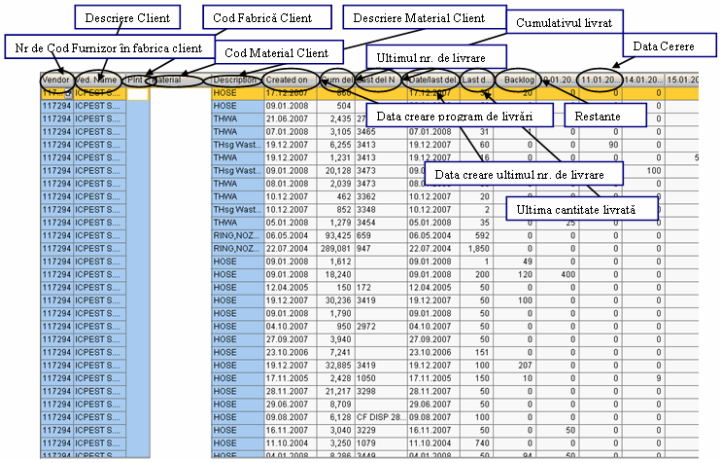

Fig. Example of delivery schedule received from customer by ICPEST

DOT is measured on a daily basis and is considered 100% if the quantity required by the customer was delivered in the requested day
DOT formula:

$$DOT = \frac{Nb\ \ of\ \ Units\ \ Delivered}{Nb\ \ of\ \ Units\ \ Requested} \times 100 \quad (5)$$

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Fig. 2 Example of DOT calculation in ICPEST

In conclusion we can say that ICPEST performance indicators are much more focused on internal activity and there is no direct method to measure the end customer satisfaction for this company.

3. Conclusions

In present paperwork our investigations focused on the logistics operations of two organizations in Romania. Typical examples in use were the traditional 'easy to measure' KPI's like DOT, OTTR and also some indicators were specially developed using continuous improvement methods – Six Sigma – such as VOC. We concluded that HGR using both delivery performance indicators and correlates them directly with customer satisfaction by using VOC. HGR results prove our statements by the fact that the customer measured delivery performance was 100% for the last year for one of the most important customer in the commercial vehicle line: Perkins, UK.
Being a big company is not an excuse for such great results, recognized and appreciated by the customers. Small and medium enterprises such as ICPEST can also improve in this direction by:

- developing a key performance indicator at customer side and link it with the input from the customer. One solution could be creation of a on-line survey and asking the customer to complete it every two months for start.

By doing this, ICPEST ensures that its internal operational performance indicator is linked to the end of the chain: its customers;

- establish relations between ICPEST supply chain performance indicators with the ones of its clients. By doing this, any small and medium enteprise ensures its supply chain robustness and solidifies its internal processes;
- development of internal performance indicators for a small and medium enteprise leads to [5]:
  - reaching its internal strategic objectives;
  - getting the bets result on the market;
  - getting the best result from its partners;
  - getting the best group performance;
  - increases the participant capabilities;
  - increase overall customer satisfaction
- good indicators are determined by medium and long term objectives that a small and medium enteprise should establish at the beginning of its activity;
- the purpose of good performance indicators ist to measure and link the internal activities of a small and medium enteprise so that the end customer is a satisfied customer. We encourage all SME to create and maintain its internal performance measurement systems as this enables its growth (fig. 3)

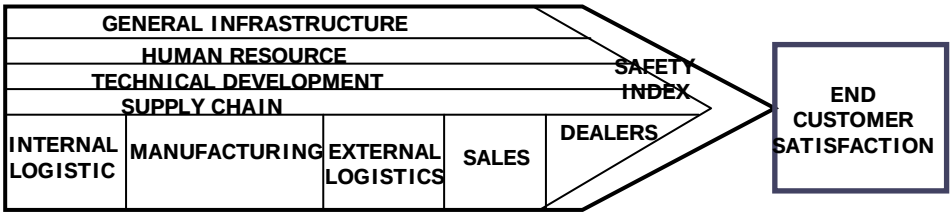

Fig. 3 Purpose of good perfromance indicators [6]

R E F E R E N C E S

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