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Management

SIX SIGMA'S APPLICATION FOR OPTIMIZING PAYMENT OF WARRANTY REFUSALS IN A SERVICE CENTER

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ABSTRACT This paper investigates the benefits of Six Sigma's implementation in a Customer Service Center and the extent to which Six Sigma is appropriate for improvement in a service organization. A brief history of Six Sigma precedes the introduction of the Six Sigma concept. After pointing out the advantages of Six Sigma for improving business processes, DMAIC methodology is introduced and the benefits of Six Sigma' s deployment in service industry are highlighted. The application of Six Sigma for optimizing refusals payment process of warranty/performance bills is studied and advantages of Six Sigma's implementation underlined.

KEYWORDS : Six Sigma, DMAIC, service industry, call center

1. Introduction

Six Sigma is a data driven methodology to achieve breakthrough improvements, directed to reduce process variation using problem solving and statistical tools. Developed by Bill Smith mid 1980s in Motorola, Six Sigma played a major role in improving quality of Motorola products and finally succeeded to revival the company. Indeed in 1988 Motorola won Malcolm Baldrige National Quality Award, saving only in four years after implementation cost of poor quality amounting to $2.2 billion. After Six Sigma's implementation in General Electric and savings of $320 million in two years after implementation, Six Sigma has spread all over US and then worldwide. Gygi, DeCarlo and Williams (2005) emphasized that Six sigma is applicable everywhere; it's applicable not only in large and complex corporations but also in the less complex and intimate worlds of professional performance and personal accomplishment.

Concerning Six Sigma's implementation in service organizations Antony et al. (2007) underlines that although six sigma approaches to quality and process improvement has been used predominantly by manufacturing organizations, currently the popularity of six sigma in service organizations is growing exponentially.

2. Six Sigma

Six Sima in brief, as underlined Smith and Blakeslee (2002), is a catalyst for change at the transformational and operational levels of an organization. Six Sigma is a high-performance, data-driven approach to analyzing the root causes of business problems and solving them.

Goldsby and Martichenko (2005) defined Six Sigma as a management methodology that attempts to understand and eliminate the negative effects of variation in our processes. Based on an infrastructure of trained professionals, Six Sigma delivers a problem-solving model armed with “voice of the customer” utilities and statistical process control tools. According to Baas (2007) Six Sigma is a meticulous, data-driven methodology that aims at generating quasi-perfect production processes that would result in no more than 3.4 defects per 1 million opportunities; Islam (2006) considers Six Sigma a methodology that aligns core business processes with customer and business requirements; systematically eliminates defects from existing processes, products, and services. For McCarthy et al. (2004) Six Sigma has been labeled as a metric, a methodology, and now, a management system (see figure 1).

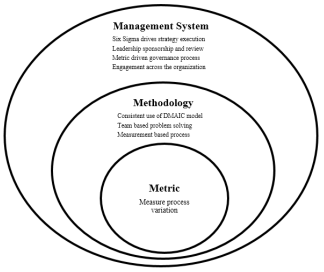

Figure 1. Six Sigma as a Metric, Methodology, Management System

Pyzdek (2003) defined DMAIC methodology as an integral part of Six Sigma that provides a useful framework for conducting Six Sigma projects. For Goldsby and Martichenko (2005) DMAIC is a map, or step-by-step approach, to understand and improve on organizational challenge.

3. Service industry and Six Sigma

Based on Six Sigma's widely recognized success in the manufacturing processes the methodology has also spread in non-manufacturing organizations, services included. Antony (2006) underlined that although six sigma has been successfully implemented in many manufacturing industries, its application in the service sector is still comparatively limited due to various constraints. Yilmaz and Chatterjee (2000) highlighted that the measurement of quality includes service-based products. Development of useful metrics for quality of services offered by banking, insurance, communications, health care has been an important reason for quality revolution.

In service industry, like payroll processing, billing, invoicing, shipping, order entry, response to service requests, baggage handling Six Sigma's deployment is really a requirement, as shown by Antony et al. (2007), as services are done at a quality level less than 3.5 sigma. This level means a process yield of 97.7 per cent, further to a defect rate of over 23,000 ppm. If we improve the sigma quality level of any of the above mentioned service processes to four sigma quality level, the defect rate will be dropped significantly to 6,210 ppm. The process yield will be increased to 99.38 per cent. According to Bandyopadhyay and Coppens (2005) service based industries usually struggle with Six Sigma approach because of its intense data focus. Decisions are made on statistics and facts, rather than instinct or past history.

4. Application of Six Sigma in a Customer service center

This research assesses Six Sigma's impact in a Bucharest service center of a world class organization within the automation and control equipment industry. The team is actually confronted with customer pressure for information's accuracy and fast data treatment. According to Laureani and Antony (2010) given the large scale of many call centre dramatically reduce the defect rate, increase customer satisfaction and deliver financial benefits to the bottom-line.

This empirical research studies Six Sigma's application in a service organization using the DMAIC improvement methodology in order to determine if suitable for service processes' optimization. The DMAIC method is very robust, as emphasised by Brassard et al. (2002) and many organizations have used it successfully to produce dramatic improvements. Using the DMAIC method also results in the following benefits: it provides a framework, a common language and a checklist to prevent skipping critical steps in the process.

4.1 Define phase

The case study reflects a Six Sigma project for optimizing payments for warranty and performance bills, released after material's assembling and comissioning; generally locked warranty amount is 10% of total delivered goods value. This project is understood to solve customer problems related to refused bills, i.e. 6-8% of total due bills' value. The project goal is to reduce by 20% value of the refusals,

reported to previous year period. In this stage a project charter was developed and also a SIPOC diagram documenting disputes process end-to-end.

4.2 Measure phase

In the first step a Value Stream Map was developed, indicating current status of the process of payment of warranty and performance bills. In the second step in order to determine the current process performance data was collected and measurement system checked; based on these data main issues and their place of occurrence were analyzed. The Pareto diagram showed, in order of appearance, the main categories of problems leading to payment refusals. Figure 2 presents the Pareto diagram for payment refusals revealing main possible root causes for refusals.

4.3 Analyse phase

Based on gathered data the start baseline process performances was calculated. Defects per million opportunities value of process and a value of 3.78 for sigma level were calculated; a sigma level target value better with 10% was proposed in order to reach project goal. For better understanding of defects' root cause a fishbone diagram was drafted.

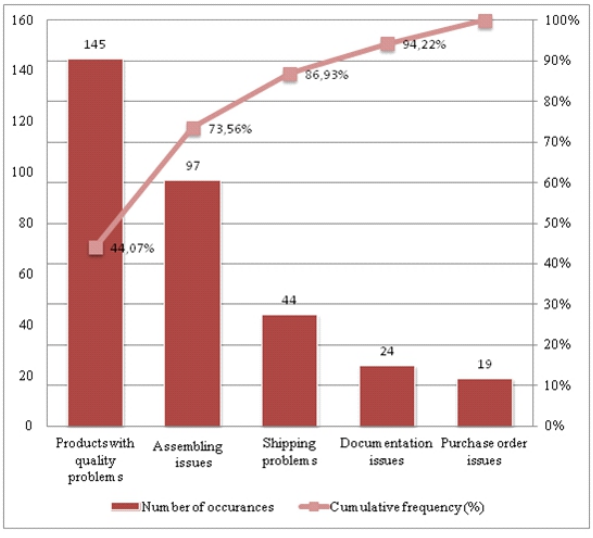

Figure 2. Pareto diagram for refusals

During the Brainstorming analysis possible causes of customer conflicts were discussed and analysis' results were collected in a PICK chart. Root causes responsible for dispute management dysfunctions were identified: quality problems, assembling issues, documentation issues, shipping problems, communication problems, confirming detected causes during Pareto analysis; hypothesis testing was done for root causes statistical validation.

4.4 Improve phase

The measures'synthesis to improve refused warranty bills' payment, as determined by the implementation team, is shown in table 1.

Table 1. Proposals to improve payment of refused warranty bills

Root Cause	Alternative	Proposed solution
A. PRODUCT QUALITY	Deffective product	Development of a measures plan to enhance product quality Introducing double checks on pre-shipment testing
	Rejected material	
B. ASSEMBLING ISSUES	Assembling errors	Final assembly verification by supplier's supervisors before comissioning
	Assembling documentation missing or not updated	Plan to check document list in order to include assembling documentation
		Update of assembling documentation according to documentation change
C. DOCUMENTATION PROBLEMS	Partial to total lack of documentation accompanying the product	Plan to check document list in order to include the product accompanying documentation
	Partial to total lack lack of product quality documentation	Plan to check document list in order to include product quality documentation
D. SHIPPING PROBLEMS	Shipping errors	Additional check of prepared shipment carried out by shipment double-checking
		Dispatch services improvement
D. COMMUNICATION ISSUES	Customer communication	Clarify customer problems concerning refusals Complete missing material/ documentation

4.5 Control phase

A control plan was done as a part of the control phase in order to ensure the sustainability of optimizing refusals payment process of warranty/performance bills.

After solutions' implementation, we checked if the objectives of the improvement project has been achieved. Sigma level of 4,38 after optimization demonstrates the achievement of established performance target, i.e. 4,16. This also results from the reduction of refusals by 36.5% reported to previous year period, much more than 20% proposed.

Thus, the comparison between initial data and final ones shows the achievements of improvement goals for refusals payment process of organization warranty bills and working capital increasement.

5. Conclusions

Process of refusals payment for warranty bills in a service organization is very important as bills not paid leads to reducing working capital and the organization's ability to invest or to pay affected. Call centers, as highlighted by McAdam et al. (2009), although being service organizations, are data centric in that they record data on performance over long periods of time. The availability of such data along with the need for business improvement offers the possibility of applying business improvement methods, one such approach is that of Six Sigma.

The case study in this research enables us to consider Six Sigma's application successful for service organizations and also using DMAIC methodology suitable for service organization continuous improvement. The results of this empirical research are also sustained by the overall Six Sigma's success achieved in production organizations all over the world.

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