Implementation of a Logistics Process Improvement System – a Case Study

Eduardo J. Rodrigues. Paula A. Alexandrino, Maria S. Carvalho

***Abstract*— The global market and the actual financial conjuncture have increased the fierce competition between organizations, either to financially survive or to gain competitive advantage. Bosch Car Multimedia Portugal S.A. identified improvement possibilities in its back office processes of the Logistics Department and that was the motto to undertake a business process improvement project. Whilst some organizations might have agreed in buying state of the art technology in order to increase its performance, Bosch Car Multimedia Portugal S.A. opted to make a more efficient use of its resources in a continuous improvement effort. Point CIP (Continuous Improvement Process) methodology is a continuous improvement philosophy created by Bosch Group which is commonly used in productive areas' processes. The plant located in Braga, Portugal, pioneered the idea of implementing this philosophy in the back office areas and used a sample of five different processes from the Logistics Department. The results were motivating because Point CIP was able to structure a continuous improvement environment which led to a better and more efficient performance of the business processes.**

***Index Terms*—Improvement, logistics, Point CIP, process, standardization**

I. INTRODUCTION

The global competition that today's world faces has led the organizations to rethink their approach of supplying products and services to their clients. This competitiveness increase, allied to the clients' demands and to the governmental and environmental regulations, suggests the reconstruction of the organizations in order to succeed in the future and to survive financially (Lockamy III and Smith, 1997; van Goor, 2001). This situation motivated the development of some business process improvement philosophies and methodologies, such as Total Quality Management (TQM) and Business Process Reengineering (BPR).

Bosch Group plants work according to the philosophy of Bosch Production System which is an adaptation of Toyota Production System to this company's requirements and characteristics. Point CIP is a business process improvement methodology that was developed by this Group and which has very good results in improving processes that are directly related to the productive areas, also known as shop floor. Bosch Car Multimedia Portugal S.A. is one of the plants of Car Multimedia Division of Bosch Group and it is located in Braga, Portugal. Its main products are related to the automotive and thermo technology industry. Nevertheless, a lot of effort is being made in increasing the product portfolio with the purpose of becoming more flexible and competitive. This plant pioneered the idea of using Point CIP methodology to the administrative areas, also known as back office. A project was developed with the purpose of validating the use of Point CIP methodology in other business processes rather than the shop floor ones. This pilot project was performed between February 2012 and September 2012 in the Logistics Department. Some gaps were identified by this department regarding the performance of its administrative areas' processes. The inefficiency of its processes was obvious and the actual problem-solving philosophy was only focused on the results and did not have in mind the elimination of the roots of the problems.

The standardization of the processes and its supporting tools is important to ensure the best practices. As Bosch acts according to the principles of Lean philosophy, the elimination of waste arises as another goal to accomplish. Due to this fact, and because the best practices of today may not be the best practices of tomorrow, the creation of a structured continuous improvement process is crucial to guarantee an incremental process performance.

Five different processes were analyzed in this study:

- Shipments in advance management process;
- Expedition process;
- Logistics complaints to suppliers' management process.
- Electronic Kanbans' management process;
- Monthly production planning process;

This sample was chosen to validate the application of the proposed business process improvement system to processes of a wide range of operational areas, such as: incoming, expedition, procurement, production planning and customer orders' management.

II. LITERATURE REVIEW

Over the years, organizations have undertaken the use and the adoption of several business process improvement tools and/or philosophies. According to Hammer and Champy (1993), there are three types of organizations that choose to

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E. J. Rodrigues is with the Algoritmi Research center, School of Engineering, University of Minho, Campus de Azurém, 4800-058 Guimarães, Portugal (phone:+351 253 604741; e-mail: eduardo.brg@hotmail.com).

P. A. Alexandrino is the leader of the project and is with the Logistics-Projects Department, Bosch Car Multimedia Portugal S.A., Lomar, 4605-820 Braga, Portugal (e-mail: paula.alexandrino@pt.bosch.com

M.S. Carvalho is with the Algoritmi Research center, School of Engineering, University of Minho, Campus de Azurém, 4800-058 Guimarães, Portugal (e-mail: sameiro@dps.uminho.pt).

review their practices. In the first place, there are those organizations that face several issues and, thus, do not have many choices if they want to survive. Secondly, there are those organizations which are performing well but the management board predicts adversities in the future. Lastly, organizations with excellent performance also undertake business process improvement efforts as an opportunity to gain advantage over the competition.

There are many different business process improvement philosophies. Some of them focus on slightly incremental performances while others have the purpose of achieving one-shot radical improvements. Total Quality Management and Business Process Reengineering are two of the most well know philosophies for achieving incremental and radical breakthroughs, respectively.

A. Total Quality Management

Total Quality Management was a movement that started around the 1940s, however, the term TQM was only formally used in 1957 by Feigenbaum (Powell, 1995). Some quality management specialists, such as Deming and Juran, are responsible for the development of this methodology although its roots are related with the American statistician W. A. Shewhart (Young and Wilkinson, 2001).

Total Quality Management focuses on existing business processes and seeks the improvement of the business processes, usually without questioning if there are better options to increase its performance, such as eliminating or overlapping activities (Pereira and Aspinwall, 1997).

Since the first time the term Total Quality Management was used, the search for a consensual definition has been unsuccessful. There are many different definitions that can be found in the literature. Crosby (1979) referred a 14-step program which focuses on the organizations' change through management and organizational processes instead of recurring to statistical techniques and tools. Like Crosby, Deming (1986) also summarized TQM in 14 points, which claimed to be a set of transformation principles for an organization to keep competitive either in the supplying of goods and in the provision of services. Another quality guru, Juran, described his version of TQM using a trilogy of management processes: quality planning, quality control and quality improvement (Juran, 1992). Chase and Aquilano (1992) have a client-oriented perspective on TQM and state that "*Total Quality Management can be defined as the management of the whole organization in order to excel in every dimension of the products and services that are important to the client*".

According to TQM supporters, this philosophy adds value through several benefits: better understanding of clients' needs, increased customer satisfaction due to a higher service level, internal communication improvements, better problem-solving, higher employees' motivation and involvement, less mistakes and reduction of costs as a result of the decrease in the number of defects or other wastes (Flood, 1993; Hipkin and De Cock, 2000; Juran, 1988; Prajogo and Sohal, 2001; Schmidt and Finnigan, 1992).

Despite this, Total Quality Management is sometimes seen as a bad option for the organizations because it incurs in high training costs, it uses too much of the organization management board time and it increases the bureaucracy and the formalities (Powell, 1995; Schaffer and Thomson, 1992).

B. Business Process Reengineering

Business Process Reengineering emerged at the beginning of the 1990s by Hammer (1990) and Davenport and Short (1990). According to Davenport (1998), the concepts inherent to process reengineering were not new when both of the aforementioned articles were published, however, it was born on their compilation and organization into a brand new process management philosophy.

One of the most well reputable definitions of BPR refers that it is the "analysis and modeling of work and processes' flow, within and between organizations" (Davenport and Short, 1990). Hammer and Champy (1993) also worked on a definition for BPR and stated that it is the "fundamental rethinking and the radical remodeling of business processes in order to achieve dramatic improvements in critical and contemporary performance measures such as quality, cost, service or velocity".

This approach of process reengineering aims to cost reduction, decrease in process duration, increase in the processes output quality and increase in the quality of life of the people involved in the processes (Davenport and Short, 1990).

Despite the successful results achieved by several organizations which adopted Business Process Reengineering, the failure rate is about 70% (Hammer and Champy, 1993). Some of the factors that contribute to the failure of this philosophy are bad communication between all the involved teams and the lack of a process-oriented vision, instead of a departmentalized one. Performing a bottom-up reengineering as well as trying to fix a process instead of completely redefining it is also considered to be a predictor of failure (Hammer, 1990).

C. Lean Thinking

According to Black and Hunter (2003), Second Industrial Revolution came at the beginning of 20th century with the emerging of the manufacturing lines and with Ford Motor Company concept of mass production. Despite the success of Ford manufacturing line, some questions were raised regarding its lack of flexibility. Henry Ford has a curious citation concerning this topic: "*Any customer can have a car painted any color that he wants so as long as it is black*" (Ford and Crowther, 1992). Unlike what happened at the time, nowadays, the global market is very turbulent and unpredictable in every dimension (Putnik and Cunha, 2005), thus, mass production predicates start getting more and more outdated. In this sense, when most of the people did not believe that there was a better organization system than mass production, Lean Thinking practices emerged.

At the end of the 1940s, the Japanese company of the automotive industry, Toyota Motor Company, presented a decrease in its sales volume. Undergoing a period of instability, and after demission of its founder, Kiichiro Toyoda, young engineer Eiji Toyoda and his partner Taiichi Ohno gathered in order to find improvement opportunities to this company's production system. They soon came to the conclusion that mass production was not appropriate to Japanese companies. After this hesitant start, it was born what Toyota would call Toyota Production System (Womack et. al, 1990). In 1990, the book *The Machine That*

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Changed the World introduced Toyota Production System to occidental world, baptizing it as "Lean Production" and presenting it as the new paradigm beyond mass production. The term "lean" is curious and comes in the context that, according to Toyota Production System, the production system uses less of everything in comparison to job-shop organization: less human effort, less production space, less machinery and about half of the engineering time needed to develop a new product, comparing to traditional time (Hunter, 2008).

This philosophy is based in two key concepts which are the cost reduction through waste reduction and total utilization of the employees' capacity (Sugimori et. al, 1977).

Toyota Production System is sometimes seen as a set of tools to remove wastes from processes (Lander and Liker, 2007), in particular, those that usually go unnoticed or that have become accepted as part of daily work (Shingo, 1989). Through waste elimination, companies can focus their resources in producing and delivering only what customers want, when they want it and in the quantities they required (Black and Hunter, 2003). Womack and Jones (1996) define *muda*, the Japanese word for waste, as any activity that consumes resources but which does not add value. Taiichi Ohno (1988) argues that there are seven types of waste that can be found on the shop-floor: transport, inventory, motion, waiting, overproduction, over processing and defects.

D. Case Study

Point CIP methodology was created by Bosch Group which is a supporter of Lean Production practices and, because of this, waste elimination and continuous improvement are two principles that can never be put aside. This methodology aims to the stabilization and improvement, in a daily basis, of the existing standards. The adoption of Point CIP allows obtaining ongoing small improvements but it is not the better option if the goal is to have radical process changes.

The first step to pursuit this business process improvement methodology is the team assignment. For this project, it was assigned a team composed of eight people from different Logistics Department operational areas. With a team with these characteristics, the exchange of information between Logistics Department sections was encouraged. This attitude fosters a process-oriented organization, contrary to the "silo" mentality where each section acts as an independent organization. As soon as the team is assigned and the roles of each team member are defined, it is time to focus on the business processes that were chosen to be analyzed.

Point CIP methodology comprises five key elements which act as guidelines for the work that will be developed (**Erro! A origem da referência não foi encontrada.**).

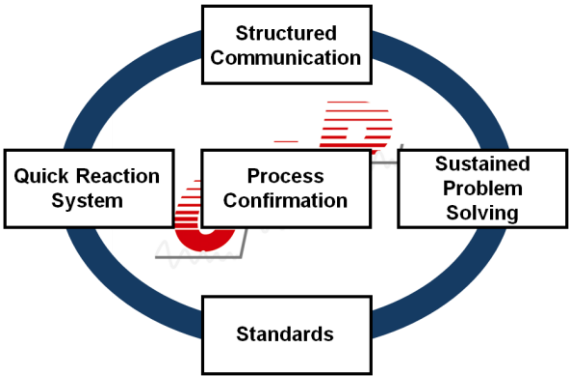

Fig. 1. Point CIP elements

Standards play a fundamental role in this methodology and in process improvement once they act as a reference point in the evaluation of employees' performance and enabling the identification of deviations. If a business process is not standardized, every activities performed by employees would be acceptable because there is not a document that instructs them how to undertake such activities. Due to this fact, standards are the basis of all the work established in Point CIP phase and, due to this, there must be a great effort in the employees' training according to the new standards. The occurrence of deviations is natural in every process but, with this methodology, it is ensured that whenever a deviation is identified, a well prepared and sustained problem-solving activity is triggered.

The second element of Point CIP is process confirmation and it is probably what most distinguishes this approach from others. Process confirmation is a tool that allows verifying if the defined standards are being fulfilled. Standardizing a process is the cornerstone of continuous improvement, however, there is no guarantee that standards will be met. To evaluate it, the Point CIP team members and, if possible, process responsible (also known as process owner) must conduct periodic process confirmation audits. In order to do it, there must be an identification of the key steps of the processes. These are the activities that directly influence the process outcome. With this information, it is created a checklist which is a document with a set of questions that will be evaluated in the audits. The process confirmation audits are not only an opportunity to identify deviations to the standards but also to record improvement chances.

A quick reaction system is essential to have an immediate and structured action plan that solves any problem or deviation to the standards, identified in the process confirmation audits. In other words, this is the stage where it is defined when and how to react to those deviations. A quick reaction system is composed by three elements. The first one is a clear display of the reaction limits in the work stations. These reaction limits enables problems' priority assignment in order to do a better resource management. Another element of the quick reaction system concerns a clear and fast way of asking for help, be it through telephone, mobile phone, email, Andon board, etc.. Lastly, there is the problem-solving contact matrix, this is, the definition of the people to contact depending on the type of problem that might occur and its severity.

The structured communication element supports a

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sustained problem-solving process and the information sharing across the organization. This is accomplished through a clearly defined, structured at all levels and regular communication. Point CIP meeting occurs to discuss the results obtained in the process confirmation audits and to delineate an action plan to avoid the recurrence of the identified deviations. The frequency of these meetings is to be defined by the team and it will depend on the process being analyzed. All information regarding the audits' results and the key process indicators should be posted on Point CIP board so that everyone can have access to that data. This is fundamental to increase the transparency of the processes and to increase the involvement of the employees on the process improvement activities.

The Point CIP elements mentioned before describe how to reveal the deviations to the processes in a structured way and to ensure a systematic answer to them. A sustained problem-solving is another characteristic of Point CIP methodology. In this stage, it is intended to identify and effectively eliminate the root causes of the failures and problems in the processes, avoiding its local resolution (firefighting). In fact, daily firefighting is sometimes confused with a systematic problem-solving. In these cases, the problem-solving steps regarding data and problem's root causes analysis are sometimes ignored. Immediate measures are adopted which are incorrectly equated to sustained corrective actions.

Point CIP methodology implementation does not stop at this point as this is a continuous improvement approach. Once the problems have been solved and the improvement actions have been undertaken, the existing standards have to be revised in order to update them according to any changes that have been agreed. With new standards, the need to verify its fulfillment arises and the Point CIP cycle starts all over again.

III. Conclusion

The project which entitled this article was developed at Bosch Car Multimedia Portugal S.A., which is located in Braga, Portugal. The Logistics Department of this plant identified some inefficiency on its back office business processes and decided to undertake a project of improving their performance. The project had as scope of study five business processes: shipments in advance management process, expedition process, logistics complaints to suppliers' management process, electronic Kanbans' management process, monthly production planning process. The strategy that was outlined intended to apply the well known and already mastered concepts of continuous improvement practices from the productive areas to the back office or administrative areas.

The results which were obtained with the use of Point CIP methodology were motivating. The adaptation and implementation of this continuous improvement methodology, originally used on productive areas, to the back office areas was smoother than expected. The commitment from top management was fundamental for its success. Because of this, the employees' involvement in the development of better practices was high and it contributed a lot to the incremental performance of the analyzed processes. The continuous monitoring of the most relevant key process indicators allowed a timely and structured intervention whenever necessary in order to have a sustained improvement plan.

Due to the fact that the studied processes regard different operational areas, and due to the similarities of the characteristics of business processes from administrative areas, it can be concluded that Point CIP is a very transverse methodology that can either be applied in productive and back office processes, be it from the Logistics Department or others.

However, despite the good results obtained, the adoption of these practices to the administrative processes might be very challenging. The main reasons for that are not only the normal resistance to change but also the lack of commitment of the responsible for the continuous improvement process. The actions involved in Point CIP are not always seen as a priority and daily business issues may overcome previous arranged Point CIP actions. Furthermore, the audit is sometimes understood to be the end of the cycle but in fact the audits are just a mean to understand the process inefficiencies.

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