Business Excellence and Management
Volume 2 Issue 4 / December 2012

SIX SIGMA - STRATEGIC OPTION FOR ENABLING SYNERGIES WITHIN BUSINESS PROCESS MANAGEMENT

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Abstract
Six Sigma and Business Process Management are two concepts that became highly regarded in the last couple years through their perspective on how organizations can manage and continuously improve their processes. These two, are approached in research mainly separately, and only at seldom times we might come across articles such this one that attempt to underline the power of the mix.
Keywords: Business process management, Business process outsourcing, Six sigma.

1. INTRODUCTION

Six Sigma is highly regarded by most practitioners in the area of quality being a cutting edge philosophy/concept that is directed towards continuous improvement. In research the benefits of Six Sigma are described especially in the area of manufacturing. With this article we attempt to highlight the benefits of Six Sigma and its application within Business Process Management looking at Business Process Outsourcing Organizations.

2. BUSINESS PROCESS MANAGEMENT

BPM's role and the criticality of a holistic approach towards business processes, was felt in the late '80s, when companies like Ford or IBM felt the benefits derived from a cross-functional approach towards business processes, which was in contrast with the traditional way based on organizational functions such as procurement, production or sales (Reijers, 2003). In a technical definition of Business Process Management viewed from the perspective of the IT systems, it is considered as a concept that underlines the support grated to business processes using methods, techniques and software design, implementation, assurance and control analysis of operational processes involving individuals,

organizations, applications, documents and other information sources (Weske et al, 2004). BPM is dependent on an important technical component, looking for general improvements in the process automation, leading to investments into new technologies that are to always be assessed against potential benefits.

The management component within BPM is needed in order to enable connections between different departments, functions, tools available within the organization and its strategic objectives which determine the character of continuous improvement.

Business Process Management (BPM), is a managerial approach that encourages innovation, technological improvements, efficiency, effectiveness and flexibility of organizations (Weske, 2007), that noticed an important interest in the last couple years (Google Trends), while the study into the synergies on BPM Six Sigma being only miscellaneous under the scope of research.

3. SIX SIGMA AND BUSINESS PROCESS MANAGEMENT

Six Sigma is a management approach based on the principles of scientific management and the theories of continuous improvement, which combines the finest elements of various quality initiatives (Aboelmaged, 2009). The concept of Six Sigma was developed by Motorola in 1986 starting from the company's desire to reduce defects by minimizing variation within their processed and thus generating improved quality for customers and financial statements. Motorola, through the implementation of Six Sigma, in the first 10 years, was able to generate improvements worth $14bn (Bhuiyan et Baghel, 2005).

Research on the concept developed intensively in the last two decades (Brady et Allen, 2006 ; Aboelmaged, 2009), Six Sigma being mainly under the scope of practitioner research, ending up being targeted also by academia.

Six Sigma is focused on the deep knowledge of customer needs and identification of causes that generate deviations/errors in order to eventually be able to eliminate these. By minimizing process variation the organization applying Six Sigma targets an improved product quality and results visible on the financial statements – cost reduction/improved margins. The focus on client and customer needs is a critical element of the Six Sigma improvement initiatives starting from the Voice of the Customer to achieve these expectations. The mere existence of client expectations, however, is not the only element of Six Sigma improvements, this being followed by the study into the causes that can enable these performance expectations to be achieved and the returns in monetary terms.

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The term Six Sigma comes from the terminology associated with manufacturing processes, mainly the area of statistical modeling. Sigma is the value of a variable that reflects the process yield, the distribution of output characteristics. In a Six Sigma process there are only 3.4 defects per million opportunities – 99,99966% of the outputs of such a process are deemed being flawless. There is some debate with regards to the definition of Six Sigma, as there are various approaches for explaining this concept – some of them including 3.4 defects per million opportunities in the definition, while in others this goal is excluded. Six Sigma improvement projects, do not necessarily aim to achieve 99.99966% quality, but to target improvements that determine propitious monetary returns in terms of the required effort (Schrage, 2001).

In order to ensure the successful implementation of Six Sigma in an organization, leadership must promote a philosophy and mindset of continuous improvement. Six Sigma can be defined as a management system, and unlike other programs that preceded Six Sigma, it displays important emphasis on leadership's involvement in monitoring improvement results and achievements (Pande et Holpp, 2002).

Perhaps the most important feature of Six Sigma, which determines it's success is related to leadership's involvement. Although Motorola is the organization that gave birth to Six Sigma, General Electric is the one that sparked the interest towards this concept (Park, 2003), and this is due to the fact that GE was maybe the first organization that introduced Six Sigma as a constant element on the CEO's agenda and maybe also due to Jack Welch's displayed frenzy towards this concept. Following Motorola's implementation of Six Sigma in 1987, some other organizations followed, Allied Signal (1994), General Electric (1995), ending up setting an equal sign between quality and Six Sigma (Pande et al, 2000).

GE's merits into promoting Six Sigma are acknowledged by Pande et Holpp (2002) that bring special thanks to Jack Welch for moving against the current and underlying the importance of quality within GE. Jack Welch's approach towards promoting Six Sigma is highly regarded and given as an example for all organizations seeking to implement this concept. This was a great example of change management enabled intensively and strongly dependent on leadership support. Leadership should follow such an approach irrespective if the change is represented by Six Sigma, BPM, etc.

Continued efforts toward ensuring stable and predictable results are of vital importance for the success of organizations. Business processes have characteristics that can be measured, analyzed, improved and controlled, and improvements may occur only as a result of the involvement of the entire organization – especially leadership.

Six Sigma and BPM complement each other with regards to the importance displayed towards processes, controllable and uncontrollable inputs and desired outputs. Business Process Optimization is targeted in a cross-functional approach that is enabled through leadership involvement.

There is partial consensus (Brady et Allen, 2006) with regards to the factors that could enable successful Six Sigma improvements : leadership commitment and support, multidisciplinary project team, these together with the structured project approach should lead toward goals. Six Sigma projects developed within an organization follow a defined sequence of steps and financial objectives (e.g. reducing costs and/or improving margins). Project methodologies used in Six Sigma projects vary depending on the purpose and use.

TABLE 1 – SIX SIGMA METHODOLOGIES

Methodology	Explanation	Comments
existing processes:		
DMAIC	Define, Measure, Analyze, Improve, Control	The original methodology used by Motorola to improve existing processes was MAIC (Measure, Analyze, Improve, Control), and then DMAIC instead of MAIC comes to be promoted by General Electric where the "D" signified the Define step.
new processes:		
DFSS	Design for Six Sigma	projects aimed at creating new products/processes
DMADV	Define, Measure, Analyze, Design, Verify	Motorola used initially MADV, and the "D" came to be added later to represent Define. From a technical standpoint DMADV is closely similar to DMAIC
IDOV	Identify, Design, Optimize, Validate	methodology introduced by General Electric, and came to be used quite often in practice
DIDES	Define, Initiate, Design, Execute, Sustain	methodology introduced by Qualtec Consulting Company.

Source: adapted from Park, 2003

These methodologies are used extensively in manufacturing and research & development, and they are viewed are lacking some of the needs of a service industry (Park, 2003) where a methodology as DMARIC (define, measure, analyze, redesign, implement, control) would be more appropriate.

DMAIC is seen as a meta-routine (Schroeder et al, 2007), a routine that is used to change existing routines or create new ones. Within DMAIC a great emphasis is placed on leadership's role in sponsoring the project, drafting the project charter in the Define phase, removing bottlenecks

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encountered by the project team and in conducting continuous assessment on project development. Green Belts are typically more active and involved in the Measure, Analyze and Improve steps and Process Owners in Control. Black Belts and Projects Leaders have a key role throughout the project development being mediators between the project team and the organizational environment or leadership.

DMAIC has five steps that start with Define where the Voice of the Customer is acknowledged and assessed at a high-level in order to enable the project objectives to be drafted. Within Define, customers and their needs are determined, purpose for the project, process to be improved, project team and task assignment. The critical to quality (CTQ's) characteristics are identified, these having to be measurable elements that must be achieved in order to generate customer satisfaction. The Project Charter is drafted, this being the document that presents the project purpose and plan, monetary benefits, project team, this Charter is thus the blueprint for the project that is to be followed. The last part of Define is the high-level graphical representation of the process as well as a COPIS sketch.

In Measure, the key process aspects are checked and relevant data is collected. Critical to Quality characteristics together with the elements that affect these are being analyzed, and then performance standards are defined, process to be measured, to what extend variation will be tolerable. Measurement system is analyzed; a valid measurement system is the one that provides accurate information with regard to the process outputs.

Data analysis is carried out in order to investigate and identify cause-effect relations. In the first phase of this step an assessment takes place on the capacity for generating free of defects products/services ; to what extent desired levels of performance are reached. Based on this information targets for improvement can be set and the defect reduction can be determined. Those variables that prevent the project from reaching goals are being identified, these being the sources of variation. In order to prevent the analysis to be overshadowed by perceptions, it is necessary that a variety of causes are considered.

TABLE 2 –ROOT CAUSES FOR VARIATION

Root causes	Comments
Methods	procedures and practices used for carrying out the work
Machines	equipment/technology used, computers, copiers, production line
Materials	data, instructions, forms and files that in the event they are wrong, can have a negative impact on outputs
Measurements	erroneous data collected due to wrong process measurements
Mother Nature	environment, weather, economic, external environmental elements that have an impact on the process and the way in which the organization operates
People	key element that determines how the above elements are integrated in order to generate business benefits

Source: adapted from Pande et Holpp, 2002

Within the Improve phase, those sources of variation that hold a greater improvement impact, are assessed in order to actions against these while also considering customer satisfaction. Once the operational tolerances are established, the proposed solution is being implemented, initially in a pilot in order to test the solution, thus enabling a better understanding of the consequences that it generates and whether there are any adjustments to be made in order to enable a general implementation that displays higher levels of efficiency and effectiveness. Within Control, the new process is being tracked and monitored in order to ensure process performance is maintain at a high level, so as to ensure customer satisfaction and of course the ability to achieve continuous improvement.

DMAIC's objective is to identify which of the process inputs affect the most the desired output, looking for a solution for the function f(x) = Y where x is the input and Y is the desired output – in line with customer needs (Voice of the Customer).

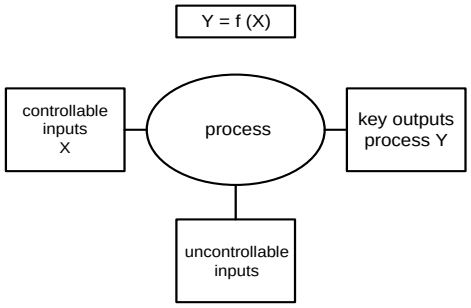

FIGURE 1 – SIX SIGMA'S F(X) = Y
Source: adapted from Gotro, 2003

DMAIC viewed from the perspective of f(x) = Y, denotes a couple steps : understanding of Y, together with measurement methods ; scaling of x's and measurement of their impact on Y ; assessment of the relationship x – Y and validation of relevant x's ; implementation of the solution for improving Y, focusing on relevant x's ; and control/monitoring of relevant x's and Y.

4. APPLICATION OF SIX SIGMA IN BUSINESS PROCESS MANAGEMENT

While Six Sigma's application within Business Process Management might seem to be relevant for large organizations or global corporations, it is critical for companies that have Business Processes at the core of their activity – the Business Process Outsourcing Companies (BPOs). These organizations manage business processes for customers around the globe combining process expertise, IT and analytical capabilities, together with operational excellence derived from experience in diverse industries, to provide a wide range of services. The goal of BPO companies is to assist clients improve

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the way they do business by continuously improving their business processes, by leveraging technology and using cutting edge quality practices as Six Sigma in order to eliminate defects and variation and improve efficiency and effectiveness. BPOs target to be an extension of client operations with a keen focus on business process excellence. Within BPOs the performance of each process is managed and measured in line with customer expectations and availability.

BPOs take great pride in the application of Six Sigma (SEC, 2007; Agarwal et Bajaj, 2008; Infosys, 2008) and quality improvement methodologies, continuous business process improvement being a critical competitive differentiator.

Six Sigma and Business Process Management go hand in hand with Business Process Outsourcing ; this becomes obvious by doing a research on Google Trends where we can notice that most interest towards Six Sigma and Business Process Management is displayed by India – also known as the back-office of the world, country were most Business Process Outsourcing Companies hold delivery centers.

We can debate that internet users in India might do most searches on Google for concepts as Six Sigma and Business Process Management as India holds one of the largest world populations, but this is not explaining the large discrepancy noticed when looking at other countries with large population and similar economic development. The other BRIC countries (China, Russia or Brazil) are surpassed by countries as Philippines, Morocco, Egypt or Mexico that have a developing Business Process Outsourcing Industry.

Maybe the best evidence of the major interest towards Six Sigma and Business Process Management within Business Process Outsourcing is the Top Cities that research these concepts as per Google Trends. Top 3 is not made by Mumbai (city with largest population in India), but by Bangalore, Chennai and Hyderabad – clusters recognized all over the world for the various IT and BPO delivery centers that are based here.

Six Sigma projects being deployed onto business processes within a Business Process Outsourcing environment are directed towards improving the outputs or corresponding effort (reducing errors, rework, quality control, headcount, improving productivity, skills) (Khatri, 2009).

The Six Sigma improvement methodology is receiving considerable attention and is one of the most important topics of research in the area of quality management, unfortunately expectations regarding this concept are getting quite exaggerated, these being in a strong contrast with the fact that massive reductions in costs and extraordinary success does not always materialize as a result of the implementation of such initiatives.

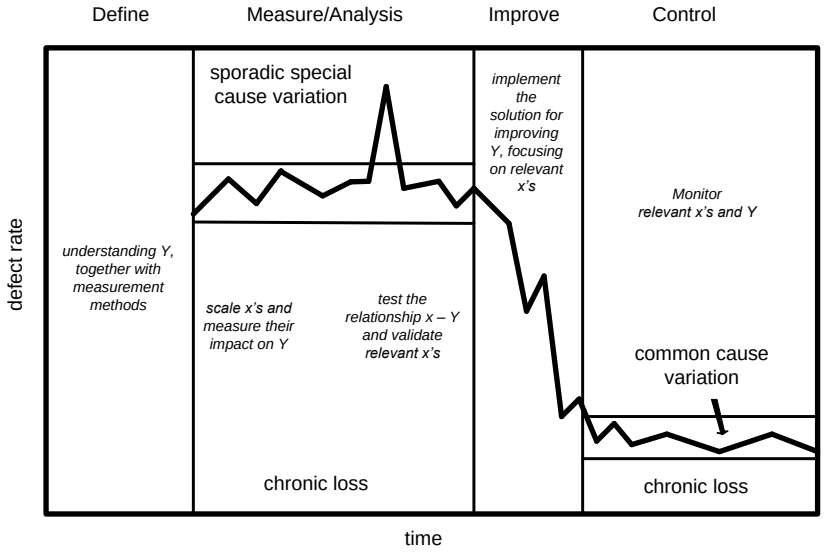

FIGURE 2 – VARIATION WITHIN DMAIC FROM THE PERSPECTIVE OF F(X) = Y
Source: adapted from Gotro, 2003

From a DMAIC perspective, Six Sigma can be viewed as an organizational knowledge development process that targets the knowledge creation, retention and promotion being also a change management process that describes ways for analyzing and implementing changes (Schroeder et al, 2007).

In terms of infrastructure, SMEs are considered less suitable for the implementation of Six Sigma, this being due to the requirement of a dedicated belt infrastructure (yellow/green/black) that maybe cannot be an investment that generates acceptable returns in a small organization, Six Sigma types of improvements being effective mainly in large organizations (Soare, 2011). In some approaches, Six Sigma is regarded as a parallel organized structure with the purpose of reducing variation in business processes through a specialized improvement personnel, and with a structured methodology, performance indicators, thus ensuring strategic objectives are reached (Schroeder et al, 2007).

Six Sigma is a flexible complex system that allows business success to be reached, maximized and sustained. Six Sigma is based on customer proximity, understanding customer needs, the disciplined use of data, information and statistical analysis, giving particular attention to managing, improving and remodeling business processes (Pande et al, 2000). Six Sigma can bring many benefits to BPM, not only in theory but also in practice (Conger, 2010).

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5. CONCLUSIONS

Research in the implementation of Six Sigma together with BPM is at an early stage and opportunities for future exploration are available. The opportunity for mixing BPM and Six Sigma is conferred by their common goals (continuous improvement) and the complementary aspects between these concepts. Six Sigma may help improve BPM through the specialized tools, a clear methodology, strong and powerful data-driven approaches. The DMAIC methodology together with a specialized improvement infrastructure may easily be employed in relevant activities of design, modeling, execution, monitoring and optimization of business processes.

Organizations that would like to benefit from process excellence and continuous improvement would have to consider six sigma, business process management and business process outsourcing as strategic options this being a priority for continued research.

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