THE APPLICATION OF SIX SIGMA WITHIN BPM IN A FINANCIAL SERVICES OUTSOURCED BACK-OFFICE ENVIRONMENT

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ABSTRACT
The present paper investigates Six Sigma's suitability within Business Process Management while exploring to what extent DMAIC can assist the management of a back-office and continuous improvement. The research is looking into the service industry, business process outsourcing in particular, exploring ways of driving productivity improvements and whether this is attainable through the application of Six Sigma.

KEYWORDS: *Business Process Management, Continuous Improvement, DMAIC, Six Sigma*.

JEL CLASSIFICATION : *L10, L15, L60, L80, M10, O30.*

1. INTRODUCTION

The world economy has noticed over the last decades an expansion of the tertiary industry versus the primary and secondary sectors,hence research in quality with regards to services is not only suitable but also required as it is an area relevant for both academic and practitioner environment.
With this research we assess the impact that Six Sigma and the application within Business Process Management can have on the invoice processing cycle time affecting cash flow, working capital, elements that determine company's growth and survival.
This research is not focused on promoting outsourcing and the impact on cost savings and profitability, as there is extensive research on the area both describing the effects on large corporations, small and medium size enterprises and even on national economies (Basu, 2008; Haskel et al., 2012; Grossman et Helpman, 2005). Outsourcing offers just the landscape for the research as it was carried out within the outsourced backoffice of a Financial Services Organisation that was facing pressures with regards to performance, accuracy, and a need for improving financial key performance indicators.

2. RESEARCH METHODOLOGY

The research seeks to assess Six Sigma's use within Business Process Management and as currently there is little empirical knowledge on the application of Six Sigma within this context we can deem the research reported in this paper as exploratory. Due to the lack of validated knowledge in the analysed subject and the inability to fully describe such systems with quantitative investigation; qualitative analysis should thus be used.

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As this paper aims to investigate the application of Six Sigma within Business Process Management, a company that uses Six Sigma's improvement methodology was selected in order to capture qualitative data on the application in services.

3. SIX SIGMA AND BUSINESS PROCESS MANAGEMENT

Business Process Management is based on the organization being characterized as a system of interconnected processes which implies efforts in the documentation, improvement and control of business processes. The concept has its roots in the works of Deming and Juran, being extended as a central element of Total Quality Management, the interest towards it being developed through various programs as ISO 9000, re-engineering, Six Sigma (Benner et Tushman, 2003).
The organisations that follow the Business Process Management path are considered to have a higher degree of efficiency and effectiveness, respond to customer/market requirements with a lower turnaround time and hold a higher quality and customer satisfaction (Pritchard et Armistead, 1999; O'Neill et Sohal, 1999).
Six Sigma was developed from Scientific Management and the theories for continuous improvement, combining the most refined elements of improvement initiatives that preceded it. (Aboelmaged, 2009)
Six Sigma is a flexible and complex system for accomplishing, optimizing and attaining the business success. Six Sigma is based on a close relationship with the customer, the understanding of customer needs, disciplined use of data, statistical analysis with a high interest on the management and improvement of business processes (Pande et al, 2000). Development in the research towards Six Sigma is noticed especially in the second half of the last decade (Brady et Allen, 2006;Aboelmaged, 2009), most of it being practitioner work, only on a seldom basis Six Sigma sparking the interest of the academic research. Six Sigma was developed within Motorola in 1986, which was operating at that time on a four sigma basis, with the intention of counteracting the pressures presented by the Japanese manufacturers.
Six Sigma holds the improvement methodology as it's pivotal element. DMAIC is seen as a meta-routine (Schroeder et al, 2007), a routine that is used to change routines or to setup some new ones.
DMAIC represents a series a steps spanning from the definition of the project scope; assessment of the process to be improved; analysis on the sources of variation; process optimization and control.

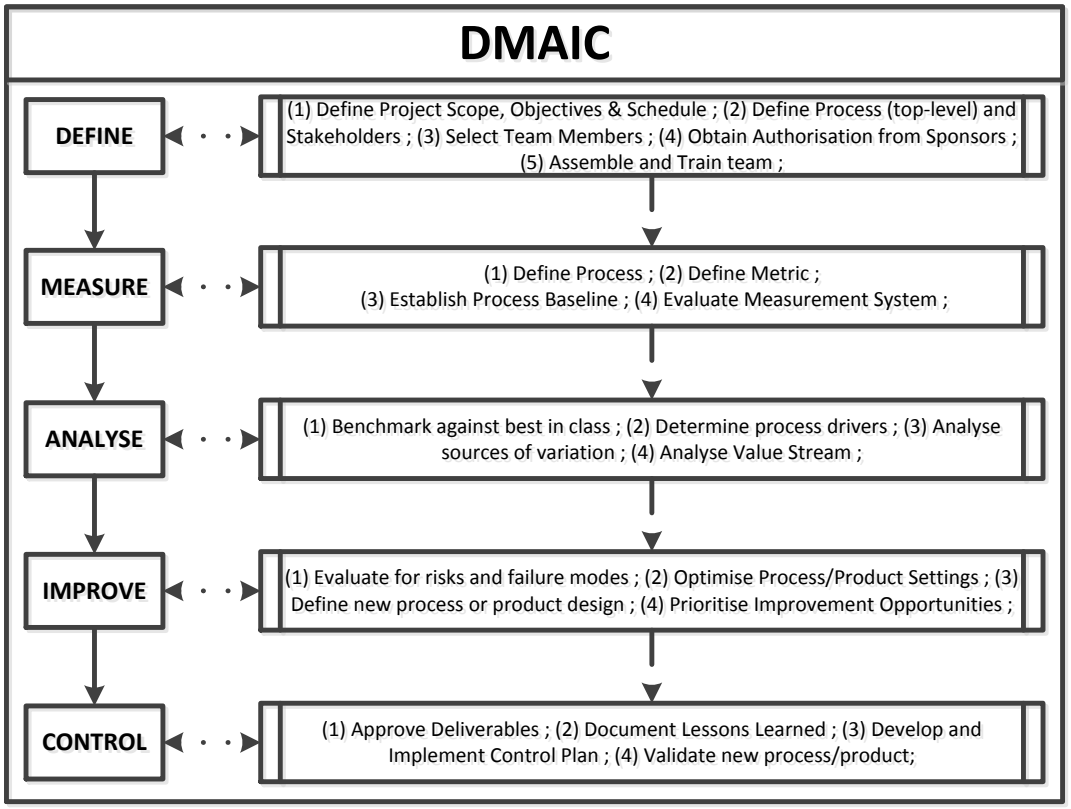

Figure 1. DMAIC explained
Source: adapted from Pyzdek et Keller (2009)

Pyzdeket Keller (2009) acknowledge the importance of Six Sigma in ensuring strategic objectives are attained while emphasizing on the importance of a Responsive Six Sigma Organisation, one in which the Six Sigma Philosophy is understood and promoted, where change is viewed as necessary and imperative.
The implementation of Six Sigma in transactional business and in service industry is viewed as beneficial (Stamatis, 2003) while also drafting some core principles : the necessity of a business strategy for net income improvement; the potential in enhancing the customer perception and the potential in improving company value.

4. APPLICATION OF SIX SIGMA WITHIN BUSINESS PROCESS MANAGEMENT

The study was carried out within the outsourced back-office of a World Class Financial Services Company that was presenting a lot of pressure for performance and accuracy while management was pushing for optimised productivity and returns.

4.1. Define

The back-office is setup on a transactional pricing model that operates based on a customer provided monthly forecast. Margins are directly impacted by productivity of the back-office associates and improvement of concerned metrics (items processed per hour) would lead to an increase of the back-office EBIT.
The scope of the back-office is to complete the amount/magnetic ink character recognition data on bank items by manually inputting the information. The process touches on average >1 M items/month and generates an average revenue >$150K/month. The project aims at improving items/hour from 1660 to 2000 (this reflecting performance of retained team), this is the Project Y – discrete data. Defect was defined as the instances where items/hour is below 2000.

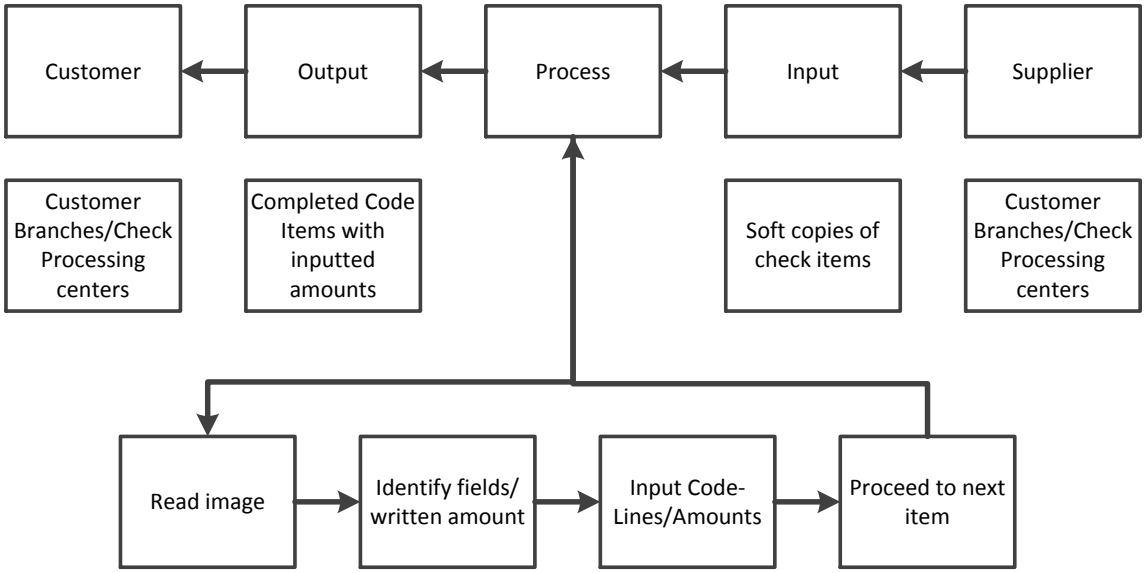

Figure 2. SIPOC
Source: made by author

A project charter was developed to define the project, business case, problem statement, goal, project scope, project team and milestones for the Define, Measure, Analyse, Improve and Control..

4.2. Measure

With the Project Y clearly stated, defect, units and defect opportunities per unit understood, and targets set a fishbone root cause analysis was drafted in order to enable an understanding into the levers that affect project Y.

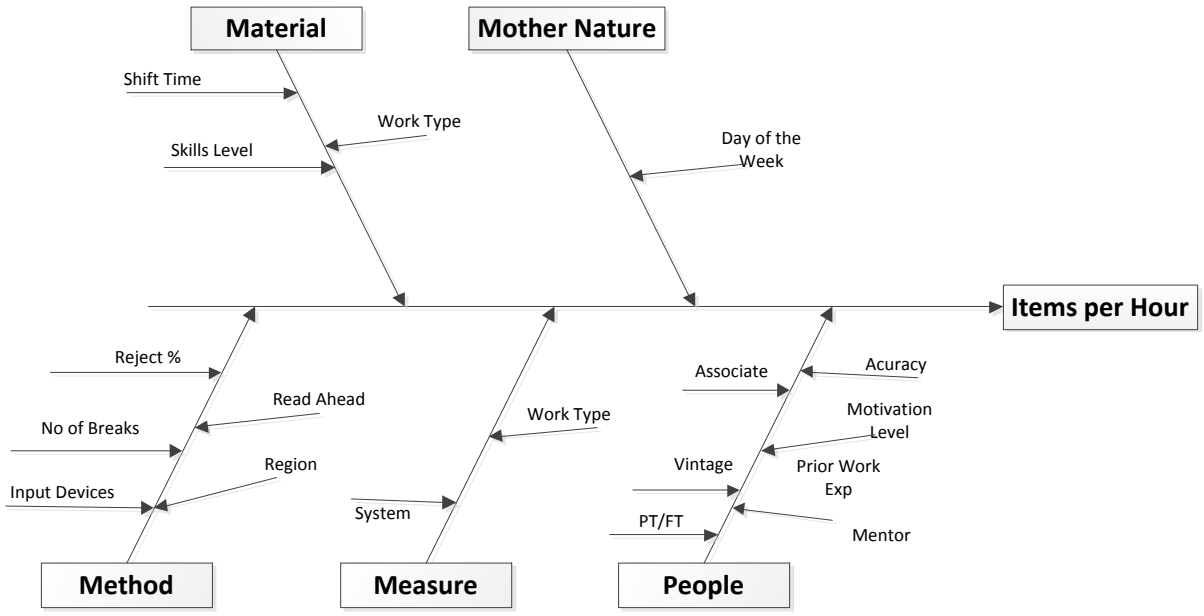

Figure 3. Fishbone analysis
Source: made by author

Afterwards the data was collected to enable a better understanding of the current performance and the measurement system was likewise analysed for accuracy, repeatability and reproducibility.

4.3. Analyze

The product performance was established and performance objective defined considering the measurements from the previous step and the project Y.

Product Performance

Component	Obs Defs	Obs Units	Opps per Unit	Cmplx	Adj Defs	Adj Units	Adj Total Opps	DPU	DPMO	Z.Shift	Z.ST	YTP
1	1456	1689	1	*	1456	1689	1689	0.862049	862048.5	1.500	0.410	0.137951
Total					1456		1689		862048.5	1.500	0.410	

Figure 4. Product Performance – pre

Source: minitab extract – made by author

Table 1. Initial vs Target

	Opportunities	Defect	DPMO	Sigma zst
Initial	1689	1456	862049	0.41
Target	?	?	600000	1.24

Source: made by author

A Brainstorming was carried out by the project team to generate ideas about possible causes that affect the number of items/hour. The causes that were identified were collated together with causes previously identified by observation or data collection and depending on the type of the concerned data, the hypotheses where tested.

Table 2. Summary of identified X's

X's	Operational Definition	P-Value	Significant	Test Used	Findings
Prior Work-experience	Associate holds prior work experience in data entry	0.000	Y	Chi-Square	Defect rate less 72% for associates with prior work-ex
EmploymentType	Part Time Full Time	0.000	Y	Chi-Square	Part Timers have a higher defect rate 94% vs FT 78%
Item Type	WT1 Normal WT2	0.000	Y	Chi-Square	Chances of defect higher in WT1 volumes
Vintage	Vintage in current role	0.000	Y	Chi-Square	Defect rate lower for high vintage associates
Associate	Back-office associate that is processing the items	0.000	Y	Chi-Square	Few associates have high consistency in achieving IPH>2000
DoW	Day of the week	0.043	Y	Chi-Square	Highest defects on Friday

Source: made by author

4.4. Improve

Once the causes for the variation were identified and tested, improvements have been proposed in order to generate the targeted improvements.

Table 3. Improve on X's

X	Root Cause Analysis	Finding	Proposed Solution
Employment Type	Part-timers have a tend toward casual working	Part time employees have a lower productivity compared to full time employees	1. Convert PT to FT based on performance improving PT/FT ratio 2. 10 PTs converted to FT based on preferences
Prior Work-ex	Skillset	Higher typing speeds; use of scientific typing methods vs regular ones	1. Look for best match (data entry background) for future associates. 2. new hirings done based on initial screening based on prior relevant work experience
Work Type	WT2 – complex; require handling from vintage associates		1. Work type alignment based on the skillset/vintage 2. WT2 to be handled by vintage associates
Associate	Variation in skills, working practices		1. Mentor-mentee program 2. Period One-on-One sessions to understand the challenges faced by new joinees/bottom performers
Vintage		Items/hour improves together with vintage	1. Mentor-mentee program 2. Extra training sessions 3. frequent One-on-One sessions with bottom performers
DoW	Casual mood on Friday and week-ends		Scheduling based on weekly shared by customer, Monday & Thursday – high volume days
Motivation Level	Goal setting; reward & recognition impact motivation	Performance& bonus system not in sync with project's Y	1. 6 wees contest for improving performance 2. extension of Rewards & Recognition program 3. Performance system set in line with Project Y; hand in hand with bonus system.
Skill Level		Training issues; exception handling	1. Mentor-mentee program 2. Extra training sessions 3. Simulated Learning Environment
Mentor			1. new and bottom performers aligned with mentors
Input Devices	Use numeric keypads for inputting information	Ergonomical use of keypad	1. piloted numeric keypads

Source: made by author

During improve the product performance was checked and a 25% reduction in DPMO was noticed together with an improvement of ZsT from 0.41 to 1.09 Sigma.

Product Performance

Component	Obs Defs	Obs Units	Opps per Unit	Cmplx	Adj Defs	Adj Units	Adj Total Opps	DPU	DPMO	Z.Shift	Z.ST	YTP
1	612	931	1	*	612	931	931	0.657358	657357.7	1.500	1.095	0.342642
Total					612		931		657357.7	1.500	1.095	

Figure 5. Product Performance - improve
Source: minitab extract – made by author

4.5. Control

After the improvements have been implementing the product performance was measured in order to assess the impact and verify the effectiveness of improvement actions and thus we can notice a35% improvement in DPMO together with a move of ZsT from 0.41 to 1.31.

Product Performance

Component	Obs Defs	Obs Units	Opps per Unit	Cmplx	Adj Defs	Adj Units	Adj Total Opps	DPU	DPMO	Z.Shift	Z.ST	YTP
1	1204	2095	1	*	1204	2095	2095	0.574702	574701.7	1.500	1.312	0.425298
Total					1204		2095		574701.7	1.500	1.312	

Figure 6. Product Performance - post
Source: minitab extract – made by author

Comparing the initial data with the data gathered after the implementation of improvements, it is evident that overall productivity has improved thus positively impacting the EBIT.

Table 4. Initial vs Target vs Achieved

	Opportunities	Defect	DPMO	Sigma zst
Initial	1689	1456	862049	0.41
Target	?	?	600000	1.24
Achieved	2095	1204	574702	1.312

Source: made by author

With the implementation of this project the instances of items/hour >2000 increased from 15% to 40%; with 95% of the team showing improvement in their own productivity & volume handling capacity.

5. CONCLUSIONS

This paper sought to investigate whether the implementation of Six Sigma is suitable within Business Process Management. Considering the case study we can state that the application of Six Sigma is relevant within a back-office environment and DMAIC is an enabler of process continuous improvement.
The paper demonstrates empirically the potential of Six Sigma within Business Process Management providing useful evidence for the academic community together with some suggestions for the management community.This research is limited, further validation on Six Sigma's importance within Business Process Management is required in order to support findings derived from this exploratory research.

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