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

Paul SOARE

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.

1Bucharest University of Economic Studies, Romania, paulsoare@ymail.com
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 its 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.
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 1. DMAIC explained](source: adapted from Pyzdek et Keller (2009))
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.

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](image)

Source: minitab extract – made by author

### Table 1. Initial vs Target

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Defect</th>
<th>DPMO</th>
<th>Sigma zst</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial</td>
<td>1689</td>
<td>1456</td>
<td>862049</td>
</tr>
<tr>
<td>Target</td>
<td>?</td>
<td>?</td>
<td>600000</td>
</tr>
</tbody>
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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 were tested.

### Table 2. Summary of identified X’s

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

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

<table>
<thead>
<tr>
<th>X</th>
<th>Root Cause Analysis</th>
<th>Finding</th>
<th>Proposed Solution</th>
</tr>
</thead>
</table>
| 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 weekends                       |                                                              | 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 weeks 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.
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 a 35% improvement in DPMO together with a move of $\text{Zst}$ from 0.41 to 1.31.

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.

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<td>600000</td>
</tr>
<tr>
<td>Achieved</td>
<td>2095</td>
<td>1204</td>
<td>574702</td>
</tr>
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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.
6. REFERENCES


