COSTS AND BENEFITS OF SIX SIGMA PROGRAMS

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ABSTRACT

Organisations are increasingly adopting Six Sigma in a bid to improve the quality of their processes and products, and thus achieve competitive advantage. Unlike previous Quality Improvement initiatives, Six Sigma has been publicised in terms of explicit financial gains. Given its greater emphasis on cost reduction, Quality Improvement, this research attempts to evaluate the direct costs and benefits of Six Sigma Programs. Using an extensive search of company annual reports and other published materials, this study estimates an average savings as a percentage of revenues of 2.1% and an average return of $3.6 in direct benefits for every dollar invested on six sigma.

Key words: Six Sigma, Cost, Benefit, Payback, Saving

INTRODUCTION

Organisations are increasingly adopting Six Sigma in a bid to improve the quality of their processes and products, and thus achieve competitive advantage. Six Sigma was developed by Motorola, in the 1980s, but gained enormous momentum, after its adoption by General Electric (GE), in the mid 1990s. Six Sigma is a disciplined approach for dramatically reducing defects and producing measurable financial results. It provides an organisational structure, in which improvement projects are led by so called black belts and greenbelts, typically selected from middle management. To guide black belts and greenbelts through the execution of an improvement project, the Program provides a collection of long standing management and statistical tools and a problem solving methodology known as DMAIC (standing for Define - Measure - Analyse - Improve - Control).

RESEARCH QUESTIONS

Given its greater emphasis on cost reduction through quality improvement, the following questions would then arise: How much it would cost to implement the program? What are the benefits? What is the expected benefits to cost ratio? Is Six Sigma more effective (in terms of financial benefits) than TQM? It would be useful to answer these questions as still there are many organisations still considering implementing Six Sigma. Scepticism also surrounds Six Sigma. Some think it is a passing fad and therefore not worth implementing it. However, if the benefits are substantial and these benefits are immediate, then it is indeed worth implementing even if the Program may fail in the long run.

LITERATURE REVIEW: THE LINK BETWEEN SIX SIGMA AND FINANCIAL RESULTS

There are a number of research papers in the literature evaluating the financial impact of continuous improvement Programs, including TQM and Six Sigma [1] [2] [3]. In undertaking such studies, there are two methodologies have been used. The first one is cross-sectional surveys and the second one examines publicly available financial data. Both methods have limitations. Most questionnaire based

surveys are superficial as they allow self selection of respondents and they rely on the managers' perceptions without critical evaluation. On the other hand tying TQM and Six Sigma Programs to financial indicators is a daunting task. There are a lot of ways to measure inimical results, and each one comes with complex factors to beware of or adjust for [4]. Financial results may also be influenced by events like 9/11 [2].

Ignoring the methodology, the current research on impact of TQM and Six Sigma is mixed. Moreover, none of the available research actually evaluated the total costs and the corresponding benefits of implementing TQM or Six Sigma Programs as these data are rarely publicly available. The little data that are available are buried in the annual reports and in published books and articles. In our research we will be gathering and summarising these data through extensive search of the published data.

METHODOLOGY

Continuous Improvement (CI) Program costs typically include consultant costs, training costs and other incidental costs related to training. Savings are the direct result of working on improvement projects. Savings that can be relatively easily measurable in dollars are: reduction in defects, waste, rework, use of material etc. Reducing cycle time, improving employee satisfaction, customer satisfaction ratings are much more difficult to quantify and their impact on bottom line is not immediate but long-term and.

The consolidated costs and savings of implementing CI Programs are not often reported by organisations. The little information that is available is buried in annual reports, articles and books. The author believed that the only way of collecting these data is through extensive search of these sources, which is currently being done.

DATA COLLECTION AND RESULTS

Research undertaken so far obtained cost and savings data on thirteen six sigma implementations (Motorola, GE, Allied Signal, Honeywell, Ford, Dow Chemicals, Transplace, Raytheon, Iomega, Samsung, W R Grace & Co., Commonwealth Health Corp, Bank of America) and two TQM implementations (PennDot and Pearl Harbour Naval Shipyard). These Six Sigma implementations took place from 1986 to 2009, while TQM implementations took place from 1986 to 1994. The following is a summary of the findings:

- All the organisations in our sample are large organisations and many of them are multi-national manufacturing companies. The revenues of these companies ranged from 350 million to 400 billion dollars.
- GE spent 0.4% of their revenues on SS. Commonwealth Health Corp spent about 0.8%. Since GE pioneered in implementing SS, it may be wise for organisations to benchmark against GE in terms of investment as well as savings.
- Savings as a percentage of revenues quoted ranged from 1.7% to 6.3% with average savings of about 3.4%. The term savings is not well defined in the articles from where the data have been collected. We assume that on-going savings are not accounted and costs are not deducted from these savings.
- Benefits to cost ratio was 2.75 for GE and 2.14 for Commonwealth Health Corp. That is for every one dollar invested in SS, the return was $2.75 for GE and $2.14 for Commonwealth Health Corp.
- Benefit to cost ratio for TQM Programs was 1.3, which is half of what has been achieved by Six Sigma.
- These results are very encouraging for organisations who are considering implementing Six Sigma. Of course, the savings are not guaranteed. But clearly it is a Program that is worth considering and is far superior to TQM Program in terms of financial results.

These are preliminary results of a more in-depth study that is currently being undertaken.

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