

THE ROLE OF FINANCE IN QUALITY PRINCIPLES

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ABSTRACT

Creating a financial advantage is important in today's competitive business world. When looking at critical reasons for success, a great deal can be learned by the role finance plays in a quality movement. Each quality movement has priorities. Financial management's importance varies by program. In some quality movement's, financial management is very important and dictates to the group financial objectives. While other programs see financial management less important using a focus on quality or end users. Of key interest, is finding out the proper financial focus. The 50 articles reviewed for this study are a subset of research completed by Aboelmaged (2010) whose review of over 417 journal articles resulted in eight definitions for Six Sigma. An ingredient absent from each definition was finance. This resulted in a need to understand the role finance plays within the design and application of the Six Sigma program. The research found that applying a balanced approach to financial measurements is integral to the success and longevity of the Six Sigma program.

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INTRODUCTION

In today's competitive environment, businesses are continuously seeking an edge over the competition (Kennedy & Widener, 2008). Organizations regularly put into action quality principles (Laux & DePew, 2014) including Quality Circles, Statistical Process Control, Theory of Constraints, Just-in-Time Inventory Management, Total Quality Management, Six Sigma, and Total Preventive Maintenance (Grasso, 2005). This paper seeks to understand impacts on program success or program failure.

Having lasted for over 35 years, Six Sigma, another quality program, is more than a temporary fad. Cited as the strength of the method, the primary goal is to lessen defects (Samuels & Adomitis, 2003). To those involved with Six Sigma, quantitative analysis is not enough to ensure success (Easton and Rosenzweig, 2012). Incorporation of techniques impacts program effectiveness (Gopnik, 2013) and translate into financial results (Kennedy & Widener, 2008). Cost-benefit analysis is one good measure to find out if implementation has a positive effect for shareholders (Ehighie & McAndrew, 2005). This paper contributes to the current literature by making a comparison of many different quality programs and linking their success to the role finance plays in their implementation. The balance of this article includes a description of the Six Sigma system, a literature review, research and methods, some preliminary findings and future research, as well as concluding comments.

Aboelmaged's research (2010) provides a review of over 417 journal articles. Yet still today, Six Sigma is still without an official definition (Laux & DePew, 2014). Aboelmaged settles with eight alternative definitions for Six Sigma. These definitions involve Six Sigma as a business improvement program that seeks to reduce mistakes. Of the definitions used in the research, none cite financial accountability as part of the Six Sigma design (Aboelmaged, 2010). In a representative sample of fifty of the original 417 articles

referenced, all identified a financial ingredient to Six Sigma. This comparison displays that although Six Sigma does not have a definition that includes finance there is a financial factor.

There are three measures that define Six Sigma. These measures include: defects per million opportunities (DPMOs), error-free yield (EFY), and sigma level. These unique measures are important in controlling an organization's efficiency. An organization can achieve a well-rounded balance by knowing and understanding these three measures. Knowledge of one measure provides a basis for calculation of the other two (De Mast & Lokkerbol, 2012).

The use of the three measures of Six Sigma success directly impacts a firm's financial performance. Management of measures is necessary to ensure it does not fall into an extreme. Left unchecked, one could easily be too financially driven or not financially driven enough. For example the DPMO is not looking for perfection by warranting a 3.4 ratio. This 3.4 means that organizations aim to only incur 3.4 errors for every one million items produced. By striving for perfection (0) the firm could unnecessarily spend money that will not amply return financial results. Alternatively, a DPMO of 10 might create too many quality issues and dissatisfied customers.

Naturally, any improvement program needs proper adoption. Six Sigma will not produce satisfactory results if performed in a vacuum. Top-down programs carried out by a Chief Executive Officer or a Chief Financial Officer will not be successful without acceptance of employees. Similarly, bottom-up employee driven programs need acceptance and support of executives. According to Samuels and Adomitis (2003), success under Six Sigma depends on four key attributes, which reflect a much broader management philosophy and approach. First, senior management needs to commit and support the implementation change. Second, access to significant data needs to be readily and continuously available. Third, operations should study the impact on profit centers, inventory, central supply, medical records, support departments, and nursing. Fourth, their needs to be access to expert knowledge about Lean Six Sigma (Lean reduces unprofitable work in an organization) to help control the remaining profitable work. Six Sigma lessens process defects through successful execution of these four attributes.

This paper serves as a literature review on the role of finance in quality programs. Several programs are researched. Six Sigma is a strong candidate for research because of its longevity and impact. This paper includes several examples to ensure a practical focus.

LITERATURE REVIEW

Why is Six Sigma's focus on finance good? When looking at the strengths of Six Sigma, understanding financial ramifications is important. A firm's finances often improve by lessening waste. There is a limit to how much waste removal is necessary and at what cost (De Koning, De Mast, Does, & Vermaat, 2008). Elimination of waste can include the capacity to lessen paperwork by creating meaningful reports (Fullerton, Kennedy, & Widener, 2013). Management should seek to understand the impact of a project before adoption. Creating reports that measure the actual impact should be post execution (Fullerton, Kennedy & Widener, 2008).

To show this point, one might consider whether to spend \$500 dollars to save a penny. The early reaction to spending \$500 in employee time and organization resources to save a penny would be a waste of shareholder investment. An organization's mission can be hampered if cost continuously outweigh the benefits. If the cost savings occurred for each item and 500 products are impacted, the result is different. The break-even point occurs in one month and all cost savings after that produce positive results.

Quality Programs that are too financially driven often fail. A program is "too financial" when an organization is too aggressive in chasing projects that do not produce financial results. Others will expect

a focusing on nonfinancial measures will lead to financial results (DeBusk, 2012). Costs are often analyzed inappropriately in an attempt to justify the project. For example, an organization working to develop new software may have an estimated fixed cost of \$300,000 and an annual cost of \$50,000. The new software would replace the current program that had a fixed outlay of \$500,000 and annual costs of \$100,000. Acceptance was based on this information. Project costs, however, were updated with significant changes. The new estimate reflected that another \$250,000 was needed to complete the new program and annual cost savings reduced to \$25,000. In this situation, it is inappropriate to consider the first \$300,000 for decision making. Regardless of completion, these project dollars are unrecoverable.

Quality programs often fail if not financially driven. Inadequate financial impact occurs when an improvement is “not financial enough.” An example is when consultants encourage a “quality-focused” culture creating only slogans to promote a quality focus. A consultant who offers even basic training on methods for documenting quality improvement will create greater awareness than any slogan. A lack of financial impact can pull employees away from their responsibilities, negatively impact production and create costs without financial benefits (Samuels & Adomitis, 2003).

A weakness of lean manufacturing initiatives includes a lack of focus on nonfinancial items. Baines and Langfield-Smith’s (2003) research finds a firm uses Total Quality Management and Just-in-Time for nonfinancial information. Kennedy and Widener (2008) found evidence of a relation between nonfinancial measures, quality, and productivity. They also found that those same firms relied more on nonfinancial measures such as productivity rather than on financial measures like profitability and return-on-investment. Organizations often use nonfinancial measures with team based management (Baines & Langfield-Smith, 2003).

Quality Programs that include finance have more success. The goal when implementing Six Sigma is to adopt a project that is “just right.” Six Sigma recognizes the significance that defect reduction has on financial performance. Six Sigma ensures that projects performed aim to meet the needs of both executives and employees. It also defines the tasks necessary to produce value for shareholders. By working as a team with employees, financial managers can begin to implement changes early in a process at minimal cost by preventing errors from becoming much more costly problems later (Samuels & Adomitis, 2003).

The health care industry is a good example of how Six Sigma can strengthen an organization. Six Sigma application can be more difficult in the health care industry because of the industry’s complexity, human interaction, and issues of diagnosis. Hospitals are non-routine causing analysis to be more difficult. As a result, hospital processes involve much more human and educated intervention than manufacturing. At every stage of a healthcare process, critical quality factors exist that directly affect some or all of these areas (Samuels & Adomitis, 2003).

The hypothesis is that Six Sigma is longer lasting and effective by nature due to its having a financial focus but not being principally financially driven.

RESEARCH DESIGN AND METHOD

Research was completed by reviewing existing literature across several quality programs. A focus was given to Six Sigma due to its longevity and evidence of financial impact. The research looks at the key drivers for program success, differences across the programs and drawbacks. The quality programs analyzed include Total Quality Management, Lean Manufacturing, Six Sigma, Cost Reduction Programs, Quality Circles, Just-in-Time, and Total Preventative Maintenance. The research looks into the key drivers for different program’s success and lays them out in a table format. A program is considered financially driven if the financial management team controls the quality process. In this situation, controlling cost is often the most significant feature.

RESULTS

The following table summarizes the reviewed articles. The programs included: Total Quality Management (TQM) (Ehigie & McAndrew, 2005), Lean Manufacturing (Osterman & Fundin, 2014), Six Sigma (Aboelmaged, 2010), Cost Reduction Programs (Labro, 2006), Quality Circles (Funk, 1995), Just-in-Time (JIT), and Total Preventative Maintenance (Brandolese, Franci, & Pozzetti, 1996) to decide impact on an organization.

Table 1 shows whether a business role impacts a quality program. The analysis includes using the following departments: finance, production, quality, customer service, and decision management. A “Yes” means the characteristic directly applied to the program.

Table 1: Comparing Quality Programs by Business Function

Quality Program/ Business Function	TQM	Lean Manufacture	Six Sigma	Cost Reduction Programs	Quality Circles	JIT	Total Preventative Maintenance
<u>Finance</u>		Yes	Yes	Yes			
<u>Production</u>	Yes	Yes	Yes		Yes	Yes	Yes
<u>Product Quality</u>	Yes		Yes		Yes		Yes
<u>Customer Service</u>	Yes		Yes				
<u>Management</u>	Yes	Yes	Yes				

This table shows the relationship between a business function and a quality program. A signal of “Yes” means the business function has a direct focus with a quality program. A black space means there is not a strong focus.

After reviewing several articles, five primary business functions were identified to explain the effect of the various quality programs. The five business roles include: finance, production, product quality, customer service, and management. After looking at several articles, these departments emerged as the ones most impacted by quality movements. From this table it can be seen that Six Sigma is the only program that includes all five business functions (Aboelmaged, 2010). Program longevity is an important consideration of program effectiveness. Program termination is a key signal that a program is no longer effective. For example, quality circles are in little use today. As a result, it is important to see what fundamental business ideas cause businesses to stop using certain programs.

Overemphasis on finances can hurt goal attainment. Traditional budgeting creates annual financial targets and are often negotiated between operating managers and the budget committee. Financially driven programs focus on organizational financial performance while quality or customer needs are often forgotten. This can sacrifice long-term financial performance (McVay & Cooke, 2006).

Though budgets are good, budgets are not perfect. There are several common problems with budgets and the budgeting process. Some of these problems include: re-estimations, become outdated, involve judgment, are time-consuming, and focus on finances (McVay & Cooke, 2006). Six Sigma allows for better decision making by providing analysis with greater detail and timeliness. The program also aids decision making by providing separate financial data for management analysis and for corporate reporting (DeBusk, 2012).

CONCLUDING COMMENTS

The goal of this research is to learn the role finance plays in a quality movement. The review of 50 articles used in prior research completed by Aboelmaged in 2010, provides the based for this research. From this, seven quality programs were identified as significant within the industry. Quality programs are impacted

by five business roles. An analysis of each quality program against each business role was performed. The research found Six Sigma is the only program impacted by all five roles.

The research found that quality programs with financial measures focus on cutting out waste through process improvements. A company can do this by measuring its costs today, estimating its projected costs, and continuing to measure its costs through and after implementation of a new process. Additionally, break even analysis must be performed to bring balance to cost cutting efforts. Quality programs that are too financially driven and fail just as badly as those with no or little financial focus. This highlights a key to program success; finding a balanced approach to the value of financial measurements. Success is measured by meeting the needs of employees, management, and shareholders alike.

This research was limited by a focus on existing research rather than new data. No financial performance reports or other qualitative data were drawn upon for conclusions.

This research is important as it identifies the interdisciplinary nature of Six Sigma. Also, it recognizes the role of finance in quality processes. The body of knowledge improves by uncovering the critical success factors for Six Sigma and the role of finance. This is different from other research that looks at what Six Sigma makes successful. Key importance is Six Sigma's balanced approach to the value of financial measurements.

Future research could include several options. First, researchers could review the input financial staff have at different levels of a project. Here the research could include the financial people themselves and their impact on quality program success. Second, the skill of the decision makers could be analyzed. Decision makers all have different strengths and weaknesses. Understanding the different competencies of leadership is important. For example, are they financial deciders, Black Belts, or Green Belts. Third, the accountability of project success based on financial drivers could be analyzed.

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