IMPLEMENTATION AND EFFECTIVENESS OF PROCESS IMPROVEMENT INITIATIVES IN MANUFACTURING AND SERVICE ORGANIZATIONS

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ABSTRACT

This study examines issues related to process improvement initiatives implementation and effectiveness of manufacturing and service organizations in different operational settings. In the process, the consistency of the level of sophistication at the industry level relative to that of the firm level is examined. The results appear to indicate that organizations in most industries are implementing process improvement initiatives at relatively different rates. Total Quality Management (TQM) and Continuous Improvement (CI) appear to be more effective in some industries than others. Overall, the banking industry appears to be the most willing to implement process improvement initiatives relative to other industries.

INTRODUCTION

Operational systems regardless of the nature of their outputs are considered dynamic interactions among technology, people, processes and procedures. Manufacturing and service operational systems consist of integrated subsystems which are operationally and strategically motivated by the customer-orientation. To achieve this customer-orientation, manufacturing and service open operational systems must pay closer attention to the different aspects of performance. In this context, performance improvements become an ongoing process. Recent operational technological advancements coupled with an increasing competitive environment resulted in an even more concern for performance improvements. In this context, improved performance is a must toward gaining and maintaining a competitive advantage.

In response to technological and environmental opportunities and threats, manufacturing and service organizations are deploying innovative operational technologies and process improvements initiatives. In this context, these systems are attempting to maintain an operational technological edge over competitors in their industry. Such edge allows these systems to offer products and services more efficiently. On the other hand, softer technologies such as process improvement initiatives allow these systems to improve quality, cooperation with suppliers, and customer satisfaction, among others. These initiatives include Total Quality Management (TQM), Continuous Improvement (CI), Benchmarking (BM), Process Reengineering (PR), and Just-in-Time (JIT), among others.

Despite the difference between manufacturing operational systems and their service counterparts, both stand to benefit from the synergetic effect of deploying innovative operational technologies and process improvement initiatives.

Motivated by the discussion above, this research attempts to empirically examine the implementation and effectiveness of process improvement initiatives in manufacturing and selected service operational systems. In the process, this research shed some light on the consistency between organizational operational technologies as compared to industry operational technologies.

BACKGROUND AND RELEVANT LITERATURE

Manufacturing organizations have successfully deployed total quality management (TQM) and other quality improvement practices in support of well-defined strategic options (Spitzer, 1993; Flynn et al., 1995; Au and Choi, 1999; Tata and Prasad, 1998; Prajogo and Sohal, 2001; Powell, 1995). However, service organizations are still lagging behind their manufacturing counterparts in terms of their strategic commitment to TQM and other quality improvement initiatives (Au and Choi, 1999; Dotzour and Lengnick-Hall, 1996; Sohal, 1994; Shortell et al., 1995). The apparent reluctance of service organizations to utilize quality improvement based strategies and practices are difficult to understand, especially in light of the increased significance of the service sector to national and global economies. For example, service activities in the U.S. accounted for 20% of the Gross Domestic Product in 2000, employing 53% of the U.S. workforce in 2001 (Statistical Abstract of the United States, 2001, 2002). The trend signifying the increasing importance of the service sector is expected to strengthen in the foreseen future (Lemak and Reed, 2000). This trend, coupled with an increasing competitive and environmental emphasis on the customer-focus make the reluctance of service organizations to implement quality improvement initiatives difficulty indeed to fathom. Some attribute this apparent reluctance of service organizations to implement quality improvement initiatives to the nature of the service quality.

Service quality is a multi-dimensional construct. Thus, service quality may be viewed based on the attributes of the service delivery system, the extent of customer satisfaction and/or the interactions among the different elements of the service operational system which define the service encounter (Chase and Bowen, 1991; Parasuraman et al., 1988; Klaus, 1985). Therefore, efforts targeted at improving service quality are directly or indirectly related to both front-end and back-end task and activities of the service operational system (Yasin et al., 2002; Yavas and Yasin, 2001; Yasin and Yavas, 2001; Czuchry et al., 2000; Yasin and Yavas, 1999). As such, it is difficult to emphasize one certain aspect of quality, as most of these aspects are intangible in nature.

Despite this apparent difficulty, some practical research has attempted to tackle the service quality component problem. Yasin, Czuchry et al. (1999) proposed a Rapid Assessment Methodology (RAM) to improve service quality in a healthcare operational setting. The RAM attempts to integrate service quality improvement initiatives into a form of system-wide quality improvement philosophy. Based on a stream of research comparing operational practices and related quality improvement initiatives in manufacturing and service organizations, the need for

service organizations to benchmark their manufacturing counterparts was underscored (Yasin et al., 2004; Yasin et al., 2003; Yasin and Wafa, 2002). These studies concluded that despite the multi-faceted nature of service quality, the implementation of quality improvement initiatives in service operational settings is not only feasible, but rather it leads to effective operational and strategic gains.

In recent years, some service organizations in different service industries, such as healthcare, insurance and hospitality among others, have shown increasing interest in developing quality improvement initiatives (Hasan and Kerr, 2003). This interest may be attributed to the positive operational and strategic impacts of these initiatives on organizational performance (Agus et al., 2000; Reed et al., 1996; Hasan and Kerr, 2003; Zahiri et al., 1994). In general, however, the effective implementation of quality improvement initiatives in service operational environments is still lagging behind that of manufacturing (Lemak and Reed, 2000; Sohal, 1994; Dotzour and Lengnick-Hall, 1998; Shortell et al., 1995). This may be attributed to the common misconception that quality improvement initiatives are, either inapplicable or at best, very difficult to implement in service operational settings (Yasin et al., 2002; Lemak and Reed, 2000; Winsor et al., 2002; Samson and Terziovski, 1999).

In the new global economy manufacturers no longer have the luxury of only competing with rivals from the same state or region, but are being forced to compete against national and global competitors, even for a share of what some had previously considered as captive local markets. Customers are also becoming more sophisticated and globally-oriented, having virtually no restrictions or reluctance to search for better deals outside of their local, regional and national borders using the world-wide-web or other forms of information technology. Thus, business organizations, regardless of industry are utilizing innovation, advance operational technology (Sharma et al., 2008, Small et. al., 2009), and process improvement initiatives to better satisfy the increasingly sophisticated customers (Osarenkhoe, 2009; Klefsjö et al., 2008).

Manufacturing systems responses to this increasingly competitive customer-oriented environment have been varied. Technological innovations such as the introduction of new and advanced manufacturing technologies (Sharma et.al., 2008, Small et. al., 2009) and the increased use of information technology to provide virtual and seamless links to share critical information with customers, suppliers and other key constituencies have been prevalent. However, manufacturing systems have also found that improvements in technology alone are often not sufficient to achieve and sustain higher levels of competitiveness. Enhancements in other aspects of their operational systems, policies and procedures are required. As such, for these enhancements to be effective, they must be approached systematically.

Quality is consistently heralded, across all manufacturing industries, as a critical competitive priority as well as a prerequisite for sustainable growth (Kundu and Vora, 2004). Indeed, improvements in quality continue to be viewed as a major source of competitive advantage in manufacturing (Prajogo, 2007). Of particular interest in this research is an analysis of the attempts of organizations to address customer quality concerns by implementation of quality improvement initiatives geared towards meeting or exceeding customer expectations rather than to merely conform to product specifications (see for example; Bayazit, 2003; Sebastianelli and Tamimi, 2002).

Beginning in the early 1990s, manufacturing operational systems took the initiative to restructure its basic methods of operation. Since then, many companies have adopted quality-oriented manufacturing improvement programs as a reaction to their challenging and constantly changing competitive environments (Lee, 2002). Recently, service operational systems also followed their manufacturing counterparts lead and began to implement operational improvement programs and initiatives (Yasin et al., 2009). The implementation of such initiatives is also taking hold in not-for-profit sector operational systems (White et. al., 2009). Programs such as Total Quality Management (TQM), Benchmarking (BM), Business Process Re-Engineering (BPR), Lean Manufacturing, International Standard Organization Certification (ISO 9000), and Continuous Improvement (CI) have been implemented in manufacturing, service, and not-for-profit sectors operational settings. Summary details of each of these practices are detailed in the following paragraphs.

Total Quality Management (TQM)

Total quality management (TQM) was one of the earliest approaches to improving the quality of manufactured products (Ehigie and McAndrew, 2005). TQM is an integrated management philosophy and set of practices that promotes an organization-wide focus on quality starting with top management, but involving workers at all levels of the organization. The major objective of TQM is the development of a business strategy that harnesses all of the company's resources to achieve world-class quality at reasonable costs (Pheng and Teo, 2003). Operationally, TQM combines a quality-oriented culture with intensive use of management and statistical tools to design and deliver quality products to customers (Daily and Bishop, 2003). Some of the benefits attributed to the implementation of TQM includes: a) improved quality of products and services, b) improvement in production performance, and c) cost reduction, in addition to many other organizational benefits (Yang, 2006; Kumar et. al., 2008; Gill, 2009; Sun, et. al., 2009).

Continuous Improvement (CI)

Continuous Improvement (CI) or Kaizen is a set of philosophies and programs that encourages improvement in the quality of manufactured products and delivered services (Briley et al., 2000). The basic theme in continuous improvement is that managers should continuously search for and implement ways to improve quality and reduce waste (Reid and Koljonen, 2003). Continuous improvement is often viewed as a prerequisite or constituent part of all the popular process improvement approaches such as TQM and Lean Manufacturing (Sahin, 2000). The primary drivers for Continuous Improvement strategies are the reduction of the triad of waste through the cutback of (1) valueless time, (2) valueless activity, and (3) valueless variance in a process (Tersine, 2004). Continuous improvement can be achieved using a number of tools and techniques dedicated to searching for sources of waste, sources of variation, and sources of other operational problems and then finding ways to mitigate or minimize them (Bhuiyan and Baghel, 2005). Continuous improvement methods have been widely adopted and are credited with providing an important component of increased company competitiveness (Hyland et al., 2003).

Business Process Reengineering (BPR)

Michael Hammer (1990) defines business process reengineering as "... the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical contemporary measures of performance, such as cost, quality, service, and speed." He suggested that the major challenge for managers was not the use of technology to eliminate work but rather the obliteration of non-value adding work. Business Process Re-engineering (BPR) is a continuum of change initiatives with varying degrees of radicalness, typically supported by information technology (IT) systems. The major objective of BPR is the delivery of superior performance standards through establishing process sustainable capability (Al-Mashari et al., 2001). The overall theme of BPR is the quest for improvement through quick and substantial gains in organizational performance by starting from scratch in designing or redesigning the core business process (Attaran and Wood, 1999).

ISO 9000

ISO 9000 is a series of international standards dealing with quality systems that can be used for external quality assurances purposes. This set of standards was promulgated by the International Organization for Standardization in 1987 and was patterned after the United Kingdom (UK) Standard BS 5750. Revised and updated standards were developed in 1994, 2000 and 2008. ISO 9000 standards serve as the basis for establishing quality management systems providing guidelines on how to develop systems for managing quality products or services at manufacturing and service firms (Guler et al., 2002; Simmons and White, 1999). ISO 9000 standards are basically management tools that are geared towards the systematization and formalization of processes and tasks in order to obtain uniformity in the product and consistency of procedures (Viadiu et al., 2006; Chow-Chua et al., 2003). Achievement of ISO 9000 certification signifies that the organization’s processes are capable of producing products or providing services with constant or consistent quality (Singels et al., 2001).

Benchmarking (BM)

Benchmarking seeks out, internalizes and improves upon competitors' best-practice capabilities (Drew, 1997). Benchmarking is a process by which an organization evaluates various aspects of its operational processes in relation to best practices, typically but not necessarily, within its own manufacturing sector (see, e.g., Voss et al., 1997; Griffin, 1997). Moreover, Yasin (2002) indicates that the scope of benchmarking has expanded to include strategies and systems. Where significant deficiencies exist, the organization can develop plans to move towards desirable best practices (Balm, 1996). Although benchmarking can be viewed as a one-time event, organizations are likely to garner more benefits if they are willing to review the operations of best practice companies on a continuous basis. Voss et al., (1997) link benchmarking to the identification and adoption of improved operational practices and an increased understanding of competitive positioning. It has also been suggested that benchmarking can actually generate broadly-based change in organizational thinking and action (Drew 1997).

RESEARCH METHODOLOGY

The purpose of this study is to determine to what extent each of the manufacturing and service industries covered in our survey had adopted each of these quality management practices and then to discern how effective these practices have been in meeting the objectives set out by management for their adoption. Four manufacturing industries were chosen: apparel, food processing; pharmaceutical/biotechnology; and semiconductors. These service industries were chosen: food services, banks, and accounting firms. These choices represent a mix of both traditional and growing manufacturing sectors. The selected industries are also diverse in terms of variations in the types of operations and types of technology being used.

The food processing and kindred products industry in the USA accounts for more than 14% of the total value of manufacturing sector output and has become very responsive to the adoption of new technologies. High technology solutions are prevalent in the processing, packaging and marketing of food products (Morrison, 1997). The semiconductor industry is very competitive and subject to constant process innovations, especially by smaller firms and latecomers (Almeida and Kogut, 1997; Cho et. al., 1998). This presents a major challenge for incumbents who often have to depend on innovative management practices to hold back market share challenges (Iansiti, 2000). The selected service industries represent a mix of traditional and growing sectors. These services utilize different operational technologies.

Instrument

The survey instrument used in this research was developed after an extensive literature review of the components, benefits and problems associated with the use of each of the six quality improvement practices. The instrument consisted of some questions requiring Likert-scaled responses, in addition to several questions which allowed open ended and categorical responses. A group of practitioners and academicians examined the instrument for face validity and clarity. They suggested a few changes which were incorporated into the survey instrument that was eventually administered.

Sample

The research instrument was mailed to CEOs at a random sample of 400 apparel, food processing, semiconductor and pharmaceutical/biotechnology manufacturing organizations in the United States. Several national manufacturing directories were used to develop the sample frame. The sample size was limited by budget constraints. The cover letter accompanying the survey contained a note assuring respondents about the confidentiality of the information that they were being asked to provide. In addition, the letter addressed the nature of the study, and provided brief descriptions of the quality improvement initiatives. The CEO's were asked to either complete the survey or pass it on to the officer in the company that would have, oversight of or, primary responsibility for implementing the types of improvement initiatives mentioned in the survey. Eighty usable responses were returned, resulting in a response rate of 20.00%.

The research instrument was also mailed to a random sample of 1000 service organizations in the United States. A letter addressing the nature of the study and encouraging participation

accompanied the research instrument. Out of the 1000 instrument mailed, 353 usable responses were obtained. Thus, resulting in a response rate of about 35%. This response rate is relatively high compared to similar survey-based studies reported in the literature (e.g., Ugboro and Obeng, 2000; Prickett and Rapley, 2001; Dissanayaka, Kumaraswamy Karim and Marosszeky, 2001; Rahman, 2001).

RESULTS

Sample Profile

The overall sample of this study included: eighty (80) manufacturing firms, fifty two (52) food services firms, eighty five (85) banking organizations, and ninety two (92) accounting firms. Table 1 shows the percentage of the participating organizations by industry. Organizations in the banking industry are the most well-established in the sample. Banks are in general, managed by executives with more experienced relative to other organizations. On the other hand, manufacturing organizations are relatively new and are managed by younger executives.

Industry and firm's Technology

Table 2 reflects a pattern of consistency between the levels of technological sophistication used in the industry verses firm level. As such, firms operating in industries with high level of technology appear to be technologically sophisticated. In this context, the participating firms are following closely the technological trends in their respective industries.

Sophistication of Industry and Firm's processes

Table 3 reinforces the findings extracted from Table 2. Firms which perceive themselves as operating in a sophisticated industry appear to be utilizing sophisticated organizational and operational processes. This reflects the awareness of these firms of the changes in their respective industries operational processes.

Industry and Process Improvement Initiatives

Table 4 shows that the implementation of the studied process management initiatives appears to be, for the most part, industry-specific. Organizations in different industries seem to be interested in implementing these initiatives to varying degrees. Total Quality Management (TQM) and Continuous Improvement (CI) represented exceptions. In this context, these two initiatives appear to be implemented equally across all the industries in the study.

Frequency of Process Improvement Implementation

Table 5 shows the organizations in different industries are not equally willing to implement the studied process improvement initiatives. In this context, the characteristics of the industry might make some of these initiatives more consequential than others to that industry. In the case of banking, organizations appear to be the most willing to implement the majority of the process

improvement initiatives. This could be attributed to pressures from the competitive environment and the increasingly sophisticated consumers.

Effectiveness of Process Improvement Initiatives

Table 6 shows that industry appears to be a factor –specific in determining the effectiveness of the majority of the implemented process improvement initiatives. However, Total Quality Management (TQM) and Continues Improvement (CI) appear to be as effective regardless of industry. This might be attributed to problems with implementation process, or perhaps the characteristics of different industries.

CONCLUDING REMARKS

Using a sample of manufacturing and service organizations (eighty (80) manufacturing firms, fifty two (52) food services firms, eighty five (85) banking organizations, and ninety two (92) accounting firms), this preliminary investigation examined process improvement initiatives implementation and effectiveness. Based on the findings, the following conclusions are derived.
First, the studied organizations appear to have technological and processes consistencies with industries. In this context, firm's choice of technology appears to be consistent with that of the industry. Also, operational processes sophistication appears to be in line with that of the industry. These consistencies are perhaps motivated by the firm's desire to follow the operational and competitive trends in their industries.

Second, most organizations in different industries appear to be realizing the fruit of effective implementation of process improvement initiatives. This in turn might encourage more implementation of these initiatives in the future.

Third, while most of the initiatives implementations and effectiveness might be industry-specific, Total Quality Management (TQM) and Continuous Improvement (CI) appear to be more universal in nature among the sample in this study.
Finally, the banking industry appears to be the most willing to implement process improvement initiatives. Perhaps this could be attributed to the increased competitive pressures and the desire of banks to reorient their operations and strategies.

REFERENCES

(References are available upon requests from any of the authors)

TABLES

(Tables are available upon requests from any of the authors)