THE RELATIONSHIPS BETWEEN JUST-IN-TIME PRACTICES AND CONSISTENCY OF BENCHMARKING PERFORMANCE MEASURES: AN EMPIRICAL STUDY

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ABSTRACT

This article examines if there are relationships between Just-in-Time (JIT) practices and alignment of benchmarking performance measures. A set of six hypotheses was used to examine if there are differences between conventional and JIT companies in setting organizational goals and objectives, competitive priorities, and alignment of competitive capabilities with competitive priorities. Statistical results indicate compared with conventional companies, JIT companies are overall better in understanding of organizational strategy, deployment of the strategy into sub strategies, and selection of benchmarking performance measures at various levels that are aligned with organizational strategy.

Key words: Benchmarking, Performance Measures, JIT, Alignment

INTRODUCTION

In a global market, knowledge of how world class organizations conduct their business is a critical element of successful competition. Benchmarking is a valuable tool that provides an opportunity to learn from other successful organizations. Benchmarking is an effective improvement tool used by successful companies to improve aspects of organizational competitive priorities such as cost, quality, delivery, flexibility, and customer service (Zairi, 1994). Benchmarking is defined as a process in which an organization tries to learn from the best-in-class organizations, determine how the best-in-class achieve superior performance levels, and utilizes those practices as benchmarks to their own organization (Watson, 1993; Whiting, 1991). Deming (1982) and a number of other quality advocates have strongly recommended the use of benchmarking as an essential component of continuous improvement (Graham, 1993; Ishikawa, 1985; Venetucci, 1992). Improving organizational performance by setting a high level of standard, outward looking, flexibility, creating a culture of organizational learning, and effective performance measurement are the main reasons for the use of benchmarking as a valuable quality improvement tool. Since 1987, benchmarking has been a major component of the Malcolm Baldrige National Quality Award criteria; it has consistently influenced more than half of the total Baldrige points (Blanchard, 2008; Bogan and English, 1994; Ford and Evans, 2001). The practice of benchmarking is also being widely used for six sigma process and for organizations seeking ISO 9000 certification.

Although for the past three decades, there has been considerable number of research on the application of benchmarking in various areas of business, the primary focus of the research, however, has been on quantitative aspects of functional benchmarking. That is, existing research primarily utilized short term technical and financial metrics to evaluate the performance of
organizational units. Fundamental strategic factors such as recognition of external environmental factors, building organizational core competencies, and alignment of short term technical and financial metrics with overall organizational strategy were generally disregarded (Bogan and English, 1994; Eccles, 1991 and 1992). As a result, due to inconsistent performance measurement, the benefits of the existing research have generally been limited. As argued by Furey (1987), Goldwasser (1995), Kaplan and Norton (2001), Ahmed and Rafiq (1998), Talluri and Vazacopoulos (1998), Papke-Shields et. al. (2002), and Madigan (1992) for the benchmarking process to be effective, organizations need to integrate benchmarking activities into long term organizational strategy and the process needs to employ a broad range of balanced performance measures that are consistent with organizational strategy. The objective of this article is to examine if there are relationships between JIT practices and alignment of benchmarking performance measures.

LITERATURE REVIEW

Since the early 1980’s a large number of articles have been written on the development and application of benchmarking in diverse areas of businesses such as manufacturing, health care, marketing, supply chain, energy, and customer service. Harrison (1999) presents an analysis of the evolution of different aspects of benchmarking activities. Zairi and Whymark (2000) report successful results of the application of benchmarking at British Royal mail. Applications of benchmarking to public procurement, world-class purchasing, investment decisions, hotel sector, public transportation, and to the US service sectors have been reported by Raymond (2008), Nassar (2012), Goncharuk (2011), Olli-Pekka (2011), and Roth et. al. (1997). Bartley, Gomibuchi, and Mann (2007) utilized benchmarking to provide insights into how organizations can develop more customer-focused culture. Seong-Jong et. al. (2009) used benchmarking to measure the performance of a number of specialty coffee stores. Singh, Narain, and Yadav (2006) utilized benchmarking and performance measurement to investigate supply chain management practices at a number Indian manufacturing organizations. They found that Indian organizations were using benchmarking mainly as a continuous improvement tool. Chia et. al. (2009) also employed a balanced scorecard approach to measure the performance of a number of entities in the supply chain. The authors concluded despite the need to utilize a balanced performance measurement, organizations primarily focused on the use of traditional financial measures. Gurumurthy and Kodali (2009) utilized benchmarking to assess the implementation of lean manufacturing. Yasir and Sandhu (2013) developed a benchmarking framework to better understand the role of trust in the performance of strategic alliances. Practical application of lead benchmarking and performance measurement to achieve organizational change has been investigated by Moffett, Anderson-Gillespie, and McAdam (2008). Goncharuk (2008) investigated the capability of using performance benchmarking tools for estimation of efficiency in gas distribution companies. The use of benchmarking to measure operational performance of organization utilizing internet based services has been reported by Hadaya (2009).

The use of benchmarking as an effective organizational learning tool has been presented by Garvin (1993), Ford and Evans (2001), Smith (1997), Hambly (1997), Gleich et. al. (2008), and Watson (2001).
As stated earlier, although the content of the above articles is diverse, the primary focus, however, has been on short term technical and financial aspects of benchmarking. In an earlier study, Meybodi (2005a) demonstrated the inconsistency of traditional organizations in choosing benchmarking performance measures at various levels of organization. That is, performance measures chosen by managers at operational levels were inconsistent with overall organizational strategy. The lack of a consistent strategy is a major impediment in building core competencies to ensure long term organizational competitiveness.

Just-in-time (JIT) system has been a great force in the world of manufacturing since the early 1980's. Some of the main benefits of JIT such as inventory reduction, quick delivery, and cost reduction have been well documented (Cook and Rogowski, 1996; Payne, 1993). Elimination of waste and respect for people are the two fundamental principles of a JIT system (Payne, 1993). Looking at JIT as a process for eliminating wastes and respectful treatment of people; its principles can be applied to other areas including services in which there is no physical inventory (Cook and Rogowski, 1996). In a number of other studies, researchers showed that world class JIT organizations are successful not only in areas such as inventory reduction and quick delivery, but also in other service areas such as quality improvement and new product development (Handfield, 1993; Meybodi (2005b); Pettersen, 2009). The objective of this article is to examine if there are relationships between JIT practices and utilization of a benchmarking performance measures that are consistent with organizational strategy. With respect to preceding discussion on performance measurement, the article presents the following hypotheses:

**H1:** JIT companies are more consistent than conventional companies in aligning their core competencies with their goals and objectives.

**H2:** JIT companies are more consistent than conventional companies in aligning their competitive priorities with their goals and objectives.

**H3:** JIT companies are more consistent than conventional companies in aligning their competitive capabilities with their competitive priorities.

**H4:** JIT companies are more consistent than conventional companies in aligning their manufacturing objectives with their competitive priorities.

**H5:** JIT companies are more consistent than conventional companies in placing a higher emphasis on strategic manufacturing objectives.

**H6:** JIT companies are more consistent than conventional companies in developing a learning organization to support organizational strategy.

**RESEARCH METHODOLOGY**

A questionnaire-based mailed survey was used to test the above hypotheses. The survey contained a series of questions on the use of strategic and tactical benchmarking performance measures for JIT and conventional organizations. Strategic questions are concerned with organizational mission and goals, as well as attitude toward customers, competition, technology, globalization, development of core competencies, and organizational competitive priorities. Tactical items are concerned with specific financial or technical performance measures such cost, quality, and delivery.
The target population for this study consisted of manufacturing firms in Midwestern United States. A sample of 500 manufacturing firms was chosen from manufacturers’ directories of the states of Illinois, Indiana, Ohio, Michigan, and Wisconsin. The sample covers organizations in a variety of industries ranging from fabricated metal, communication, electronics, automotive, tools, chemicals, rubber, and paper products. In addition to general organization and managerial profile items, the survey contained series of questions regarding organizational goals and objectives, external environmental factors, core competencies, competitive priorities, manufacturing objectives, and manufacturing action plans. Also, based on a number of questionnaire items on the principles of JIT practices, the respondents were asked to classify their organization as JIT or conventional company. Out of 84 usable surveys received, 33 respondents declared their organization to be a JIT organization and 51 respondents considered their organization to be conventional organizations.

The survey data indicates the majority of respondents had various levels of managerial positions of organization with less than 500 employees. Presidents and vice presidents accounted for 29% and plant managers accounted for 30% of the sample. About 35% of the sample had other managerial positions such as operations/production managers, quality managers, and the remaining 6% were production line supervisors. In terms of manufacturing experience, about 28% of the respondents had between 10 to 20 years and 60% had more than 20 years of manufacturing experience.

**RESEARCH RESULTS**

Table 1 shows the mean importance ratings for corporate goals and objectives and corporate strategic factors. The respondents were asked to rate each element based on the degree of importance (1=low importance, 5=high importance) to the company for the next five years. The result indicates that, for conventional companies, the top three corporate goals and objectives are building market share, maximizing profits, and focusing on customer satisfaction. However, the mean ratings for the remaining five strategic factors of understanding competition, building innovative organization, developing knowledge workforce, and understanding global and the state of technology issues are not as strong as the mean ratings for the first three factors. This is perhaps an indication of a typical reactive strategy by conventional companies in which the primary focus of managers is on marketing and financial goals. Understanding external factors such as competition and global issues and developing core competencies to effectively deal with external factors are considered to be secondary. For these companies, understanding the causes for such strategic misalignment between corporate goals and objectives and proactive development of organizational core competencies is crucial.

Table 1 demonstrates, for JIT companies, the top two ratings are customer satisfaction and building innovative organization. These are closely followed by developing knowledge workforce and understanding of competition and technology. Table 1 clearly shows that for JIT organizations, the mean ratings of external factors and organizational core competencies are significantly higher than the mean ratings of the corresponding factors for conventional organizations. This is a clear indication that unlike conventional companies JIT organizations focus more on understanding external factors and building organizational core competencies.
through development of knowledge workforce and state of the art technology. Statistical result of Table 1 clearly supports hypothesis H1.

The ratings of the elements of competitive priorities for conventional and JIT organizations are shown respectively in Table 2 and 3. The ratings for the two tables are similar to Table 1. From Table 2, the respondents from conventional companies ranked product reliability, conformance quality, delivery reliability, price, and fast delivery as the top five important competitive priorities. The ranking of product reliability and conformance quality as the top two competitive priorities is consistent with corporate strategy. It indicates the responding managers believe that quality factors are still important elements of competition. However, the ranking of delivery reliability, price, and fast delivery as the next three competitive priorities indicate that managers also believe on the importance of quick and reliable delivery and price. Relative low ranking of factors such as new product development speed and ability to make design changes is inconsistent with the corporate strategy of customer satisfaction and building innovative organization.

From Table 3, the respondents from JIT companies ranked product reliability, delivery reliability, fast delivery, design change, new product development (NPD) speed, and product customization as the top six competitive priorities. The ranking of product reliability as the top competitive priority indicates that managers of JIT companies also believe on the importance of quality as an essential element of competitive advantage. However, the ranking of delivery reliability, fast delivery, design change, NPD speed, and product customization as the next five competitive priorities indicate that the respondents also believe on the importance of time based competition and flexibility.

To understand relative strength of organizational competitive capabilities, the respondents were asked to rate relative competitive strength of their organization with respect to the competitors who are doing best for each element of competitive priorities. The mean strength scores for each element of competitive capabilities are also shown in Table 2 and 3. Statistical tests indicate, for conventional companies, the mean strength of the top five competitive priorities is significantly lower than the mean importance. This indicates for conventional companies, although managers ranked product reliability, conformance quality, delivery reliability, price, and quick delivery as the top five competitive priorities, organizational capabilities for those factors is not that strong. This imbalance between organizational competitive priorities and their competitive capabilities is a serious area that needs to be investigated. Statistical results of Table 3 indicate, unlike conventional companies, the mean strength for majority of the elements of competitive priorities for JIT companies is close or higher than the mean importance ratings. From the results of Table 2 and 3, it is clear that overall the data support hypotheses H2 and H3.

Table 4 suggests for conventional companies the future role of manufacturing unit is to focus on improving conformance quality, product reliability, and supplier quality. Reducing the costs of labor, overhead, materials, set-up, and increasing capacity utilization are the next set of objectives. While the first three objectives are consistent with competitive priorities and the strategic importance organizations are placing on customer focus, the early emphasis on reducing costs and increasing capacity utilization for the next five objectives are inconsistent with competitive priorities. Statistical results in the last column of Table 4 supports this statement by
demonstrating that the mean importance ratings of these cost elements for conventional companies is significantly higher than the corresponding cost elements for JIT companies. Table 4 also indicates relative low emphasis on strategic factors such as changing organizational culture, improving inter-functional communication, improving employee morale, improving supplier relationships, eliminating waste, and improving NPD speed. Since these are the foundation of world-class organizations, there needs to be higher emphasis on these factors. Such inconsistencies may be due to miscommunication among managers at various levels or the results of inconsistent evaluations and reward systems.

Table 4 shows, unlike conventional companies, JIT organizations place higher emphasis on fundamental strategic factors such as changing organizational culture, improving inter-functional communication, improving employee morale, improving team work, and improving supplier relationships. This is followed by eliminating wastes, improving quality, improving delivery and customization, reducing inventory, reducing costs, and increasing capacity utilization. The ranking of these factors is consistent with the principles of JIT and previous JIT research [31]. Statistical result in the last column of Table 4 shows the mean importance ratings of these strategic factors for JIT companies is significantly higher than the corresponding factors for conventional companies. Statistical result of Table 4 clearly supports hypotheses H4 and H5.

For hypothesis H6, one needs to reexamine the results of table 3 and 4. The results showed while the primary focus of conventional companies was on quantitative cost reduction and technical quality improvement factors, JIT companies placed a higher emphasis on strategic organizational and workforce developmental factors such as changing organizational culture, linking manufacturing strategy into corporate strategy, improving inter-functional communication, and improving employee morale through training, empowerment, and team work. The direct result of such activities is a better knowledge workforce and a better learning organization. Hence, it is clear that the result of tables 3 and 4 support H6.

**CONCLUSION**

The focus of this article was to examine if there are relationships between Just-in-Time practices and alignment of benchmarking performance measures. A set of eight hypotheses was used to examine the differences between conventional and JIT companies in the alignment of their benchmarking performance measures. Statistical results indicate the following:

- JIT companies are better in understanding external factors such as competition and the state of technology to set their corporate strategy.
- JIT companies are better in building their core competencies through development of knowledge workforce and state of the art technology to effectively deal with the external challenges.
- JIT companies are more consistent than conventional companies to emphasize more on strategic factors such as changing organizational culture, improving inter-functional communication, and improving employee morale through training, empowerment, and team work.
- JIT companies are more consistent than conventional organizations in using a balanced mix of performance measures that are consistent with organizational strategy.
- JIT organizations are more consistent than conventional organizations in top down bottom up alignment of their benchmarking performance measures.
REFERENCES


(Tables are available from the author upon request)