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CONSISTENCY OF BENCHMARKING PERFORMANCE MEASURES: AN EMPHASIS ON COMPANY SIZE

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Abstract

This article investigates consistency of organizational strategy and potential links between the company size and the alignments of benchmarking performance measures. Six hypotheses were used to examine the consistency of the benchmarking performance measures and the impact of company size on selection of strategic and tactical benchmarking performance measures. Statistical results show evidence of misalignment between strategic goals and objectives, competitive dimensions, and proactive development of organizational core competencies. The results also indicate that managers from larger companies placed more emphasis on strategic measures while managers from smaller organizations emphasized more on tactical performance measures.

Keywords: Benchmarking, Consistency, Performance Measures.

1. Introduction

Benchmarking is the process of learning from the best-in-class organizations, determining how the best-in-class achieve those performance levels, and utilizing the best practices to their own company to achieve superior performance (Sahoo, 2021), Yazan et al. (2019), Ferreira de Castro and Frazzon (2017). Since 1980s, world-class organizations have utilized benchmarking as an effective tool to continually improve aspects of organizational competitiveness such as cost, quality, delivery, and customer service. Flexibility, outward looking, setting a high level of standard, and creating a culture of organizational learning are the primary reasons for the use of benchmarking as an effective quality improvement tool. Benchmarking is an effective means for learning and change because it exposes employees to new approaches, systems, and procedures (Singh et.al. (2018), Welch (1993), Kuebler (1993)). Deming (1982) and other quality advocates (Graham, 1993) and Venetucci (1992) have strongly recommended the use of benchmarking as an essential component of continuous improvement.

The use of benchmarking as an effective quality improvement tool was started by Xerox in the early 1980's to overcome severe international competition. Since 1987, benchmarking has been a major component of the Malcolm Baldrige National Quality Award criteria. Since 1987, out of a total of 1000 Baldrige points, a benchmarking has consistently influenced more than 500 points, Bogan and English (1994). No other quality elements, such as process management, employee involvement, and quality planning, have had such a broad influence on the Baldrige criteria than benchmarking. More recently, the practice of benchmarking is being widely used by six sigma process, agile manufacturing, Just-in-time system, organization strategy, and supply chain management (Sahoo (2021), Shanker et al. (2021), Tipu et al (2019), Lockamy (2019), Arya et al (2017), Faisal et al. (2017), Goni et al. (2018), Moori et al (2019)).

Although for the past four decades, there has been considerable volume of research on the application of benchmarking in various areas of businesses, the primary focus of the research, however, has been on short term technical and financial aspects of functional benchmarking with limited success stories. The focus of this article is to examine consistency of organizational strategy and to investigate the effect of company size on consistency of benchmarking performance measures.

2. Literature Review

Total quality management (TQM), Just-in-time (JIT) systems, proliferation of new technologies, and a number of other important events during the last several years have helped organizations to recognize the importance of benchmarking and performance measurements in managing complex processes. Managers across various industries have recognized the importance of managing processes and the truth that what gets measured is what gets managed and improves. Special focus of Malcolm Baldrige National Quality Award on benchmarking and performance measurements is a clear indication of the critical role of these elements in managing and improving organizational processes (Sahoo and Yadav (2018), Potdar et al. (2017), Kafetzopoulos, Gotzamani, and Psomas (2013)). Since the early 1980's, application of benchmarking in various businesses, ranging from manufacturing to health care, marketing, supply chain, human resources, and accounting has been widely reported (Feibert et al (2019), Giuliano et al. (2019)). Harrison (1999) presents a detailed analysis of the evolution of different aspects of benchmarking activities. A comparison of the Xerox and Kodak benchmarking process has been reported by Bogan and English (1994). Although the two benchmarking methods utilize different numbers of steps, their overall logic is quite similar. Applications of benchmarking to world-class purchasing and to US service sectors have been reported respectively by (Newman, Hanna, and Duffett (1995) and Roth et al. (1997)). The use of benchmarking as an effective organizational learning tool has been presented by (Hichem et al. (2022), Malik et al. (2021), Tasopoulou and Tsiotras (2017), Souliotis et al. (2017), Senge (1990), Ford and Evans (2001), Smith

(1997), Hambly (1997), Watson (2001), Chen and Paetsch (1995), O'Dell and Grayson (2000), Routroy and Pradhan (2013), and Evans and Dean (2003)). A comprehensive list of legal and ethical issues of benchmarking is presented by Brue (2002), and Vaziri (1992). As stated earlier, although the content of these articles is diverse, their primary focus, however, has been on short term financial and operational aspects of benchmarking. Today, managers understand that focus on short-term financial and technical results without consideration to overall organizational strategy could produce devastating results over the long term. As a result, organizations are learning to manage the system in a way that crosses traditional departmental boundaries. In this new horizontally integrated system, organizations need to accept a long-term perspective and utilize balanced, financial and nonfinancial performance measures to carefully improve the competitiveness of the entire organization. The approach requires that benchmarking organizations develop a complete understanding of their own business strategy and deployment of the strategy into functional strategies. This process will ensure that there is a consensus within the organization about long term and short-term performance measures that are consistent with organizational mission and goals (Shukla, S.K. and Sushil (2022), Papke-Shields et. al. (2000), Goldwasser (1995), Kaplan and Norton (1992), and Talluri and Vazacopoulos (1998)). The focus of the article is to test the following hypotheses:

- H1: Company goals and objectives are consistent with their core competence*
- H2: Company goals and objectives are consistent with external environmental factors.*
- H3: Company goals and objectives are consistent with competitive priorities.*
- H4: Company competitive priorities are consistent with competitive capabilities.*
- H5: Company size and alignment of strategic benchmarking metrics are unrelated.*
- H6: Company size and alignment of tactical benchmarking metrics are unrelated.*

3. Methodology

A questionnaire-based survey was used to examine the above questions. The part of the survey related to this article contains a series of questions on the use of strategic and tactical benchmarking metrics. Strategic questions are concerned about organizational mission and goals, as well as attitude toward customers, competition, technology, globalization, quality, and employee developments. Tactical items are related to specific technical performance measures such as cost, quality, and delivery. The target population for this study consisted of manufacturing firms in the Midwestern United States. A sample of 500 manufacturing firms with more than 50 employees 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, toots, chemicals, rubber, and paper products. In addition to general organization and managerial profile items, the survey contained a series of questions regarding organizational goals and objectives, competitive priorities, manufacturing performance objectives, and manufacturing action

plans. Out of 91 completed surveys received, 84 surveys were usable, resulting in a response rate of 17%. The survey data indicates the majority of respondents had various high level managerial positions from organizations 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.

4. Results

Table 1 shows the ranking of the mean importance score for each element of corporate goals and objectives. The respondents were asked to rate each element based on the degree of importance (1=low importance, 5=high importance) to their company for the next five years. Summary data indicates that the respondents' top three corporate goals and objectives are building market share, maximizing profits, and focusing on customer satisfaction. Being in a better competitive position with respect to quality and customer satisfaction is reasonable explanation for market expansion and profit making. However, the mean ratings for the last four factors in Table 1 are significantly lower than the ratings of the first three factors at 0.05 level of significance. This is perhaps an indication of traditional reactive strategy in which the primary focus of managers is on marketing and financial goals. Understanding external environmental factors such as competition, global issues, technology, and development of core competencies to effectively deal with these factors are rated as secondary. This is a rather disturbing posture because in today's global market world-class organizations focus more on building core competencies than on achieving marketing and financial goals. They develop core competencies first, then utilize a proactive strategy and look for opportunities to exploit their core competencies to achieve a competitive advantage. Understanding the causes for such strategic inconsistencies between organizational goals and objectives and proactive development of their core competencies is crucial. Hence, hypotheses one and two are not supported by the data.

Table 1. Ratings for Corporate Goals and Objectives (1=low importance, 5=high importance)

Factor	Mean	SD
Build market share	4.76*	1.27
Maximize profits	4.61*	1.32
Focus on customer satisfaction	4.52*	1.15
Understand competitors' strategy	4.14	1.32
Understand global strategies	3.88	1.21
Understand technology	3.91	1.37
Build and exploit core competencies	3.74	1.39

SD= Standard Deviation, * = statistically larger than the other Means at alpha = 0.05

Table 2. Importance and Strength Ratings for Competitive Priorities
 (1=low importance, 5=high importance) (1=weak strength, 5=strong strength)

Factor	Importance		Strength		t-value	p-value*
	Mean	SD	Mean	SD		
Product reliability	4.69	1.16	3.56	1.24	4.21**	0.000
Conformance quality	4.58	1.28	3.84	1.14	1.34	0.090
Delivery reliability	4.47	1.24	3.78	1.32	2.57**	0.005
Product customization	4.35	1.36	3.42	1.09	3.46**	0.000
NPD speed	4.29	1.23	3.35	1.36	3.50**	0.000
Price	4.16	1.34	3.96	1.25	0.75	0.230
Fast delivery	4.03	1.32	3.82	1.19	0.78	0.210
Performance	3.98	1.22	4.22	1.28	0.89	0.190
Service after sales	3.84	1.44	4.18	1.23	1.27	0.100
Volume flexibility	3.62	1.31	4.32	1.37	2.61**	0.005

* Small p-value indicates the difference between two means is statistically significant

** Mean strength is less than mean importance at alpha = 0.05

Table 2 shows the ranking of the mean importance score for each element of competitive priorities. The importance ratings are similar to the one stated earlier. From Table 2, the respondents ranked product reliability, conformance quality, delivery reliability, product customization, and new product development speed 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 goals and objectives and with recent manufacturing literature. It indicates that managers believe that quality factors are still important elements of competitive advantage. However, the ranking of delivery reliability, product customization, and new product development speed as the next three competitive priorities indicate that the respondents also believe on the importance of time based competition and product customization. Overall, one can argue that the importance ranking of top five competitive priorities is consistent with recent manufacturing literature and with organizational strategy of market expansion, profitability, and customer satisfaction. We can conclude that overall, the third hypothesis is supported by the data.

To understand organizational competitive capabilities, the respondents were asked to rate relative competitive capabilities of their organization with respect to the competitors who are doing best in that area. A five-point scale, where 1 corresponds to weak and 5 corresponds to strong, is used to indicate managers' perceptions of the company's current competitive capability relative to the best competitors. The mean competitive capability scores for each element of competitive priorities are shown in Table 2. Statistical tests indicate that, for the top five competitive priorities, the mean competitive capability is significantly lower than the mean importance. This is evident because with the exception of conformance quality, the p-value for other four competitive priorities is less than 0.005. This indicates, although managers ranked product reliability, conformance quality, delivery reliability, product customization, and

new product development speed as the top five important competitive priorities, organizational competitive capability for those elements, however, is not that strong. On the other hand, the mean competitive capability for the last three competitive priorities is larger than the mean importance indicating that managers believe their competitive capabilities in the areas of performance quality, service after the sales, and volume flexibility are quite strong.

This imbalance between importance and actual capability for the top five competitive priorities is perhaps a critical area that needs to be investigated. Hence, the fourth hypothesis is not supported by the data.

Table 3. Strategic and Tactical Benchmarking Factors

Strategic Factors	Tactical Factors
Develop mission and goals (DMG)	Reduce percent defects (RPD)
Develop core competencies (DCC)	Reduce percent errors (RPE)
Understand competitors' strategies (UCS)	Reduce labor costs (RLC)
Develop global strategies (DGS)	Reduce materials costs (RMC)
Develop technology strategies (DTS)	Reduce overhead costs (ROC)
Focus on customer satisfaction (FCS)	Reduce inventory costs (RIC)
Adopt TQM philosophy and practices (TQM)	Reduce set-up/changeover costs (RSUC)
Change organizational culture (COC)	Increase labor utilization (ILU)
Improve interfunctional communication (IIFC)	Increase equipment utilization (IEU)
Improve employee training (IET)	Improve process capability (IPC)
Improve employee empowerment (IEE)	Improve quality circle practices (IQCP)
Improve employee team work (IETW)	Utilize quality improvement tools (UQIT)
Install continuous improvement (ICI)	Utilize statistical process charts (USPC)
Adopt quality at the source (AQS)	Increase delivery speed (IDS)
Improve supply chain management (ISCM)	Increase product development speed (IPDS)
Improve supplier relationships (ISR)	Reduce manufacturing lead time (RMLT)
Eliminate wastes (ELW)	Increase delivery reliability (IDR)
Reengineer new product development (RNPd)	Increase new product customization (INPC)

Table 3 shows the listing of strategic and tactical benchmarking factors. Table 4 and 5 lists respectively the mean importance score for strategic and tactical benchmarking factors. Each Table shows the mean and the standard deviation of importance ratings for large and small organizational size. In Table 4 and 5, organizations with more than 100 employees are grouped under large and organizations with less than 100 employees are considered to be small organizations. The respondents were asked to rate each factor based on the degree to which they believe the factors are important (1=low importance, 5=high importance) to be used for benchmarking performance metrics.

Table 4 shows that overall managers from large organizations rated strategic factors higher than the managers of small organizations. This is evident because, for large organizations, the mean rating for all strategic factors is above 4.00. Also, statistical tests indicate that out of 18 tests, 13 were statistically significant; meaning managers of large organizations rated these strategic factors significantly higher than the managers of small organizations.

However, for the strategic factors such as customer satisfaction, employee training, employee empowerment, continuous improvement, and quality at the source the mean ratings for the large organizations were not significantly different than the mean ratings for small organizations. One possible explanation for such result would be the popularity of these factors. Since these are popular TQM factors, managers of both large and small organizations believe on the importance of these strategic factors. Table 5 shows the mean ratings of tactical factors for managers of large and small organizations.

Table 5 indicates, unlike strategic factors, overall managers from smaller organizations rated tactical factors higher than the managers from larger organization. Statistical tests indicate that for 11 tests, there were significant differences between the mean ratings of managers from large organizations and the mean ratings of managers from small organizations.

Table 4. Ratings for Strategic Benchmarking Factors
(1=low importance, 5=high importance)

Organizational Size					
Large			Small		
Factor	Mean	SD	Mean	SD	t-value
DMG	4.72	1.71	3.79	1.82	2.36*
DCC	4.46	1.64	3.57	1.57	2.48*
UCS	4.68	1.54	3.76	1.63	2.60*
DGS	4.73	1.82	3.42	1.78	3.25*
DTS	4.63	1.76	3.75	1.64	2.32*
FCS	4.78	1.84	4.53	1.62	0.65
TQM	4.65	1.63	3.84	1.72	2.16**
COC	4.52	1.92	3.57	1.86	2.25**
IIFC	4.37	1.61	3.43	1.67	2.56*
IET	4.68	1.78	4.32	1.75	0.92
IEE	4.31	1.76	4.12	1.86	0.47
IETW	4.71	1.64	3.78	1.94	2.32*
ICI	4.76	1.68	4.25	1.61	1.20
AQS	4.58	1.53	4.24	1.69	0.94
ISCM	4.64	1.92	3.56	1.97	2.49*
ISR	4.52	1.86	3.62	1.73	2.24**
ELW	4.71	1.78	3.76	1.68	2.45*
RNPD	4.66	1.93	3.76	1.76	2.18**

SD= standard deviation, * = significant at 0.01, ** = significant at 0.05

Table 5. Ratings for Tactical Benchmarking Factors
(1=low importance, 5=high importance)

Organizational Size					
Large			Small		
Factor	Mean	SD	Mean	SD	t-value
RPD	4.63	1.83	4.71	1.77	0.21
RPE	4.57	1.53	4.73	1.64	0.41
RLC	3.87	1.68	4.69	1.59	2.24**
RMC	3.83	1.79	4.75	1.47	2.51*
ROC	4.42	1.67	4.68	1.69	0.69
RIC	4.08	1.87	4.77	1.68	1.74**
RSUC	4.67	1.59	4.45	1.82	0.58
ILU	3.72	1.73	4.67	1.66	2.51*
IEU	3.37	1.84	4.46	1.91	2.87*
IPC	4.63	1.88	4.57	1.78	0.15
IQCP	4.11	1.63	4.74	1.74	1.67**
UQIT	4.33	1.77	4.79	1.85	1.12
USPC	4.36	1.57	4.75	1.82	1.19
IDS	4.78	1.86	4.13	1.77	1.71**
IPDS	4.75	1.83	3.36	1.68	1.79**
RMLT	4.62	1.74	3.53	1.79	2.76*
IDR	4.77	1.85	3.78	1.57	2.58*
INPC	4.68	1.88	3.76	1.67	2.31**

SD= standard deviation, * = significant at 0.01, ** = significant at 0.05

Specifically, for tactical factors such as reducing labor, materials, and inventory costs, as well as increasing labor and equipment utilizations, managers from small organizations rated significantly higher than managers from large organizations. This result is not surprising because smaller organizations typically place more emphasis on cost reduction measures and better utilization of labor and equipment. On the other hand, for tactical factors such as improving quality circle practices, increasing delivery and new product development speeds, reducing manufacturing lead-time, increasing delivery reliability, and increasing new product customization, managers from large organizations rated these factors significantly higher than managers from small organizations. Perhaps due to availability of more resources, larger organizations focus more on global quality, delivery, and customization issues than the smaller organizations. For tactical factors reducing defects and errors, increasing process capability, utilization of quality improvement tools, and utilization of statistical process charts the mean ratings for large organizations were not significantly different than the mean ratings for the small organizations. Again, since these are popular TQM factors, perhaps managers of both large and small organizations believe on the importance of these tactical factors.

5. Conclusion

This article demonstrates how understanding organizational strategy is crucial to improve the effectiveness of benchmarking process. The article also investigates the impact of organizational size on the deployment of strategic and tactical benchmarking performance measures. Six hypotheses were tested to examine the consistency of the decisions and to examine the relationship between organization size on the selection of strategic and tactical benchmarking performance measures. Summary of statistical results indicate possible misalignment between organizational goals and objectives and proactive development of their core competencies. Also, organizations are often inconsistent to understand external environmental factors to set their goals and objective. Inconsistencies between organizational competitive priorities and their competitive capabilities are another shortcoming of organizational strategy. Overall, managers from large organizations rated strategic factors significantly higher than the managers from small organizations. Also, managers from smaller organizations rated overall tactical factors higher than the managers from larger organizations. This result is consistent with manufacturing literature because managers from smaller organizations often have tendency to focus more on tactical cost cutting and quality improvement measures.

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