International Review of Business Research Papers
Vol.5 N0. 2 March 2009 Pp. 283-292

Assessing the Differential Effects of Quality Management System on Product Quality and Business Performance

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This paper presents a study that determined the link between quality management system (QMS) on business performance (BP) and product quality (PQ). Further, this study examined the differential effects of QMS on BP and PQ. Data was collected from a sample of 200 managerial staff of small and medium manufacturing companies in Malaysia. The obtained data were analyzed using SPSS (Statistical Package for Social Sciences). Descriptive and inferential statistics were also employed to answer the objectives and hypotheses of the study. The study found that all of the QMS aspects are related to PQ and BP. The study also revealed that QMS practices significantly contributed to both PQ and BP. Finally, it was found that QMS had more effects on BP than PQ. The findings of the study provide empirical evidence that QMS significantly enhanced the product quality and strategic business performance. Findings, implications, recommendations and future research from this study are discussed.

Field of Research: Management

1. Introduction

Much emphasis has been given on the QMS practices as a mechanism for achieving competitive advantage on business performance (BP) and product quality (PQ). Firms need QMS that they have or they will need to develop in order to face with economic turbulent. The issue is whether management system practices will contribute to product quality and business performance?

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The main purpose of this study is to investigate the link and effects of QMS on PQ and BP. Further, the study addresses whether there is a different effects of QMS on PQ and BP.

1.1 Background of Study

Quality is a widely used concept that becomes one of the important agendas in most organizations. This is specifically for them to compete and face with the challenging forces of globalization. Global competition requires organizations across borders to initiate efforts in order to ensure their products achieve the highest quality standard. Most researchers are in agreement that an adoption of a quality management model by organization could be considered as a potential source of competitive advantage and value generating (Powell, 1995).

In the present world of intense competition, one of the primary factors for sustainable competitive advantage lies in delivering the highest quality service that leads to satisfied customers (Shemwell et al., 1998). Consequently, customer service is considered as a distinct and important aspect of the product or service offering. QMS is one of the core strategies for the continuous improvement of product and service quality to meet customer satisfaction. Further, it has become the integral philosophy of management in many organizations. This is without exception to small and medium-size enterprises (SMEs) in Malaysia. QMS are particularly crucial in these sectors as Malaysian SMEs become a major source of employment and providing jobs for about 3 million workers or 65.1 percent of total employment. To meet these challenges, Malaysian SMEs that involved in any industries should think of ways in order to be sustainable in their business. Further, SMEs should be able to practice effective management system that would help them remain competitive in business. Therefore, they should incorporate a quality system in their management to ensure their business implementation remain relevant.

2. Literature Review

2.1 Quality Management System

Quality has been characterized by many authors as something that relates to the results of an ongoing improvement that includes products, services, processes and people to fulfill customer expectations and customer satisfaction. Formal writing on the concept of quality can be found from quality gurus such as Deming (1986), Juran (1994), Crosby (1979), Feigenbaum (1991) and Ishikawa (1985). These gurus have laid the foundation for understanding most concepts of quality management such as Total Quality Management (TQM), Total Quality Control (TQC) and Quality Management System (QMS).

Crosby (1979) defines quality as conformance to requirements and can be measured by the cost of nonconformance which leads to only one standard of performance that is zero defect performance. Juran (1994) attributed quality as fitness for purpose, that is the users of the product or service should be able to count on it for what they need or want to do with it. According to Ishikawa (1985) customer satisfaction is the main focus of quality therefore quality is defined as a product that is most economical, most useful and always satisfactory to the consumer.

Deming (1986) defines quality as a predictable degree of uniformity and dependability, at low cost and suited to the market and quality is whatever the customer needs or requires. Meanwhile, Feigenbaum (1991) refers quality as the total composite product and service characteristics of marketing, engineering, manufacture and maintenance through which the product and service achieve the expectations of the customer. The various definitions of quality found in the literature are due to the different backgrounds of experts or writers in this area.

The above reviewed approaches of QMS from quality gurus indicate that each has its own distinctive approach. However, the principles and practices of QMS proposed by these quality experts do provide better understanding of the concept of quality management to the author. These differing perspectives also share some common points of QMS in terms of: 1) leadership; 2) emphasis on evaluation activities; 3) employees' recognition and reward; 4) training and education; 5) process control and improvement; 6) a systematic firm-wide activity from supplier to customers (customer focus); 7) employee participation and (8) quality system improvement. These areas are also among the most important identified and validated elements in QMS (Powell, 1995). These insights also help the author in laying the foundations for this study.

2.2 Quality Management System, Business Performance and Product Quality

Organizational business performance literature has focused on two areas of research stream mainly on economic perspective and the organizational perspective. The economic perspective emphasizes on the importance of external market factors such as the firms' competitive business position. The organizational perspective builds on behavioral and sociological paradigms and their fit with the environment (Tvorok & McGiven, 1997). Accordingly, both organizational and economic factors serve as important indicators for business performance. Based on these constructs the author defines product quality based on organizational factor and business performance based on economic perspective.

Literature has concluded that QMS improve organizations' competitive abilities and provide strategic advantage in the market place (Anderson et al., 1995). Rategan (1992) found that 90% improvement rate in employee relations, operating procedures, customer satisfaction, product quality and financial performance was influenced by QMS. This is because according to Ho and Fung (1994) QMS is a way of managing on how to improve the effectiveness and competitiveness of organizational business. Among the critical factors of QMS that could influence business performance are like leadership, evaluation of activities, employee participation, recognition and reward, education and training, cooperation and teamwork, customer focus, zero defect mentality, flexible manufacturing and process improvement (Black & Porter, 1996 and Powell, 1995). Extensive literature review suggested that all of these aspects are related and have an influence on BP and PQ. Accordingly quality policy has influenced the overall business performance in terms of productivity improvements, product quality, customer satisfaction and loyalty.

In conclusion, QMS have affected on both PQ and BP that focuses on economic aspects and organizational factors. However, Burrows (1992), found 95% failure rate of QMS in determining BP. Meanwhile, Eskildson (1994), reported that QMS has uncertain or even negative effects on BP and PQ. A study done by Mowtani et al. (1996) revealed that there is no relationship between top management support for PQ level and BP. A replication study of Deming's quality management theory by Rungtusanatham et al. (1998), in three different industries in Italy and by Anderson et al. (1995) in US-based firms found that the results differed considerably.

Although many studies have addressed the link between QMS with PQ and BP, the results have not been conclusive. The inconclusive findings have also been reported on the effects of QMS on overall business performance. Thus, conflicting research findings may be experienced by SMEs involved in Malaysian SMEs. Further less research is done in Malaysia in this area and Sim & Yap (1997) has suggested the need to have more research on various perspectives of SMEs which include effect of QMS on business performance and product quality.

Based on the literature the following hypotheses are proposed in this study:

H1: There is a positive and significant relationship between QMS aspects and PQ
H2: There is a positive and significant relationship between QMS aspects and BP
H3: QMS will have a positive and significant effect on PQ
H4: QMS will have a positive and significant effect on BP
H5: QMS will have more significant and positive effect on BP than PQ

3. Methodology and Research Design

3.1 Sample and Procedure

Participants in the study were managerial staff of SMEs specifically in electronic and electrical companies in Malaysia. 400 questionnaires were distributed to the staff of the selected companies obtained from the Federation of Malaysian Manufacturers (FMM). 200 useable questionnaires were used in the statistical analysis represented a response rate of 50% from the sample. The selection of the respondents was based on the random sampling. In terms of age the average age of the respondents was 36.04 years, while the mean age of their experience in organization was 17.3 years and experience with the current job was 6.6 years. Regarding gender, 26% of respondents were male while female respondents were 74%. Majority of the respondents (78%) were married while 22% were not married. In terms of position, 60% of the respondents were from senior level of management and 40% were middle level of management**.**

3.2 Measurement

The independent variable of the study is QMS. QMS was measured based on seven (8) dimensions with a scale of 32 items, developed by the author and adapted from Ahira et al. (1996); Fyynn et al. (1994) and Saraph et al. (1989). Seven point Likert-type scales was used to measure QMS dimensions (leadership, evaluation activities, employee participation, recognition and reward, education and training, process control and improvement, quality system improvement and customer focus) as independent variables. Respondents were asked to evaluate level of their QMS on a range from 1 = strongly disagree to 7 = strongly agree.

The mean, standard deviation and the reliability test of all scales are within the acceptable and expected ranges ($\alpha > .70$) as indicated in Table 1.

TABLE 1: Number of Items, Mean, Standard Deviation and Cronbach's Alpha Values

Variables	Number of Items	Mean	S.D	α
Leadership	4	4.82	1.33	0.89
Evaluation activities	4	5.13	1.32	0.91
Employee participation	4	5.71	1.11	0.85
Recognition and rewards	4	5.35	1.18	0.87
Education and training	4	5.48	1.27	0.79
Process control and improvement	3	5.95	1.16	0.88
Quality system improvement	4	5.63	0.97	0.83
Customer focus	5	5.27	1.15	0.92

Product Quality	5	5.21	1.13	0.81
Business Performance	5	5.11	1.11	0.83

Business performance (BP) was the dependent variable that encompasses five items; annual sales, sales growth, profits, market share and exports. BP scale was developed by the author and adapted from previous earlier researchers (Morgan & Strong 2003; Rosenzweig et al., 2003 and King & Zeithaml, 2001). BP's items was evaluated on a range scale from 1 = much worse than average of industry to 7 = much better than average of industry scale, with a middle anchor point of 4 = to average of industry scale. Another dependent variable was product quality (PQ) which was measured based on five items mainly on conformity rates, reliability, durability, defects rates and failure costs developed by the author. Respondents were asked to evaluate the overall PQ on a range of scale from 1 = worst in the industry to 7 = the best in the industry with a middle anchor point of 4 = above average.

4. Discussion and Findings

4.1 Correlations and Associations Between Variables of the Study

As shown in Table 2, all the variables are positively correlated with BP and PQ. This correlation analysis also revealed that all dimensions of QMS practices are correlated each other and each dimension of QMS is positively correlated with BP and PQ. Thus the first and second hypothesis (H1 and H2) is accepted and we can conclude that all of the eight elements of QMS practices significantly enhanced the BP and PQ.

TABLE 2: Correlation Coefficients of the Main Variables

	Variables	1	2	3	4	5	6	7	8	9	10
1	Leadership	1									
2	Employee participation	.20*	1								
3	Recognition and reward	.13*	.43*	1							
4	Education and training	.29*	.23*	.16*	1						
5	Process control and improvement	.34*	.46*	.26*	.28*	1					
6	Quality system improvement	.49*	.33*	.61*	.29*	.58*	1				
7	Customer focus	.41*	.62*	.27*	.22*	.48*	.26*	1			
8	Evaluation activities	.23*	.15*	.32*	.24*	.30*	.25*	.28*	1		
9	Product quality	.43*	.35*	.51*	.44*	.50*	.44*	.33*	.32*	1	
10	Business performance	.43*	.35*	.49*	.34*	.22*	.63*	.23*	.33*	.27*	1

*p = 0.05

4.2 Effects of QMS on Business Performance and Product Quality

Table 3 presents results of multiple regression analysis to answer the H3, H4 and H5 of the study. From Table 3, when the eight QMS dimensions were regressed with business performance, the R^2 value was found to be .52. This indicates that 52 percent of the variance in business performance was explained by the QMS dimensions. The beta values as indicated in Table 3 shows that all of the QMS dimensions had a positive and significant effect on business performance. Among all these QMS dimensions leadership emerged as the most significant effect of business performance. This shows that among the QMS factors leadership is the most important factor to enhance business performance. This data provided support for the H3 of the study. Therefore, the H3 of the study was accepted.

TABLE 3: Impacts of QMS on Business performance and Product Quality

	Business Performance					Product Quality				
Dimensions	Std β	t	R^2	f	P	Std β	t	R^2	f	P
Quality Management System:			0.52	102.82	.000			0.23	99.28	0.000
Leadership	.48	2.54			.000*	.18	2.54			.002*
Evaluation activities	.23	3.03			.002*	.31	3.03			.000*
Employee participation	.25	1.20			.000*	.23	1.20			.000*
Recognition and reward	.17	3.35			.003*	.07	0.75			.086
Education and training	.47	1.48			.000*	.17	2.78			.003*
Process control & improvement	.42	1.95			.000*	.14	2.95			.004*
Quality system improvement	.37	1.63			.000*	.21	2.23			.000*
Customer focus	.22	2.30			.002*	.27	2.10			.000*

*p = 0.05

In order to answer the H4 of the study all of the QMS dimensions were regressed with product quality. As can be seen on Table 3, R^2 value was .23 indicates that 23 percent of variance in product quality was explained by eight QMS dimensions. As shown in Table 3 too, the QMS aspects except recognition and reward had a positive and significant effect on product quality. Examining each of the QMS dimensions, it was found that evaluation activities dimension of QMS was found to be the most significant contributor to product quality. This implied that evaluation activities factor was considered as the most important factor in

determining product quality. The data from the analysis provided partial support for the H4, therefore the H4 was partially accepted.

4.3 Differential Effects of QMS on Business Performance and Product Quality

Data in Table 3 revealed that the variance explained in business performance by QMS was 52 percent while the variance explained by QMS in product quality was 23 percent. This shows that the amount explained by QMS on business performance is higher than on product quality. Therefore this analysis supported the H5 of the study that QMS had more effect on business performance than product quality. Thus the H5 of the study was accepted.

5. Conclusion

The purpose of this study was to determine the relationship between QMS practices with business performance and product quality. Consequently it examined the different effects or contribution of QMS on business performance and product quality. The correlation matrix indicated that all of the QMS practices were positively related to business performance and product quality. This implied that all of the QMS aspects had relationships with business performance and product quality. The multiple regression analysis revealed that all of the QMS practices had a positive and significant effect on business performance. The analysis also revealed that QMS aspect had a positive and significant effect on product quality except for recognition and rewards.

The result indicated that leadership emerged as the most important factor for business performance, while evaluation activity found to be the most important factor of product quality. Further, the study revealed that QMS had more significant effect on business performance than product quality. The finding therefore validates the result of previous research and generalizes it to other group of employees (Hoffman & Mehra 1999). This indicates that beside leadership, evaluation activities also play important role to promote and support the improvement and expansion of QMS, business performance and product quality. This study implied that the application of some aspects of QMS practices in combination can lead to improvement in business performance and product quality.

This study suggests that all of the QMS factors need to be recognized as a potential factor for business performance and product quality of SMEs in Malaysia. Finding of this study serves as guidelines for management to formulate the improvement plan in Malaysian SMEs. These guidelines however are not a universal panacea but can be used as reference especially for practitioners and researchers. There is no single or best approach of QMS practices that can improve BP and PQ. This is because organizations are different in terms of for example their people, history, goals, vision, structure, products, processes and

culture. The ability to combine their own uniqueness with the existing QMS system will lead them into organization excellence. This finding is certainly useful for both practical and theoretical purposes. However, further research could be explored on other variety of samples, approaches and setting to generalize the results.

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