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This study alerts consultants and managers to the possible areas that small enterprises need to focus on to get the best out of their TQM implementation. The study also indicates that the formality of the criteria in assessment tools such as the Baldrige award criteria may not be very suitable for small enterprises. Past research about the use of TQM in small and medium enterprises for the most part use self-reported data and rarely provide comparison to large enterprises. The study compares the performance of small enterprises with large enterprises and provides objective data to confirm the differences in performance of small enterprises in TQM practices.

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Published Date: 3/31/2018

Page.60-68

Vol 6 No 03 2018

Link: <http://ijer.net/ijer/article/view/984>

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1. Introduction

Since the 1970s there has been increased global competition in critical industries such as automotive and electronics. Businesses have reacted to this competition by improving performance through the adoption of just-in-time and total quality management (TQM) principles. The fact that consumer awareness and global competition has made quality an order qualifier has led to the focus on quality as an essential component of business improvement plans. This focus has cascaded down to small enterprises that are suppliers to the larger firms. Although a number of small enterprises have had success with quality management programs, there are quite a few that have not seen the improvement they expected (Terziowski and Samson, 2000). This difference in achievement is mostly due to the fact that the success of the programs depends on how well they are adapted to the organizational context (Yusof and Aspinwall, 2001; Broderick *et al.*, 2010; Escrig and de Menezes, 2016).

One of the advantages of TQM as a tool for performance improvement is its applicability to all sizes of firms. A number of research studies have been published identifying the use of TQM principles in small and medium-sized organizations (Kuratko *et al.*, 2001; Temtime, 2003; Fred *et al.*, 2008; Assarlind and Gremyr, 2016).

Some of these studies clearly point to the advantages that small enterprises have in implementing TQM (Ghobadian and Gallea, 1996; Ahire and Golhar, 1996), while others have identified the problems small enterprises face in applying TQM principles (Yusof and Aspinwall, 2000; Gustafsson *et al.*, 2001; Escrig and de Menezes, 2016).

Past research about the use of TQM in small and medium enterprises for the most part use self-reported data. In this study trained examiners and judges evaluation of TQM practices and performance of applicants to a state quality award is used to compare the performance of small, medium, and large enterprises and draws conclusions based on these differences. The state quality award uses the Baldrige criteria, which measure quality management along seven dimensions or categories – leadership; strategic planning; customer focus; measurement, analysis and knowledge management; human resources focus; process management; and business results (NIST, 2018). The factors measured under each of the categories are operationalized through a set of examination items.

2. TQM Constructs and the Relationship to Performance of Small Enterprises

In order to successfully implement quality management programs, organizations have to adapt the teachings of the quality gurus and the different quality tools to their specific context. Ignoring this and taking an off-the-shelf approach to quality management is probably the primary reason for the failure of TQM programs in some organizations (Cole, 1993).

The size of an organization has a great influence on the type of programs that are useful and the success of these programs. Although it is expected that small firms will benefit as much as large firms from quality improvement activities, the benefits are greatly dependent on how well the programs are implemented (Ebel, 1991). Studies also indicate that small organizations need to adapt their quality management programs as they move through the different stages of their growth, which makes maintaining quality programs difficult and expensive (Port, 1993).

This study addresses the effect of size on the performance of firms when they are evaluated using the Baldrige criteria. The following discussion of the literature related to TQM in small enterprises therefore is organized by the seven Baldrige categories.

2.1 Leadership

This Baldrige category is concerned with the role of senior leadership in guiding and sustaining the organization (NIST, 2018). The leaders play an important role in making sure that all employees understand the values of the organization. This goal is achieved through effective communications. Small organizations have some advantages in providing strong leadership for quality management and improvement. Due to the flat organization structure, there is little doubt in the employees' minds about the values of the organization. It is also easier to communicate these values in smaller organizations (Haksever, 1996; Tannock, 2002)). Kuratko *et al.* (2001) found that communication of values was prevalent in small organizations. Management is also effective in promoting quality efforts amongst its employees (Anderson and Sohal, 1999). However, studies show that the leaders in small organizations do not focus on the improvement of their leadership skills and tend to improvise their techniques (Kuratko *et al.*, 2001).

2.2 Strategic Planning

This category addresses the process used for the development of the long-term strategy and how well it is deployed to the operational areas. Taking a long-term view is an important requirement for the success of TQM programs. Small organizations, already competing with large corporations for market share, tend to take

a survivalistic view to their business and focus less on the long-term future. Further, most managers in small organizations spend more time fighting fires and now have to adapt themselves to spend more time planning for the future (Bonvillian, 1996). Most CEOs in small organizations started their careers as entrepreneurs with skills in specific technical areas. Now they have to learn new (and often times difficult) managerial skills in other functions of the business. One of these new skills is the ability to delegate authority and responsibility to employees at lower levels. Entrepreneurs used to making all the decisions in an organization may have problems delegating the decision-making process (Haksever, 1996).

Kuratko *et al.* (2001) identified that while small organizations use suitable strategic planning processes they suffer from the lack of systematic dissemination of the requirements at the operational levels. Further, deployment is done very informally and may lead to a lack of understanding (Anderson and Sohal, 1999; Tannock, 2002). It is important to involve partners, including employees, customers, and suppliers in the planning process. In small organizations there is a lack of involvement of employees, customers, and suppliers in the process (Anderson and Sohal, 1999; Tannock, 2002).

2.3 Customer Focus

This Baldrige category recognizes that the customer is the center of all strategies and tools. It addresses the organizations evaluation of customer needs, commitment to and relationship with customers. Small organizations do recognize that knowledge of customer needs is essential to the growth of their organization (Kuratko *et al.*, 2001; Temtime, 2003; Anderson and Sohal, 1999). Studies, however, have also identified a lack of focus on improving customer relationship (Kuratko *et al.*, 2001) and the lack of adequate measurement of customer satisfaction (Anderson and Sohal, 1999) among small organizations.

2.4 Measurement, Knowledge, and Information Management

Good and timely information is key to making the right decisions for continuous improvement. This category of the Baldrige criteria addresses how effective an organization is in selecting, gathering, monitoring, analyzing, sharing, and using the information for decision-making. In small organizations, investment in the methods and equipment needed to collect data may be limited due to lack of capital (Haksever, 1996). The resulting lack of data may lead to decisions based on incomplete information. Most studies indicate that small organizations are effective in collecting company level (business) data (Kuratko *et al.*, 2001; Anderson and Sohal, 1999). Small firms, however, are not effective in gathering performance and quality data and hence lack adequate knowledge of the scale of their quality problems and make poor decisions (Kuratko *et al.* 2001; Tannock, 2002). Small organizations also do not focus on market and benchmark data (Temtime, 2003; Tannock, 2002; Kuratko *et al.*, 2001; Anderson and Sohal, 1999).

2.5 Human Resource Focus

This Baldrige category addresses the organizations work systems and the development, training, motivation, satisfaction, and well-being of the employees. Hoogervorst *et al.* (2005) discuss the importance of organization culture, management practices, and organizational structure in ensuring employee behavior that enables TQM implementation. Many small organizations lack the human resources to implement TQM programs. While large firms usually are able to designate individuals to coordinate and direct their TQM programs, small firms depend on their line staff to perform these functions. As a result of this some work suffers, either in TQM implementation or regular line duties (Ebel, 1991). Small firms also have problems attracting qualified and experienced managers to direct the TQM programs (Haksever, 1996). Axland (1992) and Penzer (1991) argue that small organizations have some advantage in TQM implementation. Due to their size and structure, employees in small organization are cross-trained to effectively handle multiple jobs (Penzer, 1991). Small

organization also provide an atmosphere where personal growth is encouraged and workers understand better how their jobs fit with organizational goals (Axland, 1992). Other studies show that employees are not sufficiently empowered and hence are not involved in TQM practices in small organizations (Anderson and Sohal, 1999; Kuratko *et al.* 2001; Tannock, 2002; Temtime, 2003).

2.6 Process Management

The efficient management of product design, production, support, and supplier processes and their continuous improvement is essential to any quality organization. Small organizations involved in TQM effectively document their processes (Kuratko *et al.*, 2001) and encourage involvement of key personnel and innovation in its product and process design and management (Anderson and Sohal, 1999). Huang *et al.*'s (2002) study of the new product development process shows that small enterprises lack a clear strategy in this process. A number of small organizations do not emphasize the involvement of suppliers and customers in their internal processes (Kuratko *et al.*, 2001; Anderson and Sohal, 1999). Small organizations also show less commitment to continuous improvement and do not document their improvement process very effectively (Kuratko *et al.*, 2001; Temtime, 2003).

2.7 Business Results

The business results category addresses how effectively the organization collects business, financial, supplier, customer, and employee results and uses them to make decisions. It is important for small organizations to develop their personnel to collect data and use it effectively to make accurate decisions (Rucci *et al.* 1998). Studies indicate that small organizations are effective in gathering financial results and using them to make decisions. However, they are not very effective in collecting performance data and relating them to business results effectively enough to make good decisions. Small organizations also show a lack of focus on supplier and other partner data (Kuratko *et al.*, 2001).

The above discussion indicates that small enterprises might do as well as large enterprises in using some of the elements of TQM. However, they struggle in areas such as linking information to strategy, formalizing processes, and working with partners. As a result, one would expect that small firms would perform worse than large firms in TQM implementations and realize fewer benefits from the programs.

3. Data and Research Question

The data for this research is derived from the applications to a state quality award in the US. This award is modeled after the Baldrige Award criteria and process. The award is open to all organizations, private, public, or non-profit, provided they have 50% of their assets or employees in the state. The distribution of these organizations by their size and type of firms is provided in Table I. Each of these applicants was individually evaluated by 4 to 7 examiners in each of the twenty-eight items examination items under the seven categories. The evaluation was done on a scale of zero to 100 in intervals of ten points.

Table I: Distribution of sample firms

	Type					Total
	Manufacturing	Service	Education	Health Care	Government	
Size						
Small	12	17	0	0	0	29
Medium	8	21	3	2	0	34
Large	4	3	3	5	8	23
Total	24	41	6	7	8	86

The analyses of the data focused on one basic research question: “Are there significant differences in the performance of small enterprises versus large enterprises along the seven TQM constructs and each of the twenty-eight examination items?” Since large organizations have more resources to implement new tools, it is expected that large organizations will rank highest and small organizations lowest in performance in quality management.

3. Research Methodology

For this research enterprises were classified as:

- a) small (less than 100 employees),
- b) medium (100 to 500 employees), and
- c) large (more than 500 employees).

The research question was tested using twenty-eight hypotheses for each of the twenty-eight examination items. The hypotheses were tested using analysis of variance models. The dependent variable for each model was the average score for the examination item. Organization size was treated as a fixed effect. Although it is possible for scores to range from 0 to 100, scores for most organizations are concentrated within 30 points with outliers in at the upper and lower bounds. Further, since the scoring is done in 10-point increments they are not on a pure continuous scale. Due to these reasons the data from the evaluation did not fit a normal distribution. Hence non-parametric tests were used to compare the means. The Kruskal-Wallis test performs an analysis of the ranks of the data (the Wilcoxon scores). The chi-square approximation of the Kruskal-Wallis test was used to test the hypotheses.

4. Results and Discussion

The average score and standard deviation by applicant size and the p-value for the chi-square approximation of the Kruskal-Wallis test for size effect are shown in Table II. The p-values indicate that the size of the organizations significantly affected the performance on each of the twenty-eight items. Scheffe’s multiple comparison procedure was performed to identify how firm size affected the scores. The significant differences in scores (at $\alpha = .05$) are also indicated in Table II. The Scheffe’s tests indicate that, in most cases, the difference in scores between small and medium firms and small and large firms were significant (p-value of 0.05). However, the scores between medium and large firms were not significantly different.

Table II. Item Scores by Size

Item	Mean Scores						p-value of K-W test
	Small N = 29		Medium N = 34		Large N = 23		
	Mean	S.D	Mean	S.D	Mean	S.D	
Leadership							
Senior Executive Leadership	31.88	14.15	48.98	13.03	48.46	15.68	0.0001*
Management for Quality	30.42	15.71	46.74	13.56	41.44	15.41	0.0005*
Public Responsibility	29.85	16.92	46.59	14.01	42.55	12.62	0.0006*
Information and Analysis							
Management of Data	33.78	17.51	47.54	14.11	44.81	14.07	0.0094*
Benchmarking	21.66	13.27	38.19	16.71	38.88	13.42	0.0001*
Company Level Data	27.28	16.81	43.66	13.23	42.26	13.70	0.0003*
Strategic Quality Planning							
Performance Planning Process	24.17	14.28	42.71	18.62	41.01	13.56	0.0001*
Performance Plans	21.13	13.17	43.29	13.86	33.27	16.59	0.0001*
HR Management							
HR Plans	24.92	14.88	39.02	16.48	34.91	13.59	0.0085**
Employee Involvement	28.88	16.52	41.64	14.31	37.29	13.19	0.0183**
Employee Training	27.25	13.04	44.66	14.27	35.93	13.59	0.0001**
Employee Performance	24.55	14.57	38.75	15.35	34.28	15.65	0.0001**
Employee Well Being	23.22	15.52	41.01	14.78	39.55	16.92	0.0001*
Process Quality							
Design Quality	27.75	17.28	46.01	13.33	45.63	13.75	0.0001*
Process Management	31.15	17.38	42.92	13.20	45.02	15.49	0.002*
Support Services Management	20.01	12.76	40.88	10.92	34.65	14.73	0.0001*
Supplier Quality	26.74	15.56	41.22	16.72	37.80	16.18	0.0034**
Quality Assessment	25.36	16.53	43.02	17.71	40.71	13.25	0.0003*
Results							
Quality Results	19.59	16.55	36.17	18.47	30.54	11.98	0.0027**
Operational Results	18.04	13.12	41.45	17.92	28.51	15.43	0.0001*
Business Results	12.72	12.18	27.49	17.68	22.87	14.99	0.0011*
Supplier Quality Results	9.42	9.25	22.43	14.51	18.50	12.91	0.0004*
Customer Focus and Satisfaction							
Customer Expectation	28.26	16.81	44.75	16.12	40.42	14.62	0.0012*
Customer Relationship Management	28.86	17.70	46.98	14.81	44.78	18.21	0.0009*
Commitment to Customers	26.69	16.31	43.18	16.69	36.57	11.47	0.0013*
Satisfaction Determination	24.10	15.53	42.01	16.49	36.54	14.48	0.0002*
Satisfaction Results	21.25	13.45	33.84	17.32	31.27	18.20	0.0152*
Satisfaction Comparison	13.10	12.63	28.42	18.82	22.90	18.03	0.003*

* - Scheffe's test indicates that large higher than small and medium higher than small at a of 0.05.

** - Scheffe's test indicates medium higher than small at a of 0.05.

A review of the feedback reports from the examiners helped in identifying areas for improvement for the small enterprises. In most cases the small enterprises lacked sustained or formal quality programs. The firms had instituted informal programs and provided anecdotal evidence of the outcomes; however, it was not clear that the benefits would continue in the long-term. Deployment also was a recurring issue. Many of the applicants used processes for analysis, but these processes were limited to the primary areas or products.

In the area of leadership, the company's values and mission were communicated, but not very formally; also, reinforcement of these values was lacking. Further, continuous improvement of leadership qualities was rarely identified as important. Planning for quality was present in most small enterprises; the planning process, in many cases, was more an event rather than a process. In many firms, partners, and sometimes even employees, were not involved in the strategic planning process. Further, the connection between information gathering and the planning process was not very clear. The primary area for improvement cited in information management was benchmarking. The small enterprises did not invest in benchmarking; even when done, the investment was limited to the comparison to industry averages. This conclusion is supported by past research (Sharma, 2006).

The small enterprises performed the best in the human resources area. In fact, the large firms did not do significantly better than small organizations. The medium sized organizations ranked the best. This can be attributed to the fact that medium size organizations have the advantage of much flatter organization structures leading to better trained and motivated employees (Penzer, 1991; Axland, 1992) and have access to resources not available to smaller organizations. One common area cited for improvement for small enterprises was in the measurement of employee satisfaction. In the area of customer focus, the most common issue mentioned in the feedback reports had to do with the data gathering – consistency in the measurement of customer satisfaction and identifying long-term customer needs.

5. Conclusions

The above results support the literature on the problems that small firms face in implementing TQM programs. While past research has helped identify the TQM practices of small businesses, this research using the Baldrige criteria and process, which places great emphasis on formalized processes to ensure quality management has identified that the performance of small businesses vary greatly from that of large and medium firms in TQM practices. The fact that small firms' performance was poor in all of the twenty-eight items of the criteria is telling. Small firms, especially entrepreneurial firms, tend not to formalize their processes. The results from this study support prior research that point to these differences (Sharma, 2006; Nelson, 2012) and support the need to tailor TQM practices for the flexible and entrepreneurial spirit of most small businesses (Assarind and Gremyr, 2016). The results alert executives and consultants in charge of implementing TQM programs to pay particular attention to the organization characteristics, especially size of the organization. However, one needs to be cognizant of the fact that the firms in the study were self-selected. As a result of this self-selection, the differences in the scores might be more exaggerated. Also, the Baldrige criteria emphasize formalized procedures that may not be applicable to small organizations in a growth phase. Further research should be performed using a more random sample of firms to confirm the results from this study.

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