Quality Management Factors in SMEs: An Investigation of Their Effect on Organisational Performance

Professor David Gadenne
Faculty of Business and Law, Central Queensland University, North Rockhampton, Australia
Email: d.gadenne@cqu.edu.au

and Dr Bishnu Sharma
Faculty of Business, University of the Sunshine Coast, Maroochydore, Australia
Email: bsharma@usc.edu.au
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Abstract
This paper investigates the key quality management factors used by Small and Medium Enterprises (SMEs) and their association with organisational performance. The study found that perceived productivity, competitive position, profitability, revenue growth and overall performance appear to be favourably influenced by top management philosophy and supplier support, efficiency improvement and increased interaction with employees and customers. Furthermore, employee and customer involvement, and efficiency improvement would appear to be important in maintaining a competitive edge in terms of return on assets.

Keywords: Quality management practices, Small and Medium Enterprises (SMEs)

Introduction
Small and medium businesses in Australia employ nearly 49% of all private sector employment and represent approximately 97% of all private sector businesses - the total number being 1.233 million (ABS, Cat. 1321 2001). Moreover, the contribution of SMEs to Australia’s Gross Domestic Product is approximately thirty-five percent (ABS 2001). According to the ABS definition (ABS, Cat. 1321 2001), small businesses include sole proprietorships and partnerships without employees, businesses employing less than 5 people (micro-businesses) and other businesses employing 5 or more people but less than 20 people, whereas medium-sized businesses are defined as those employing less than 200 people (ABS 2001).

SMEs differ from large firms in many respects including management style, production processes, capital availability, purchasing practices, inventory systems, and negotiating power (Ahire and Golhar 1996). Ghobadian and Gallear (1996) considered SMEs as the “life blood of modern economies”. The success of large organisations in producing or improving the quality of products or services depends on the quality of products or components the supplier firms provide to them. Generally, the component suppliers are small and medium-sized firms. Therefore, SMEs face considerable pressure to gain ISO 9000 quality certification particularly if their customers are the government agencies (van der Wiele and Brown 1998). Past studies have reported that the application of quality management practices in SMEs helps them to sharpen their market focus, use their material and human resources more efficiently and improve their
competitive position in the market (Ahire and Golhar 1996). However, compared with large organisations, SMEs have been slow to adopt the quality management tool such as TQM (Ghobadian and Gallear 1996). In spite of several studies conducted over the past two decades in the area of quality management, the application of quality management concepts in SMEs and their impact on business performance have not been clearly understood as most of the studies have focused on large manufacturing businesses (Rahman 2001a). Citing a highly credible report (Foley et al, 1997: 81), Rahman (2001b) pointed out that “the quality philosophy has not effectively reached the core of Australia’s commercial base – the SMEs”. Hence this study has been conducted with a particular focus on quality management aspects in Queensland SMEs.

Literature review

Quality management and related research in Australia

Total quality management (TQM) has generally been known as a “management philosophy and a way of thinking” to transform an organisation’s status to a world-class level (Yusof and Aspinwall 2000). It has also been described as a system that helps organisation to achieve its excellence (Yusof and Aspinwall 2001). This topic has attracted intense interest over the past twenty years as evidenced by the large number of research articles published in academic journals that address a wide range of quality management aspects within both developed and developing economies (Rahman 2001a). A majority of these studies, however, have been conducted in developed economies such as the USA, Australia, UK and Singapore. Many of these studies have been undertaken on specific industries including banking (Dawson and Patrickson 1991), service and manufacturing (Samson 1993, Beaumont et al. 1997, Kayis 1998, Beaumont and Sohal 1999, Dean and Terziovski 2001, Sohal and Gordan 2001), retail (Morrison and Terziovski 2001), construction (Walker and Keniger 2002), and higher education (Cruickshank 2003). Researchers have also tried to differentiate the soft and hard aspects of TQM. Soft aspects of TQM generally deal with ‘people (HR) aspects’ such as training and education, loyalty, leadership, teamwork and empowerment. These aspects have been extensively discussed in the management literature (Rahman 2002, Rahman 2004, Rahman and Bullock 2005). Along with TQM, there are many research articles which have attempted to assess the effectiveness of the ISO 9000 standards, a popular quality certification standard (Terziovski et al. 1997, 1999). In an effort to differentiate TQM and ISO 9000 certification, the advocates of ISO 9000 tend to claim that adherence to ISO 9000 prescribed methods of operation in all business processes gives a signal of a firm’s commitment to quality which can ultimately lead to TQM. However, critics of ISO 9000 disagree with this argument. They claim that the process of “attaining ISO 9000 is little more than a paper exercise that adds to bureaucratic waste and has little relation to TQM”
Anderson et al. 1999). In developing countries, however, ISO 9000 certification has remained the focus of quality management practice and TQM is still a new and challenging concept (Tannock et al. 2002).

**Characteristics of SMEs and TQM implementation**

Six characteristics that differentiate SMEs from large enterprises are structure, procedures, behaviour/culture, processes, people and contacts (Ghobadian and Gallear 1997). In terms of structure, SMEs have a relatively flat structure compared with large enterprises. SMEs adopt an ad-hoc approach with a low degree of standard procedures. In SMEs, the culture and values of an owner/manager is widely spread throughout the organisation. SMEs tend to use simple and informal control systems. In SMEs, training and development activities tend to be small-scale and ad-hoc. SMEs have limited contacts with suppliers, customers and professional associations. In terms of TQM implementation, although a number of studies have shown that small companies can adopt some of the aspects of TQM such as training, usage of quality tools and benchmarking as effectively as larger companies (Ahire and Golhar 1996), a number of other researchers suggest that there are some barriers for SMEs to implement TQM effectively (Parkin and Parkin 1996). Some of those barriers relate to cultural, management awareness, financial and training related issues (Tannock et al. 2002). The problems associated with TQM implementation, however, are not restricted to SMEs, but also apply to large businesses as well. For successful implementation of TQM, organisational culture, commitment and empowerment are considered as some of the important elements (Powell 1995). According to Hung (2004), process alignment and people involvement are the two key concepts for successful implementation of TQM.

As SMEs play a dominant role in most developed or developing countries, there are a large number of studies available in the area of quality management in SMEs. (eg Ghobadian and Gallear 1996, Temtime and Solomon 2002, Rahman 2001). However, there are relatively few quality management studies involving Australian SMEs. Thus the purpose of this study is to investigate the relationship between quality management practices and business performance in the context of Australian SMEs.

**Research Questions**

The main research questions that form the focus of this study are:

1. What are the main quality management factors for Australian SMEs?
2. Which of these quality management factors are significantly associated with organisational performance?
Method

Of the several quality management frameworks discussed in the literature, a survey questionnaire was constructed using Powell's (1995) Quality Management framework for this research. Respondents from the manufacturing, service and construction industries were required to indicate their degree of implementation of a range of some 40 quality management practices on a 0 to 5 scale, and were also required to indicate the type of quality management program used by the business in relation to various options including TQM, ISO9000, TQM and ISO9000, and other. The survey form also required respondents to (1) rate their TQM performance in relation to productivity, competitive position, profitability, revenue and overall performance (2) indicate their approximate return on assets in the last financial year, and (3) indicate their approximate market share. As explained later in the paper, these three measures were used to operationalise organisational performance.

The survey was addressed to the chief executive officers (CEOs) of the company as it was considered that they would have a good knowledge of the firm’s strategies and quality management aspects. The sample of approximately 900 companies was selected from businesses in Queensland employing more than 16 people representing manufacturing, service, and construction industries using the Dun & Bradstreet database. A follow up was carried out to improve the response rate of the survey. To verify the accuracy of the information, face-to-face interviews of CEOs or senior managers were carried out. These interviews were also useful in validating the outcome of the data analysis and for developing an understanding of practical aspects of the adoption of quality management principles.

Early respondents were compared with the late respondents to check the sample representativeness across some of the key attributes of quality management practices and performance. (The first 80 questionnaires that were received without any follow-up were considered as early respondents and the remaining 39 as late respondents.) There were no significant differences noted in these attributes between the early and late respondents. A Chi-square test was conducted to determine whether there was a difference in the
proportion of early and late respondents in terms of firm size, industry category and the type of quality
management program used. The analysis revealed no significant difference in these attributes between the
early and late respondents.

Results

One hundred and nineteen responses were received representing a response rate of about thirteen percent.
Seventy-one percent of the questionnaires were completed by the firm’s top management. Of the total
respondents, sixty-eight percent indicated their commitment in quality management programs. Sixty-seven
percent of respondents who had commitment in quality management programs had adopted ISO 9000,
more then thirteen percent had adopted a combination of TQM and ISO 9000, and more then eight percent
had adopted TQM. There was a clear indication that ISO 9000 was the most popular program in the
Queensland businesses.

The answers to the research questions are presented below:

1. What are the main quality management factors for Australian SMEs?

To reduce the list of 40 quality management practices to a more manageable size a factor analysis was
conducted. The resulting principal components analysis using varimax rotation yielded the following six
factors (see table 1 for full list of loadings):

1. Benchmarking and quality measurement - comprising the quality management practices of
researching best practice of other organisations, visiting other organisations to investigate best
practices first hand, use of statistical methods to measure and monitor quality, use of charts
and graphs to measure and monitor quality, use of empowered (responsible) teams, and
employee training in statistical methods for measuring quality.
2. Continuous improvement - comprising the quality management practices of a program for continuous reduction in defects, a plan to reduce rework drastically, a program to find wasted time and costs in all internal processes, and employee training in teamwork.

3. Top management philosophy and supplier support – comprising the quality management practices a top executive decision to commit fully to a quality program, top executives actively championing the quality program, quality principles included in the mission statement, and requiring suppliers to adopt a quality program and meet stricter quality specifications

4. Employee and customer involvement - comprising the quality management practices of increased employee involvement in design and planning, increased employee interaction with customers and suppliers, a more open trusting organisational culture, a more active employee suggestion system, increasing the organisation’s direct personal contacts with customers, and involving customers in product or service design.

5. Employee training - comprising the quality management practices of employee training in quality principles, executives actively communicating a quality commitment to employees, actively seeking customer inputs to determine their requirements, less bureaucracy and measurement of quality performance in all areas

6. Efficiency improvement - comprising the quality management practices of a program to reduce new product or service development cycle times, a program to reduce order-processing cycle time, and a program to reduce overall product or service delivery times.

Each of these factors had an eigenvalue of greater than 1.5 and consisted of items that loaded at greater than 0.55 on the factor. (Comrey and Lee, 1992 suggest that loadings in excess of 0.55 can be classified as good.) The factors collectively explain 60% of the total variance.
Table 1 Rotated Component Matrix

<table>
<thead>
<tr>
<th>Component</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Researching best practices of other organisations</td>
<td>.722</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visiting other organisations to investigate best practices</td>
<td>.574</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of charts and graphs to measure and monitor quality</td>
<td>.639</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of statistical methods to measure and monitor quality</td>
<td>.616</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of empowered (responsible) teams</td>
<td>.652</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employee training in statistical methods for measuring</td>
<td>.681</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A program for continuous reduction in defects</td>
<td></td>
<td>.753</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A plan to reduce rework drastically</td>
<td></td>
<td>.766</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A program to find wasted time and costs in all internal</td>
<td></td>
<td>.662</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employee training in teamwork</td>
<td></td>
<td>.555</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A top executive decision to commit fully to a quality</td>
<td></td>
<td>.768</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top executives actively championing our quality program</td>
<td></td>
<td>.615</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality principles included in our mission statement</td>
<td></td>
<td>.557</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Requiring suppliers to adopt a quality program</td>
<td></td>
<td>.759</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Requiring suppliers to meet stricter quality specifications</td>
<td></td>
<td>.605</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased employee involvement in design and planning</td>
<td></td>
<td>.811</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased employee interaction with customers and</td>
<td></td>
<td>.685</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A more open, trusting organisational culture</td>
<td></td>
<td>.750</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A more active employee suggestion system</td>
<td></td>
<td>.661</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increasing the organisation's direct personal contacts with</td>
<td></td>
<td>.701</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Involving customers in product or service design</td>
<td></td>
<td>.611</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employee training in quality principles</td>
<td></td>
<td>.668</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Executives actively communicating a quality commitment</td>
<td></td>
<td>.607</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actively seeking customer inputs to determine their</td>
<td></td>
<td>.579</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less bureaucracy</td>
<td></td>
<td>.566</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement of quality performance in all areas</td>
<td></td>
<td>.559</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A program to reduce new product or service development</td>
<td></td>
<td></td>
<td>.737</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A program to reduce order-processing cycle time</td>
<td></td>
<td></td>
<td>.694</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A program to reduce overall product or service delivery</td>
<td></td>
<td></td>
<td></td>
<td>.661</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Which of these quality management factors are significantly associated with organisational performance?

When the factors were regressed against the three dependent performance variables (using MANCOVA analysis) the following results were obtained (see table 2):

1. Top management philosophy and supplier support, employee and customer involvement, and efficiency improvement were significantly associated with total quality management performance.
2. Employee and customer involvement, and efficiency improvement were significantly associated with return on assets.

3. None of the factors were significantly associated with market share.

### Table 2 MANCOVA Tests of Between-Subjects Effects (extract of significant predictors)

<table>
<thead>
<tr>
<th>Source</th>
<th>Dependent Variable</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>Total Quality Management Performance</td>
<td>18.558</td>
<td>6</td>
<td>3.093</td>
<td>4.704</td>
<td>.001</td>
</tr>
<tr>
<td>FAC3</td>
<td>Return on total assets (ROA)</td>
<td>1342.156</td>
<td>6</td>
<td>223.693</td>
<td>2.466</td>
<td>.042</td>
</tr>
<tr>
<td>FAC3</td>
<td>Market share in %</td>
<td>5587.340</td>
<td>6</td>
<td>931.223</td>
<td>1.023</td>
<td>.426</td>
</tr>
<tr>
<td>FAC4</td>
<td>Return on total assets (ROA)</td>
<td>.005</td>
<td>1</td>
<td>.005</td>
<td>.000</td>
<td>.994</td>
</tr>
<tr>
<td>FAC6</td>
<td>Market share in %</td>
<td>1443.779</td>
<td>1</td>
<td>1443.779</td>
<td>1.586</td>
<td>.216</td>
</tr>
<tr>
<td>FAC6</td>
<td>Total Quality Management Performance</td>
<td>3.133</td>
<td>1</td>
<td>3.133</td>
<td>4.766</td>
<td>.035</td>
</tr>
<tr>
<td>FAC6</td>
<td>Return on total assets (ROA)</td>
<td>823.710</td>
<td>1</td>
<td>823.710</td>
<td>9.081</td>
<td>.005</td>
</tr>
<tr>
<td>FAC6</td>
<td>Market share in %</td>
<td>2.294</td>
<td>1</td>
<td>2.294</td>
<td>.003</td>
<td>.960</td>
</tr>
<tr>
<td>FAC6</td>
<td>Total Quality Management Performance</td>
<td>3.236</td>
<td>1</td>
<td>3.236</td>
<td>4.922</td>
<td>.033</td>
</tr>
<tr>
<td>FAC6</td>
<td>Return on total assets (ROA)</td>
<td>375.935</td>
<td>1</td>
<td>375.935</td>
<td>4.144</td>
<td>.049</td>
</tr>
<tr>
<td>FAC6</td>
<td>Market share in %</td>
<td>3701.371</td>
<td>1</td>
<td>3701.371</td>
<td>4.066</td>
<td>.051</td>
</tr>
</tbody>
</table>

The results of this multivariate analysis would suggest that perceived productivity, competitive position, profitability, revenue growth and overall performance appear to be favourably influenced by top management philosophy and supplier support, efficiency improvement and increased interaction with employees and customers. Furthermore, employee and customer involvement, and efficiency improvement would appear to be important in maintaining a competitive edge in terms of return on assets.

**Conclusions, Limitations and Suggestions for Further Research**

This study investigated the particular quality management practices implemented by small and medium businesses for a sample of Queensland businesses, and which of those QM practices were associated with
organisational performance. The findings show that these practices can be reduced to some key factors including benchmarking and quality measurement, continuous improvement, top management philosophy and supplier support, employee and customer involvement, employee training and efficiency improvement. Of these factors only top management philosophy and supplier support, employee and customer involvement, and efficiency improvement appear to also contribute to organisational performance and effectiveness.

However, it must be acknowledged that the sample firms could only be regarded as representative of small to medium business enterprises in the manufacturing, service and construction industries. Moreover, the total sample size of one hundred and forty firms may limit the generalisability of these results to a wider population of businesses. This is particularly important in that the response rate was only 13%, from which it is difficult to make any general inferences about the population, as the quality management practices of the non-respondents are unknown. Therefore further research is called for to ascertain whether the same practices are evident across organisations of different size and industry group within a broader sampling frame.

This study was also restricted to particular types of quality management practices consistent with those advocated by Powell (1995). Future research may investigate the perceived importance of other types of quality management practices. An exploratory factor analysis was also undertaken to investigate whether any combinations of these practices were correlated with organisational performance. Future research may extend this study by considering the importance and effectiveness of total integrated systems of quality management practices to further investigate our preliminary proposition that holistic approach to quality management leads to improvements in organisational effectiveness.

Finally, in the current study organisational performance was operationalised by subjective measure of total quality management performance as being represented by respondents’ perceptions of their firm’s quality
management contribution to productivity, competitive position, profitability, revenue growth, overall performance, and positive organisational development; and the objective measures of return on assets and the organisation’s overall market share in Queensland. Further research may investigate alternative subjective measures of organisational performance such as different benchmarking standards of comparative performance, and different alternative measures such as profit margins and sales growth.

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