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LONGITUDINAL ANALYSIS OF
QUALITY MANAGEMENT PRACTICES
IN   AUSTRALIAN ORGANISATIONS

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ABSTRACT

Higher requirements for improved quality of products and services have led to three important changes in international business over the last decade: (i) the growing recognition of the strategic importance of Total Quality Management (TQM) philosophy and methods; (ii) a major push by organisations worldwide to seek certification to the ISO 9000 quality standards; (iii) the growing recognition and application of the Malcolm Baldrige National Quality Award (MBNQA); the Australian Quality Award (AQA), and the European Quality Award (EQA). Despite the above developments, there is still considerable confusion and frustration surrounding the applied role and business value of quality management practices in Australian industry. A review of the literature revealed a major gap in research in this area of operations/quality management. The purpose of the paper is to evaluate the results of three empirical studies conducted in 1991, 1993 and 1996 on the adoption of quality management practices in Australian manufacturing organisations.

Quantitative studies were conducted primarily on large random populations of approximately 1,000 manufacturing companies in Australia. The average response rate for the three studies was 30 per cent. The data was analysed using techniques available on SPSS for Windows. Our findings show that there has been a shift in popularity in quality management practices in the Australian manufacturing industry over the last five years. The popularity of TQM and its related practices such as statistical process control (SPC), quality circles (QC), benchmarking, business process reengineering (BPR), had decreased, while the popularity of ISO 9000 certification has increased significantly. A paradox has emerged from this finding. On one hand, business performance was found to be enhanced by the implementation of all TQM related practices. On the other hand, ISO 9000 certified firms did not perform significantly better than firms that were not certified, and yet there has been a shift away from TQM practice to ISO 9000 certification. This raises the question: why are managers so keen on ISO 9000 certification?

The study concludes that managers are impatient with the rate of improvement of organisational performance from the implementation of quality management practices. This has led to the belief that gaining a certificate to ISO 9000 is synonymous to becoming a quality organisation. This is a clear indication that managers lack understanding of the concepts and principles of quality management and are frustrated with the slow bottom-line payback from the implementation of quality management practices. Based on these findings, the paper recommends that managers should improve their understanding of quality management practices and the sources of their organisation's quality performance. This will lead to quality management being perceived as a philosophy rather than tools and techniques for problem solving at the shop-floor level.

INTRODUCTION

The manufacturing industry in Australia is faced with an expanding competitive domestic and international business environment (Foley et al, 1997). Technological change is occurring at an ever increasing pace and there is both an escalating competitive intensity in the marketplace and also in consumer sophistication. These trends are leading to increasingly shorter product life cycles and customer demands for greater product assortment and quality. These factors, and many others, have contributed to a decline in the competitiveness of Australian industry. In a recent government study on leadership and management skills conducted by the Karpin Committee (Karpin, 1995), it is stated that:

> *There is a strong view internationally that those companies which take their commitment to quality beyond the certification stage into a mode of continuous improvement find that the empowered and flatter organisational model emerges as the most effective means of achieving improved quality and customer satisfaction.*

Despite the strong international views on the value of quality management practices, many

senior managers in the Australian manufacturing industry are very slow to embrace the new quality philosophy (Fisher, 1993). The purpose of this report is therefore to synthesise the results of a longitudinal study conducted by the Quality Management Research Unit, Monash University on the adoption and use of quality management practices in the Australian manufacturing industry, and how these practices are deployed for the improvement of quality, productivity and competitiveness in this industry (Foley, et al., 1997). The results are compared to identify any shifts that may have taken place over the five year period. The barriers to the implementation of these practices and the strength of the relationship between quality practice and organisational performance is also investigated.

LITERATURE REVIEW

TQM has been the fundamental business strategy of the world's leading organisations throughout the 1980s and will continue to be a major competitive advantage of the 1990s. TQM is described as a comprehensive set of processes, which engages all people in a company on process improvements. TQM requires organisations to design their services and products with knowledge of their customer requirements. This involves operations, marketing, distribution and support activities to meet customer expectations and to increase company performance. There is growing evidence that improvements in quality leads to increases in productivity, performance and profits. The International Quality Study, conducted by Ernst & Young for the American Quality Foundation (1991), has been a major effort in understanding the link between quality management practices and business benefits. The International Quality Study focussed on developing knowledge on how businesses in Canada, Germany, Japan and the United States manage their quality process and identified practices which work best within and across industries, countries and cultures. The key findings of the International Quality Study were:

- Virtually every company in the sample believes that quality is a crucial factor in its strategic performance.

- German and Japanese businesses place more importance on incorporating customer research into the design of new products and services than do North American businesses.

- Japanese companies use technology twice as much as US companies in meeting customer expectations. However, business in all countries expected a substantial increase in the use of technology in meeting customer expectations.

- Approximately 40% of businesses in Canada, Japan and the US place primary emphasis on customer satisfaction in the strategic planning process. In Germany about half as many do.

- Many more Japanese businesses use process simplification and cycle-time analysis to improve business processes than do businesses in the other countries. About half of Japanese companies use these technologies more than 90% of the time.

- Japanese companies have the highest rate of widespread participation of employees in regularly scheduled meetings about quality.

In Australia and New Zealand, a number of studies have been conducted over the past five years that have focussed on TQM and organisational performance. Maani, Putterill and Sluti (1994) have been able to show empirically that in manufacturing companies in New Zealand, improving quality enhances operational performance and productivity, and certain indicators of business performance. These researchers found that the strongest association was found between quality and process utilisation, with the second largest impact of quality being on manufacturing costs. A recent study for a doctoral thesis by Terziovski (1997) found that people and leadership related practices were the best predictors of organisational performance. For example, 'unity of purpose and elimination of barriers between individuals and/or departments' was the most significant differentiating practice between high and low performing manufacturing organisations.

This finding is also supported from the literature (Powell, 1995; Garvin, 1988; Patterson, 1989). Sohal, Ramsay and Samson (1991) also provide evidence of companies achieving both tangible and intangible benefits from quality improvement processes adopted by Australian companies. They found that benefits do not happen quickly and that the time needed to change the organisational culture and attitudes of the workforce should not be underestimated. Managers must learn to be patient and not expect benefits from their quality improvement efforts in the short term.

The US General Accounting Office Study (1991) found that it took an average of 2.5 years to realise significant bottom-line results as a result of the TQM philosophy and methods. Fox (1991) points out that failures in the area of TQM are legion, and many Australian companies that have tried to introduce TQM have failed to achieve their full potential. This is mainly due

to the absence of CEO commitment and the failure of managers to recognise the link between TQM practice and organisational performance. Why do such failures in TQM occur, when paradoxically, it is such initiatives as the successful implementation of quality management practice that will enable firms to achieve international "best practice?" Garvin (1988) articulates one reason by stating that:

> *Its technical tools may be well developed but its theory and practice lag far behind...anecdotes remain the main source of most recommendations...quality remains a fertile area for research.*

There are many Australian organisations, however, that have successfully implemented quality management practices and obtained significant improvements in quality, productivity and competitiveness. For example, the Australian Automotive Industy has clearly demonstrated that the revitalisation of old manufacturing businesses is possible, has already happened in some firms and will continue to show improvements in quality, productivity and competitiveness. Indeed, there is also a small but growing number of manufacturers in Australia that are focused on achieving 'best manufacturing practice' and are aiming at export markets. Australian 'best practice' companies such as Kodak, Ford, Toyota and many more provide critically important evidence that quality-based competitiveness is possible. The right manufacturing policies, combined with suitable employee relations and quality improvement initiatives, would provide the right ingredients for Australian firms to compete with the best in the world from an Australian base.

This paper, therefore, presents the findings of a longitudinal study of quality management practices in Australian manufacturing firms in order to identify the 'right ingredients' for Australian firms to incrase their quality and productivity and hence become internationally competitive from an Australian base.

Research Methodology

Surveys

Postal questionnaire surveys were utilised to undertake this research. Response anonymity was optional. The questionnaires were designed to identify current practices and attitudes associated with quality management in Australian organisations. The survey population was selected from Dunn & Bradstreet's Salescan database. The questionnaires on each ocassion (ie. 1991, 1993, 1996) were sent with an accompanying cover letter to the Director, Managing Director or CEO of the selected organisations. A reminder letter was also sent one month later. Questionnaires were mailed to 895 companies in early 1991; 365 of these companies replied, yielding an exceptional response rate of 41%. In addition, a similar questionnaire was mailed to 985 organisations in late 1993 in which 313 replied, providing a response rate of 32%. Finally, a slightly modified questionnaire was mailed to 800 organisations in mid 1996. This survey attracted 102 responses, yielding a response rate of 15%. A variety of statistical methods were utilised to analyse these data. To assess the extent to which practices and attitudes varied across the years, χ^2 tests-of-independence were followed by Cohen's arcsine transformation procedure when appropriate. In addition, factor analyses were conducted to derive scales that reflect the impact of quality management.

Samples classified by geographical location

The geographical distribution of respondents was very similar across the 1991, 1993 and 1996 studies. The majority of organisations were from New South Wales and Victoria. Statistical analyses revealed that *utilisation of quality management practices did not vary across the states.*

DATA ANALYSIS

1991 Study Findings

The major findings of the 1991 survey relating to the adoption of quality management practice were:

* Large companies with many employees are more likely to adopt modern quality management practices.
* Highly profitable companies are also more likely to espouse the quality management philosophy.
* The more profitable, the less likely the company is to report any obstacles or impediments to adoption of these practices.
* Companies with high gross sales volumes are more likely to report use of quality management practices.

A company claiming to be using the Total Quality Management practices tended to have the following attributes:

* A quality mission/statement in place.
* The philosophy would have been applied across all functional areas.
* All people in the company are likely to have received some training in the philosophy of quality management practices.
* There will be a well developed awareness of the customer/supplier relationships including both internal and external customers.
* There will be closer relationships with suppliers which will include vendor pre-qualification and some involvement in the company's training program for quality management practices.
* The technical methodologies such as Statistical Process Control (SPC) and Quality Circles will be in place and operational.

- **Comparison of the 1991 and 1993 Studies**

In late 1993, the same study was repeated to examine the changes that had taken place in the adoption and use of modern quality management practices and the barriers to the implementation of these practices. A further objective of the 1993 study was to establish whether the relationships between the type of company and its quality management practices identified in the 1991 survey are consistent with the 1993 survey and whether there are other relationships identified in 1993 which did not exist in 1991.

The key findings of the 1993 survey are presented below and show that significant improvements had been made in a number of areas between 1991 and 1993.

- A higher proportion of companies were using TQM and preparing a corporate quality mission statement. There had been substantial increases in the use of quality certification and benchmarking. These are the dominant quality practices of the 1990s and are driving the implementation of TQM and quality improvement programs in Australian industry.

- The focus of quality management practices was still in the manufacturing function with little increase in the use of these practices in other functional areas. Around a third of the companies indicated that quality management techniques were not being practiced in Human Resources, Administration and Marketing functions.

- In terms of who has responsibility for quality, there was a clear shift away from management/supervisor and the quality control department to all employees of the organisation. The analysis showes a significant relationship between the use of TQM and all employees having responsibility for quality.

- There had been a significant reduction (from 20% in 1991 to 13% in 1993) in the proportion of companies which only focussed on external customers. The move had been toward both internal and external customer recognition. There was a statistically significant relationship between the use of TQM/Benchmarking and recognition of external/internal customers.

- The provision of training in quality management practices to all employees in the organisation had increased from around one third in 1991 to half of the 1993 responding companies. Also instances of "no training" in quality management decreased from 10% to 3% of the companies over this period. Training had clearly been recognised as an important success factor in successful TQM initiatives. Professional associations such as the Australian Institute of Management, the Australian Organisation for Quality and the Australian Quality Council, and Consultants were a major source of quality management training. Only around one-fifth of the companies considered universities and colleges as a source of quality management training. Nearly 14% of the companies said that they were aware of the available source of training for quality management but considered it to be too expensive.

- There is little improvement in terms of developing long-term vendor relationships. Less than 10% of the companies reported single sourcing of components. This is an area which has not received the attention that it deserves and companies are failing to achieve the enormous benefits which can result from better vendor relationships.

- There was a significant increase in the proportion of companies that believe there is sufficient support from the Governments to assist with quality management practices (increased from 37% to 49%). The remaining companies indicated that both Federal and State Governments should support the promotion of quality and provide subsidies and grants to help manufacturers adopt quality management practices.

- Fewer companies relied on outside consultants in 1993 than in 1991 to assist them in introducing quality management practices and people training.

- A third of the companies in 1993 indicated that they experienced no obstacles in adopting quality management practices. For 1991 this figure was 54%. The major impediments to adopting quality

management practices were identified as lack of understanding by managers (33%), resistance by the managers/supervisors (26%) and resistance by employees (16.5%).

- In 1991, the analysis showed that the larger the company the more inclined it was to use TQM. This relationship was not statistically significant in 1993 which means that small and medium-sized companies were equally likely to adopt TQM as are larger companies based on the number of employees. However, there was a significant relationship between size of firm and the use of benchmarking, quality circles and total quality control with larger companies more inclined to use these practices. On the other hand, as in 1991, analysis showed that the larger the sales revenue, the more inclined companies were to use quality management practices, such as TQM and benchmarking. TQM practices were used significantly less by firms with small sales revenue.

- There was little difference between 1991 and 1993 on the level of profitability of the firms. Only 7% indicated that they were "very profitable" and around half indicated "adequate profits" with the remainder indicating "inadequate profits". Clearly, firms were still in the grips of the world-wide recession and the increased level of activity in quality management practices had not had any effect on profitability of the firms.

Synthesis of the 1991, 1993, and 1996 Studies

This section compares the three studies on compatible questions asked in the questionnaires.

A synthesis of the findings on the adoption and use of modern quality management practices is provided.

- **Corporate Quality Mission**

One of the key facets of TQM is a Corporate Quality Mission, a document defining the corporate philosophy and attitude towards quality. Figure 1 presents the percentage of organisations surveyed in 1991, 1993, and 1996 that utilised a corporate quality mission statement. The percentage of organisations that prepared quality mission statements rose considerably between 1991 and 1993. No significant difference was observed between 1993 and 1996.
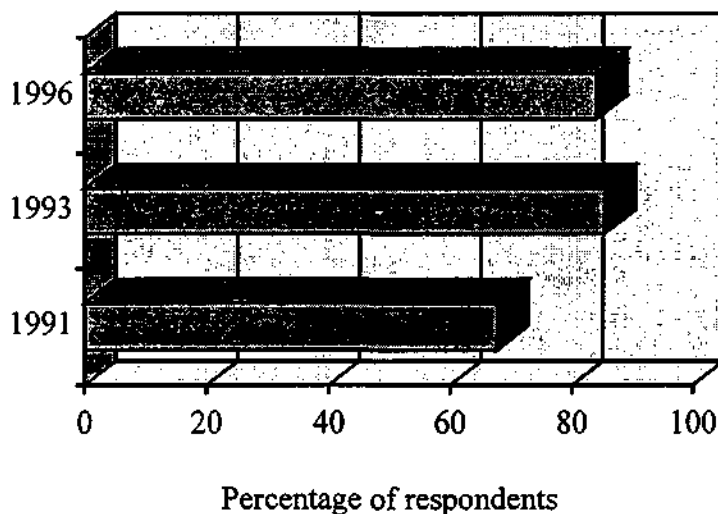

Percentage of respondents

Figure 1: Percentage of organisations that construct a corporate quality mission statement.

- **Functional areas that use quality management practices**

Respondents also specified the degree to which quality management is applied to various functional areas. These areas were ranked according to the extent to which quality management is utilised. Figure 2 displays the outcome of this process. Higher ranks correspond to more extensive utilisation. For each survey, quality management was primarily employed in operations and, to a lesser extent, in services. In addition, quality management was utilised least often in human resource management. The rank ordering of these five areas was thus stable across time.
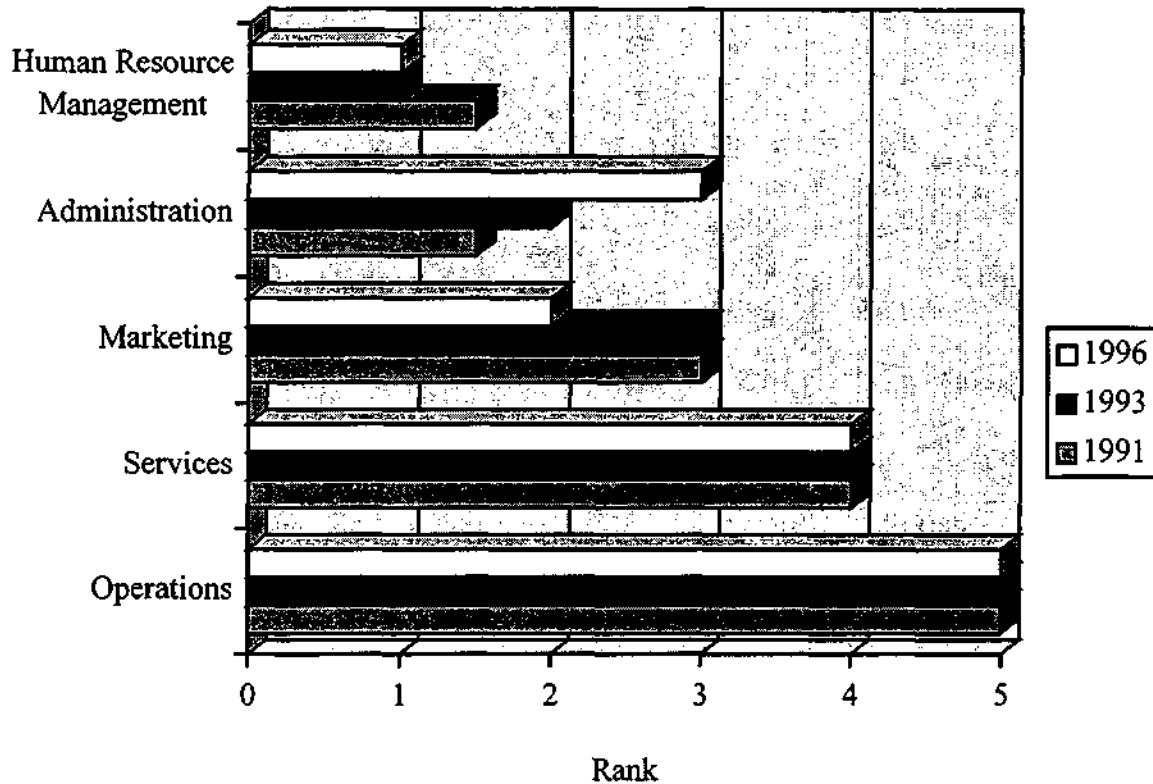

Figur e 2: Extent to which quality management is employed in each functional area. Higher numbers represent more extensive utilisation.

- **Responsibility for quality**

Responsibility for quality can be assigned to a specialised quality department, to all managers, to all employees, or even to a combination of these alternatives. Figure 3 displays the percentage of organisations who allocated responsibility to a quality department, all managers, and all employees across the 1991, 1993 and 1996 surveys.

Interestingly, the percentage of organisations that utilised a specialised quality department dwindled during 1991 and 1993 and then rose during 1993 and 1996. In addition, the 1996 survey revealed that quality management was statistically less successful in those organisations that employed a quality department. Accordingly, the recent introduction of specialised quality departments is not a desirable trend.

Likewise, the reliance on managers diminished during 1991 and 1993 and then rose during 1993 and 1996. In contrast, the percentage of organisations that assigned responsibility to all employees has steadily increased since 1991.
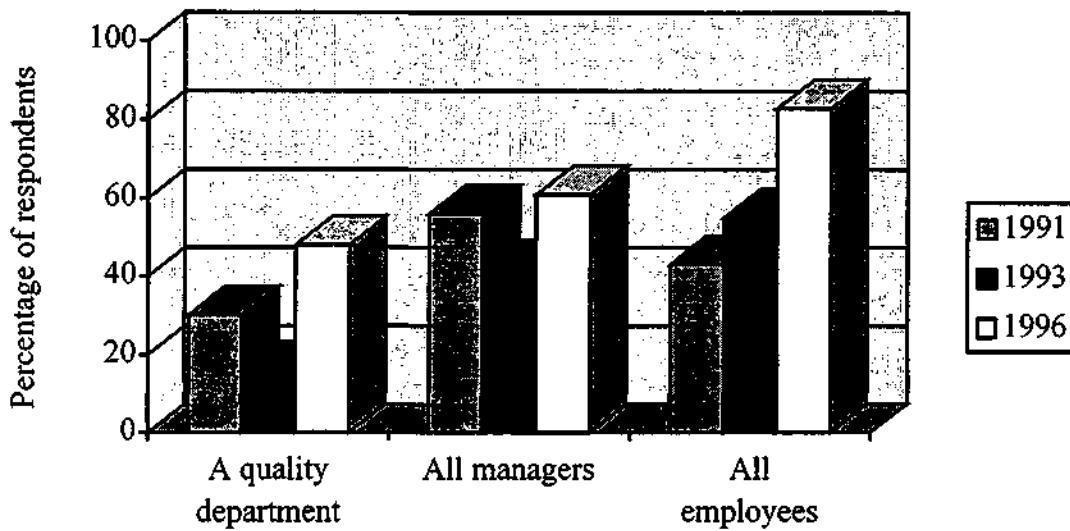
Figure 3: Percentage of respondents who assign responsibility for quality to a quality department, to all managers, or to all employees.

• **Customer recognition**

The extent to which organisations acknowledge the needs and expectations of both internal customers and external customers was also explored. Figure 4 presents the percentage of organisations that recognise the needs of internal and external customers in 1991, 1993 and 1996. The degree of recognition appeared to rise during 1991 and 1993, although this increase did not attain statistical significance. A significant decline in recognition of customers was observed during 1993 and 1996.

• **Use of quality management practices**

Figure 5 displays the percentage of organisations that utilise the various quality management practices as a function of year. These responses revealed that TQM gained in popularity between 1991 and 1993, but then diminished in popularity between 1993 and 1996. In stark contrast to TQM, the prevalence of Total Quality Control (TQC) deteriorated during 1991 and 1993 but was stable during 1993 and 1996. Finally, the proportion of organisations that employed Statistical Process Control (SPC) and Quality Circles (QC) did not vary between 1991 and 1993 but declined markedly between 1993 and 1996. In a nutshell, the popularity of these quality practices has largely crumbled away since 1993.
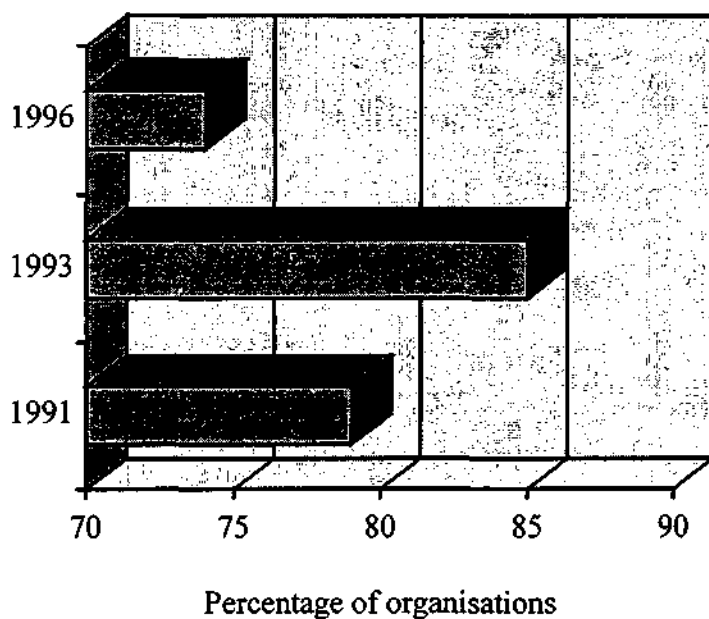
Percentage of organisations

Figure 4: Percentage of organisations that recognise the needs and expectations of both external and internal customers.

Statistical analysis of the 1996 data reveal that Statistical Process Control and Quality Circles improve the impact of quality management. Accordingly, the decline in these practices is suboptimal.
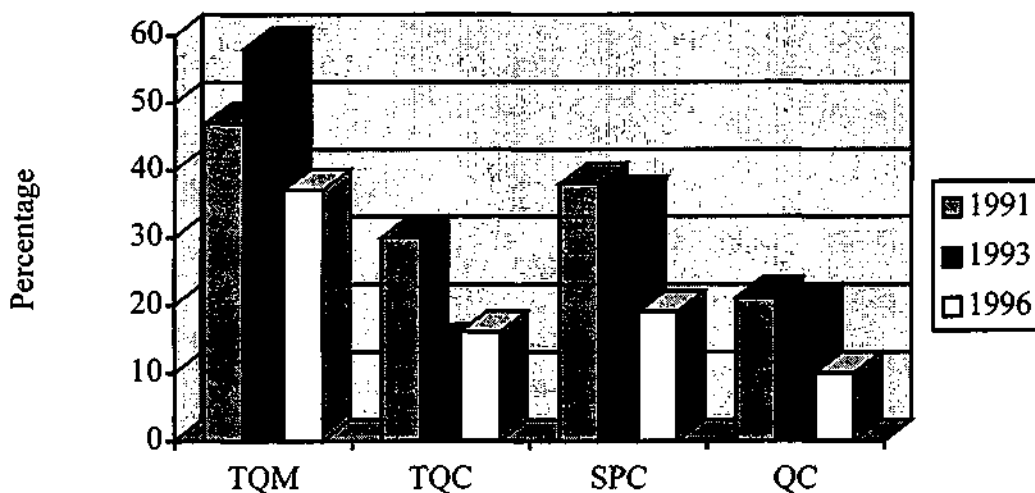

Figure 5: Percentage of respondents who selected each practice in the 1991, 1993, and 1996 surveys.

- **Sources of Quality Management Training**

The sources of training in quality management were also explored across the three time periods. Figure 6 reveals the percentage of organisations that utilise each source of training in the 1991, 1993, and 1996 surveys. The extent to which Universities and TAFEs were utilised remained stable between 1991 and 1993 but rose between 1993 and 1996.

In contrast, the percentage of organisations that utilised the Australian Institute of Management (AIM) did not differ significantly across the three time periods. Nonetheless, other institutions were utilised less often in 1993 vis-a-vis 1991; the difference between 1993 and 1996, however, did not attain statistical significance. Finally, the extent to which consultants were employed did not vary significantly between 1991 and 1996.
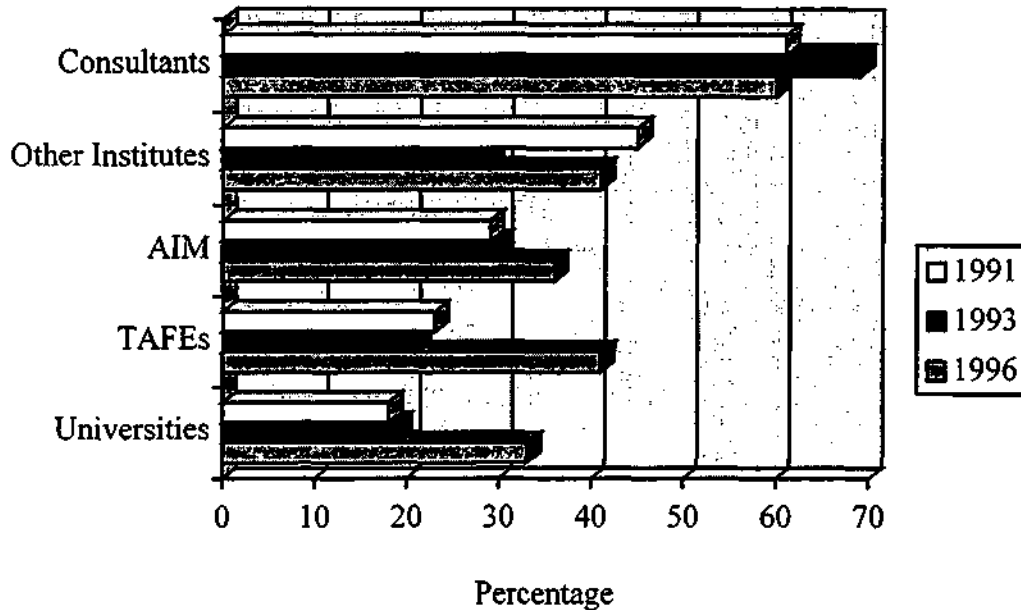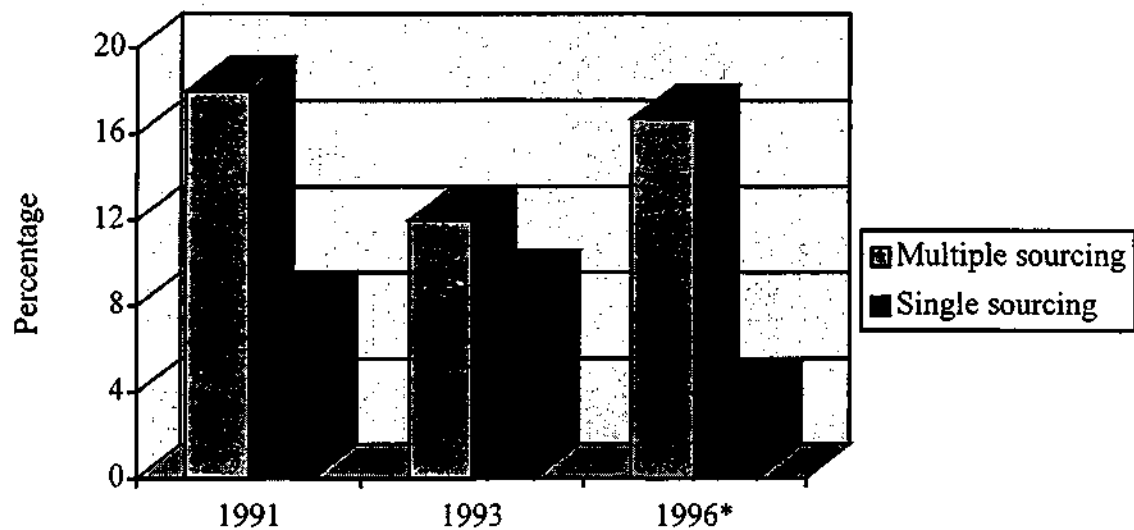

Figure 6: Percentage of respondents that have used the various sources of quality management training.

- **Component sourcing**

Figure 7 presents the percentage of respondents who utilise multiple sourcing only and the percentage of respondents who utilise single sourcing only. Note the questions that explored this issue varied across the three surveys. Nonetheless, the ratio of multiple sourcing to single sourcing can be compared across the three studies. This figure reveals that multiple sourcing was appreciably more popular than single sourcing in 1991. This disparity, however, diminished in 1993. Nonetheless, in 1996, the preference of multiple sourcing seems to have been restored. Further tests conducted on the 1996 data reveal that single sourcing tends to impair the success of quality management practice implementation. In other words using single sourcing as the driver is not the ideal strategy. According to our results, the ideal method is the selection of suppliers based on strategic fit with the intrinsic nature of the business conducted.

* Corresponds to the percentage of respondents who selected the 'very high usage' option.

Figure 7: Percentage of respondents who utilise multiple sourcing and single sourcing.

Based on the results of the longitudinal study, a sythesis of the characteristics of a Quality Organisation are:

Characteristics of a successful Quality Organisation
• Middle managers, front-line managers and staff have a positive attitude towards quality.
• A variety of quality management practices are employed, including Statistical Process Control and Quality Circles.
• Quality initiatives are primarily introduced to improve the business's performance.
• Responsibility for quality is not assigned to a specialised quality department or person.
• Leadership training is implemented extensively.
• Quality indicators are a crucial part of performance indicators.
• Customer surveys are utilised regularly.
• Customers are involved in the continuous improvement of the business.
• A supplier agreement contract exists.
• Suppliers are involved in the changing and improving of the system.
• Strategic alliances have been formed with customers and suppliers.

IMPLICATIONS FOR MANAGERS

Considering the findings of this study, the following implications for managers are articulated:

- Many organisations have experienced resistance to the implementation of quality management practices. One of the prime reasons for this difficulty is the relative paucity of research that attests to the contribution of various quality management practices to organisational performance. This 'gap' generally creates misunderstandings and disagreement regarding the expected benefits of quality management. The results of this study have significant implications for managers who are contemplating the implementation of quality practices. This study has identified the chief characteristics of a successful quality management strategy. The study provides an empirical analysis of the data of quality management practices over time. In contrast, previous studies have typically utilised a cross-sectional design, which merely provide a 'snap-shot' in time. Hence, the present study provides a more detailed account of quality practices. Accordingly, managers would attach appreciably more credence to the present study vis-a-vis previous cross-sectional research.

  Quality performance was shown to deteriorate when responsibility for quality was allocated to a specialised quality department. This finding yields some critical implications for managers. In particular, quality should be integrated with the entire organisation rather than delegated to a specific group or person.

- The finding that quality management practices are least implemented in the area of human resources, and most implemented in the area of operations, has crucial implications for managers. This finding appears to imply that managers still believe, albeit erroneously, that 'quality' pertains to the area of operations only. Based on these findings, managers should acknowledge that quality management encompasses:

  a corporate quality mission which defines the corporate philosophy and attitudes towards quality; that quality management practices can be used effectively in every aspect of the organisation rather than merely operations; that responsibility for quality should be disseminated to all managers and employees and not simply a specialised quality department; that managers must acknowledge the needs and expectations of both internal and external customers; and that multiple sourcing of components enhances the impact of quality management.

The main implication that emerges from this study is that unless managers understand the concepts and principles of quality management, the popularity of these practices will diminsish over time as shown by our results. Unless this diminishing trend is reversed, managers will be constantly in search of the next 'fad' in the hope of obtaining quick gains in bottom-line results.

CONCLUSIONS

The major conclusions drawn from the three studies are:

- The study concludes that there has been a shift in popularity in quality management practices in the Australian manufacturing industry over the last five years. The popularity of TQM and its related practices such as SPC, QC, benchmarking, BPR, had decreased, while the popularity of ISO 9000 certification has increased significantly.

- Organisational performance suffers when responsibility for quality is allocated to a specialised quality department. Responsibility for quality rests with all employees in the organisation.

- A major finding of this study is that quality management practices were least implemented in the area of human resources, and most implemented in the area of operations. This finding implies that managers still believe, albeit erroneously, that 'quality' pertains to the area of operations only.

There is a significant jump in quality management practices implementation in the administration area.

- The popularity of tools and techniques has diminished even though managers believe that these practices have a positive impact on performance.

- The extent to which leadership training is provided influences organisational performance. Companies that had invested in leadership training are more likely to succeed than those companies that did not invest in leadership training.

- Customer surveys and continuous improvement concepts have a significant effect on organisational performance. On the other hand, customer involvement in design and development, and in inspection and testing did not influence organisational performance.

- Single sourcing as the driver of vendor relationship is not the ideal strategy. Supplier selection based on strategic fit is the ideal method.

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