The impact of TQM on financial performance

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Abstract *The question of whether an adoption of total quality management (TQM) improves the financial performance has been discussed for several years. Various studies have been conducted to examine the impact of TQM on financial performance, but there is still disagreement concerning the effectiveness of TQM. This paper presents a study of Swedish quality award recipients, which are compared to branch indices and to identified competitors. The comparison concerns the development of different financial performance indicators. The study indicates that the award recipients as a group outperform the branch index and their identified competitors on most of the studied indicators.*

Keywords *Total quality management, Quality, Awards, Financial performance, Sweden*

Background

Total quality management (TQM) has been acknowledged as an important subject in management theory and practise during the last decades. The use of TQM among many western organisations has been relatively high during the 1990s, see for example, Lawler *et al.* (1995). However, the relationship between TQM practices and improved financial performance is discussed frequently in the TQM literature. Results have been published, which argue that TQM investments result in an improved financial performance, see, for instance, Shetty (1993), Hendricks and Singhal (1997), Easton and Jarrell (1998), Handsfield *et al.* (1998), Samson and Terziovski

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(1999), Reed *et al.* (2000), Allen and Kilmann (2001), Tena *et al.* (2001) and Wrolstad and Krueger (2001). Bergquist and Ramsing (1999) argue, on the other hand, that it is difficult to establish a relationship between TQM and the performance of the company. Results have also been published, presenting a more negative picture of TQM implementation benefits. Eskildson (1994) states, based on survey results, that many organisations do not succeed with their TQM efforts. The two main reasons are here argued to be vague definitions of TQM and inappropriate implementation. Also, Harari (1993) argues, based on own experience, that TQM programs are ineffective, and that at best one third of the TQM programs have achieved significant improvements.

The differentiation among research conducted, to outline financial benefits of TQM implementation, imply that the area needs further investigation. The approaches used to determine the benefits of TQM programs, and to find a relationship between TQM and the financial performance, also differ between the different studies. One approach to measure the effects of TQM investment on financial performance is to compare companies that have received a quality award against companies that have not received any quality award, see, for example, Hendricks and Singhal (1997). These two researchers use American companies in order to measure the effects of successful TQM implementations on financial performance. The approach to study the financial performance development of quality award recipients has not been used, according to extensive literature, on Swedish quality award recipients. Such a study would be a complement to earlier studies, also considering

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the facts that Sweden and the USA have different company cultures and that the award models are somewhat different.

As many still argue whether TQM programs are profitable, the purpose of this study is to form an opinion if companies in Sweden that successfully have implemented TQM have better financial performance development than median branch indices and their stated competitors.

Theory

TQM is frequently mentioned in discussions concerning quality and, according to Hodgetts (1996), all enterprises, regardless of size and financial status, are involved in the quality revolution. There exist many descriptions of the concept of TQM, but few clear definitions. For example, Oakland (1989), describes TQM as "an approach to improve competitiveness, efficiency and flexibility for a whole organisation". Dale (1994) and Huxtable (1995) describe TQM as an important management philosophy, which sustains the organisations in their efforts to obtain satisfied customers. Some argue that TQM is a management approach, while others state that TQM is a management system. In this article, the definition by Hellsten and Klefsjö (2000) is used. They define TQM as "a management system in continuous change, which is constituted of values, methodologies and tools, the aim of which is to increase external and internal customer satisfaction with a reduced amount of resources". For example, the core values of TQM are values such as customer orientation and committed leadership. Core values are also the basis of the quality award models. Self-assessment that is used when applying for an award can be seen as a methodology, and the criteria booklet of the Malcolm Baldrige National Quality Award and the Swedish Quality Award can be considered as examples of tools.

Lascelles and Dale (1991) identified six levels of adoption of TQM[1]. These levels are uncommitted, drifters, tool pushers, improvers, award winners and worldclass, see Figure 1.

It is argued by Lascelles and Dale (1991) that these levels are not necessarily the stages through which organisations pass on their TQM journey, rather they are characteristics and behaviors which organisations display in reaction to TQM. In level 5, award winners, the organisations have reached the stage of being able to compete for a quality award and some recipients of quality awards can be found in this level. At this stage the organisations have reached a point in their total quality maturity where they have developed the kind of cultures, values, trust, capabilities, relationships and employee involvement in the business that are required to receive a quality award (Lascelles and Dale, 1991). Ghobadian and Gallear (2001) use, among other criteria, the receiving of a quality award as a measurement for a successful implementation of TQM. Hendricks and Singhal (1997) also use the receiving of quality awards as a criterion

for a successful implementation of TQM programs.

According to Lascelles and Dale (1991), the last level, worldclass, which is only reached by a handful organisations, is characterized by the total integration of quality improvement and business strategy to creatively delight the customer.

There are many similarities between the existing national quality awards. Almost all of the existing national quality awards are carried out in the three evaluation dimensions of approaches, deployment and results, see Chuan and Soon (2000). The Swedish Quality Award model, which was inspired by the Malcolm Baldrige National Quality Award model, has many similarities with the latter. However, there are also differences between the two award models. For example, the Swedish Quality Award model puts more emphasis on the evaluation and improvement in all the criteria addressed and on the practice of TQM principles in all organisational activities. There is also relatively more emphasis on the organisation's impact on society, and on the organisation's commitment to the customers compared to most other national quality award models (Chuan and Soon, 2000).

Performance can, as well as TQM, be defined in many different ways. The definition, provided by European Foundation for Quality Management (EFQM) (1999) is used in this article. EFQM (1999) defines performance as a measure of attainment achieved by an individual, team, organisation or process. There are many different indicators to measure the performance. This article sets out to measure TQM's impact on financial performance. In Hendricks and Singhal (1997), six indicators of the financial performance were used to illuminate the impact of TQM. These were change in operating income, change in sales, change in return on assets, change in return on sales, change in total assets and change in number of employees. Easton and Jarrell (1998) also use similar indicators, net income, operating income, sales and inventory, to evaluate the impact of TQM on financial performance.

Methodology

Definition of successful implementation of TQM

One of the first issues to be solved, when studying the impact of TQM on the financial performance, is what a successful implementation of TQM constitutes. Hackman and Wageman (1995) have, for example, provided a measuring framework, which can be used to test if TQM has been properly implemented. This framework was used in a qualitative study by McAdam and Bannister (2001) in order to determine if the framework of TQM was perceived to be implemented. Hendricks and Singhal (1997) and Ghobadian and Gallear (2001) use the receiving of a quality award as a criterion for a successful implementation of TQM. The same proxy was used in this study because the qualitative case study approach by McAdam and Bannister (2001) was

Figure 1 — The different levels of TQM adoption

Source: Lascelles and Dale (1991)

considered to be inappropriate due to the subjective judgement of what a successful implementation of TQM constitutes. Also, it was the intention to make a comparison with the results of this study with those of the Hendricks and Singhal (1997) study. Further, as shown in Figure 1, quality award recipients show a TQM maturity (Lascelles and Dale, 1991), and one can therefore argue that these companies have successfully implemented TQM.

Selection of companies

In this study, all Swedish companies that have either received the national, a regional or an in-company quality award were included. The regional and in-company quality awards are to a large extent based on the Swedish Quality Award criteria. The information about which companies that had received a quality award in Sweden was collected from the Swedish Institute for Quality (SIQ), which is the organisation managing the Swedish Quality Award. Only companies that are profit-driven were included in the study, because non-profit organisations do not always strive to increase the financial performance due to other business incentives. A total number of 21 companies conformed to these criteria. In some cases a unit of a larger company had received a quality award. In these cases the total company was included in the study if the unit that had received the award had 40 per cent or more of the total number of employees of the company. This limitation was set to get as many of the award recipients as possible included in the study and yet not decrease the reliability of the study. It can be argued that if 40 per cent of the company has implemented a TQM program, the rest of the company should to some extent also have been working with TQM. Further, since the authors wish to study the development of the financial performance after the award announcement,

only companies that received an award in 1999 or before were included in the study (for quality award recipients later than 1999 no sufficient data are yet available). In total, 17 companies conformed to the above-described criteria. The exclusions that were made were due to the following reasons:

- One award recipient was closed down by their foreign owner and the production was moved abroad.
- One award recipient presented the financial figures in a way that made comparisons impossible.
- Two award recipients constituted less than 40 per cent of the company that provided the financial figures.

The companies that were included in the study came mainly from the manufacturing industry and had a relatively large number of employees (see Table I). The classification by the Commission of the European Communities regarding the size of companies was used (0-9 employees, 10-49 employees, 50-249 employees and 250 or more employees).

Table I — The table shows which year the companies in the study received the quality award, as well as type of business and the number of employees

	1994	1995	1996	1997	1998	1999	Total
Total number of companies	2	2	2	5	4	2	17
0-9 employees	—	1	—	—	—	—	1
10-49 employees	—	—	—	2	2	—	4
50-249 employees	—	—	1	1	1	2	5
250+ employees	2	1	1	2	1	—	7
Manufacturing industry	2	1	2	2	3	—	10
Service industry	—	1	—	3	1	2	7

Selection of comparisons

To assess the financial benefits of implementing TQM, it would be ideal to compare the actual companies' performance with the performance that would have been the case if the companies had not implemented TQM. Since it, in this study, was impossible to find or construct such ideal comparisons, two other comparisons were chosen.

First, each company that had received a quality award in Sweden was individually compared to the respective branch index in order to make a valid comparison regarding financial performance. Different branch indices for different sizes of companies regarding total number of employees were available through Statistics Sweden (SCB). Each company that had received a quality award was, therefore, separated into different sizes (based on the number of employees) and branches.

Second, a comparison was performed with the award recipients' stated competitors, i.e. each award recipient was individually compared with one of its competitors. This comparison gives an idea how the quality recipients have developed in relation to their competitors. Only one competitor was identified for each company that had received a quality award. In those cases, when a competitor could not be identified or the competitors to the company were a non-Swedish company, no competitor was included in the study. In those cases, when the award recipient stated that they had many competitors, the competitor that was closest in size was selected. These two comparisons give an indication of the benefit of a successful implementation of TQM.

Selection of indicators

The five following indicators were used in order to study the performance development for the companies included in the study:

- (1) Percentage change in sales.
- (2) Return on assets, which is the result after financial income and financial costs divided by 0.7 multiplied by non-taxed reserves plus assets. This indicator is, according to Hendricks and Singhal (1997), an efficiency indicator, which is based on the assumption that implementing an effective TQM program increases revenues.
- (3) Return on sales, which is the operating income divided by sales. This indicator is based on the assumption that an effective TQM program will increase revenues. Lemak and Reed (1997) discuss the advantage of using operating income instead of net income to ascertain the impact on financial performance of TQM. They state that operating income is a better measure of performance than net income since it is not greatly affected by accounting methods, tax strategies, or financial structure.
- (4) Percentage change in total assets.

- (5) Percentage change in number of employees. The opinions differ among TQM experts regarding what impact TQM has on this indicator, as well as change in total assets. Some claim that TQM requires investment in people and capital, resulting in an increase in employment and total assets. Others believe that TQM programs increase the effective productive capacity of the company because of process improvements and reduction in defects, rework, and waste among other things. This improvement could result in a decrease in employment and total assets (Hendricks and Singhal, 1997).

The indicators chosen and the approach for calculating and comparing them with the control groups differ to some extent compared to the study by Hendricks and Singhal (1997). Change in operating income was not included in our study, since some of the companies, both award recipients and their competitors, showed a negative operating income on some occasions. Owing to the fact that it is impossible to calculate a change in operating income from a negative result, expressed in percentages, this indicator was excluded. If change in operating income, expressed in percentages, were studied, and the companies that showed a negative operating income excluded on the occasions when they developed positively from a negative point of departure, the result from the operating income indicator would be biased. However, return on sales, which was included in this study, is defined as operating income divided by sales. Hence, the change in operating income is, to some extent, reflected in this indicator. Hendricks and Singhal (1997) excluded, when calculating the operating income, the years that the companies showed a negative operating income. However, one can argue that this gives a biased result. The number of companies included in our study is far less than in Hendricks and Singhal (1997), since the number of award recipients is much less in Sweden than in the USA, and the bias of excluding companies would therefore turn out to be even more severe for this study.

The same problem of calculating change, expressed in percentages, with negative numbers as departure also concerned the indicators return on sales and return on assets. The annual change of these indicators was not calculated. Instead, the results (the actual "value" in return on sales and return on assets) for the competitor and the branch index were subtracted from the indicator of the particular award recipient. Thereafter, a median value of the differences was calculated. This procedure was used for all the years included in the study.

The use of medians when comparing the performance indicators was based on the fact that the medians are more robust than average values to problems concerning outliers, wide tails or different forms of skewness.

The other indicators, change in sales, change in total assets and change in total numbers of employees were

calculated in the same way as by Hendricks and Singhal (1997). The change of these indicators for the competitor and branch index was subtracted from respective change of these indicators of the award recipient. Further, the median value of the difference between the award recipient and their stated competitor and branch index was calculated to give a general reflection of the development.

The indicators of the award recipients and respective competitor were found in annual reports available mainly from the companies and the Swedish Patent and Registration Office (PRV).

Selection of comparison periods

A six-year period, divided into one implementation period and one post implementation period, was studied regarding these indicators. The implementation period was defined as starting four years before the company received the quality award and ending two years before the award, see Figure 2. Since the applicants of the quality award start describing their activities and results approximately one year before the announcement of the recipient in order to hand in the application on time and give examiners and judges time to evaluate the application, it can be argued that the activities and results described in the application should be in place one year before the announcement of the recipient of the award. Hence it is most convenient to start the post implementation period one year before the announcement of the recipient of the award. The post implementation period started one year before the award was received and ended one year after the award, see Figure 2.

In the GAO (1991) study, 20 companies that were among the highest-scored applicants in 1988 and 1989 for the Malcolm Baldrige National Quality Award were evaluated. The companies in the GAO study realised the initial benefits with TQM after two and a half years. Hence, after a three-year implementation period, the companies in this study should be able to show possible benefits with TQM regarding the studied indicators. Also, the indicators were collected, if

possible, after the post implementation period until year 2000, in order to see possible progress after the post implementation period (i.e. it is possible to study the development of the indicators after the post implementation period for the companies that received a quality award before 1999). This results in the fact that the development of the indicators can be presented up to two years after the award announcement.

Exclusions of observations

Some observations were excluded due to the following reasons:

- Two quality award recipients of the year 1999 were excluded for the year after the post implementation period due to the fact that no current data were available.
- No Swedish competitor could be identified for four of the award recipients.
- No branch indices could be constructed for two of the award recipients within the insurance and real estate business.
- No branch indices were available between -5 and -4 for the indicators of number of employees and total assets.
- No branch indices were available for one award recipient for -4 and for one award recipient for -3, due to few companies in the branch indices.

Tables II and III present the number of comparisons made for the different indicators and for the different years.

Results

Two main types of results are presented below. First, the development of the indicators of the award recipients in comparison with the competitors and the branch indices is presented on an annual basis (see Figures 3-7). Second, the indicators of the award recipients in comparison with the competitors and the branch indices are presented as a median during the implementation period and the post implementation period (see Figures 8 and 9).

Figure 2 — The years included in the implementation period and the post implementation period

Annual comparisons

In Figures 3-5 the indicators, change in sales, change in total assets and change in numbers of employees are presented.

As shown in Figures 3-5 the award recipients outperform their competitors and branch indices for the indicators of change in sales, change in total assets and change in total number of employees for most of the studied years. The indicator, change in sales, shows the largest difference between the award

recipients and the competitors and the branch indices. Also, between the year of the announcement and one year after the announcement ("0-1"), the award recipients outperform their competitors and branch indices for all three indicators.

In Figures 6 and 7 the return on sales and return on assets are presented.

The award recipients outperform their competitors and branch indices for most of the years, see Figures 6 and 7. A positive trend for the award recipients can also be identified for the indicator of return on assets in comparison with their competitors.

Period comparisons

Figures 8 and 9 present the median value of the indicators of the award recipients in comparison with the competitors, and the branch indices during the implementation period and post implementation period. As an example, the difference between the award recipients and the competitors for the indicators of percentage change in sales during the implementation period was calculated by, first, subtracting

Table II — The number of comparisons performed for the different years for the indicators of return on assets and return on sales

Year	-4	-3	-2	-1	0	1	2
Award recipient – competitor							
Return on assets	13	13	13	13	13	13	12
Return on sales	13	13	13	13	13	13	12
Award recipient – branch index							
Return on assets	15	14	14	15	15	15	14
Return on sales	15	14	14	15	15	15	14

Table III — The number of comparisons performed for the different years for the annual percentage change in number of employees, change in total assets and change in sales

Year	-5 to -4	-4 to -3	-3 to -2	-2 to -1	-1 to 0	0 to 1	1 to 2
Award recipient – competitor							
Number of employees	10	12	13	13	13	13	12
Total assets	10	13	13	13	13	13	12
Sales	10	13	13	13	13	13	12
Award recipient – branch index							
Number of employees	–	14	13	14	15	15	14
Total assets	–	14	13	14	15	15	14
Sales	14	14	14	15	15	15	14

Figure 3 — Change in sales

Note: The piles show the median differences of change in sales between the award recipients and the competitors, and between the award recipients and the branch indices, during different years. Zero indicates the year of the award announcement. A positive percentage means that the median award recipient outperforms its competitor or branch index

Figure 4 — Change in total assets

Note: The piles show the median differences of change in total assets between the award recipients and the competitors, and between the award recipients and the branch indices, during different years. Zero indicates the year of the award announcement. A positive percentage means that the median award recipient outperforms its competitor or branch index

Figure 5 — Change in number of employees

Note: The piles show the median differences of change in number of employees between the award recipients and the competitors, and between the award recipients and the branch indices, during different years. Zero indicates the year of the award announcement. A positive percentage means that the median award recipient outperforms its competitor or branch index

all the percentages changes in sales of the competitors from respective award recipients. Second, the median difference was calculated, including all the differences between the award recipients and the competitors for the indicator of change in sales for all of the years in the implementation period. This median difference is represented in the first pile from the left in Figure 8. The same procedure was used for the other comparisons, indicators and periods. Figure 8 shows that the award recipients outperform both the competitors and the branch indices for the indicators of change in sales and return on sales during the

implementation period. On the other hand, this is not the case for the other indicators.

To investigate the precision of the median values, reflected in Figure 8, confidence intervals, with a 95 per cent confidence level, were created. The confidence intervals are non-parametric, and accordingly not based on any distributional assumptions. These confidence intervals are presented in Table IV.

The wider confidence interval, the less accurate is the estimation of the median value. If the interval contains 0, a significant difference between the award recipients and the

Figure 6 — Return on sales

Note: The piles show the median differences between the award recipients and the competitors, and between the award recipients and the branch indices, during different years. Zero indicates the year of the award announcement. A positive percentage means that the median award recipient outperforms its competitor or branch index

Figure 7 — Return on assets

Note: The piles show the median differences of return on assets between the award recipients and the competitors, and between the award recipients and the branch indices, during different years. Zero indicates the year of the award announcement. A positive percentage means that the median award recipient outperforms its competitor or branch index

competitors, or between the award recipients and the branch indices cannot be shown. However, if the confidence interval does not contain 0, there is a significant difference between the award recipients and the competitors, or between the award recipients and the branch indices. Hence, for the indicator of change in sales, there is a significant difference, with a 95 per cent confidence level, between the award recipients and the competitors, and the branch indices, in that sense that the award recipients increase their sales

more than the control groups during the implementation period. The same result is also shown for the indicators of return on sales and for the return on assets, when comparing the award recipients with the branch indices.

As shown in Figure 9, the award recipients outperform their competitors and branch indices for all the studied indicators during the post implementation period.

Table V shows the confidence intervals, at a 95 per cent confidence level, for the indicators presented in Figure 9.

Figure 8 — Implementation period

Note: The figure shows the median value of the differences between employees between the award recipients and the competitors, and between the award recipients and the branch indices of the indicators during the implementation period. A positive percentage means that the median award recipient outperforms its competitor or branch index

Figure 9 — Post implementation period

Note: The figure shows the median value of the differences between the award recipients and the competitors and between the award recipients and the branch indices during the post implementation period. A positive percentage means that the median award recipient outperforms its competitor or branch index

Table IV — The table shows the confidence intervals with a 95 per cent confidence level for the indicators and the comparisons with the competitors (comp.) and the branch indices (index) during the implementation period

Indicators Comparison	Sales		Total assets		Number of employees		Return on sales		Return on assets	
	Comp.	Index	Comp.	Index	Comp.	Index	Comp.	Index	Comp.	Index
Upper limit	8.64	10.30	5.50	3.66	2.75	1.8	4.47	7.25	24.85	28.02
Lower limit	1.38	2.53	-1.98	-20.37	-4.29	-6.67	-2.16	0.38	-24.08	1.28

Table V — The table shows the confidence intervals with a 95 per cent confidence level for the indicators and the comparisons with the competitors (comp.) and the branch indices (index) during the post implementation period

Indicators Comparison	Sales		Total assets		Number of employees		Return on sales		Return on assets	
	Comp.	Index	Comp.	Index	Comp.	Index	Comp.	Index	Comp.	Index
Upper limit	7.83	8.45	8.31	7.50	10.34	13.04	8.63	7.52	36.18	61.17
Lower limit	-3.51	1.26	-8.55	-2.43	-6.31	3.33	-0.53	0.04	3.48	6.12

During the post implementation period, and for the comparison between the award recipients and the branch indices, there is a significant difference, in that sense, that the award recipients outperform the branch indices for the indicators of change in sales, number of employees, return on sales and return on assets. However, there is only a significant difference for the indicator of return on assets, when comparing the award recipients with the competitors during the post implementation period. On the other hand, one can argue that the comparison with the branch indices reflects reality better than the comparison with the competitors, since the branch indices include many companies from that specific branch.

Discussion

One of the incentives with this study was to investigate the development of financial performance of quality award recipients compared to their stated competitors and median branch indices. Figures 8 and 9 show an improvement between the implementation period and the post implementation period for all of the studied indicators except for the indicator change in sales. However, the differences between the two periods are not that large. This could be due to the fact that quality award recipients might have been high performing companies even before the implementation of TQM.

This study does not reflect an ideal comparison between companies that have successfully implemented TQM (award recipients) with companies that have not (competitors). When looking at the comparison between the award recipients and their competitors, the quality work of the competitors is a possible bias. This is due to the fact that at least some of the companies are known to have been working with TQM, although they have not applied for any type of award. The same situation is also a possibility for the companies that constitute the branch indices.

The exclusions discussed in the methodological section might also have influenced the result of this study. Yet the exclusions are relatively small and should not have influenced the results to a large extent.

For the branch indices, there was another problem that might have had an influence. For manufacturing companies with fewer than 20 employees and service companies with fewer than 50 employees, for the years before 1996, the branch indices are based on random samples of companies. This results in the fact that the companies included in the

branch indices vary up to 1996 for five of the award recipients[2]. However, according to the authors of this article, the negative effect of this is limited since the branch indices still should reflect the general picture.

Conclusion

During the implementation period the award recipients do not necessarily perform better than their competitors and the branch indices. On the other hand, the award recipients perform better than their competitors and branch indices on all studied indicators during the post implementation period. For example, the award recipients show a significantly higher return of assets than their competitors and the branch indices during the post implementation period of TQM. Also, the indicators, change in sales, number of employees, return on sales and the return on assets, show that the award recipients outperform the branch indices during the post implementation period. The findings indicate that the financial performance, measured by the stated indicators, become more advantageous for companies that have successfully implemented TQM, than their branch indices and stated competitors. ■

Notes

1. Lascelles and Dale (1991) use the term of total quality improvement (TQI) instead of total quality management (TQM). TQI is, according to the authors, an enabling mechanism based on continuous improvement that incorporates the strategic components that drive the entire business organisation. TQI are required to reach the vision of TQM.
2. In year -4 all companies that constitute the branch indices are included, but for the following years, up to year 1996, the branch indices only constitute those that happened to be included in the random sample. The minimum number of "-4 year companies" that constitute the branch indices is five since that is a requirement set by SCB to compute the median values.

References

- Allen, R.S. and Kilman, R.H. (2001), "The role of the reward system for a total quality management based strategy", *Journal of Organizational Change*, Vol. 14 No. 2, pp. 110-31.
- Bergquist, T.M. and Ramsing, K.D. (1999), "Measuring performance after meeting award criteria", *Quality Progress*, Vol. 32 No. 9, pp. 66-72.

- Chuan, T.K. and Soon, L.C. (2000), "A detailed trends analysis of national quality awards world-wide", *Total Quality Management*, Vol. 11 No. 8, pp. 1065-88.
- Dale, B.G. (1994), *Managing Quality*, Prentice-Hall Europe, London.
- Easton, G.S. and Jarrell, S.L. (1998), "The effects of total quality management on corporate performance: an empirical investigation", *Journal of Business*, Vol. 71 No. 2, pp. 253-307.
- EFQM (1999), *The EFQM Excellence Model*, European Foundation for Quality Management, Brussels.
- Eskildson, L. (1994), "Improving the odds of TQM's success", *Quality Progress*, Vol. 27 No. 4, pp. 61-3.
- GAO (1991), "Management practices: US companies improve performance through quality efforts", Report no. GAO/NSIAD-91-190, US General Accounting Office, Washington, DC.
- Ghobadian, A. and Gallea, D. (2001), "TQM implementation: an empirical examination and proposed generic model", *Omega*, Vol. 29 No. 4, pp. 343-59.
- Hackman, J.R. and Wageman, R. (1995), "TQM: empirical, conceptual and practical issues", *Administrative Science Quarterly*, Vol. 4 No. 2, pp. 309-20.
- Handsfield, R., Gosh, S. and Fawcett, S. (1998), "Quality-driven change and its effects on financial performance", *Quality Management Journal*, Vol. 5 No. 3, pp. 13-30.
- Harari, O. (1993), "Ten reasons why TQM doesn't work", *Management Review*, Vol. 82 No. 1, pp. 38-44.
- Hellsten, U. and Klefsjö, B. (2000), "TQM as a management system consisting of values, techniques and tools", *TQM Magazine*, Vol. 12 No. 4, pp. 238-44.
- Hendricks, K.B. and Singhal, V.R. (1997), "Does implementing an effective TQM program actually improve operating performance? Empirical evidence from firms that have won quality awards", *Management Science*, Vol. 43 No. 9, pp. 1258-74.
- Hodgetts, R.M. (1996), *Implementing TQM in Small and Medium-sized Organisations*, AMACOM, New York, NY.
- Huxtable, N. (1995), *Small Business Total Quality*, Chapman & Hall, London.
- Lascelles, D.M. and Dale, B.G. (1991), "Levelling out the future", *Total Quality Management*, Vol. 2 No. 6, pp. 325-30.
- Lawler, E.E.I. III, Mohrman, S.A. and Ledford, G.E.J. (1995), *Creating High Performance Organizations: Survey of Practices and Results of Employee Involvement and TQM in Fortune 1000 Companies*, Jossey-Bass, San Francisco, CA.
- Lemak, D.J. and Reed, R. (1997), "Commitment to total quality management: is there a relationship with firm performance", *Journal of Quality Management*, Vol. 2 No. 1, pp. 67-86.
- McAdam, R. and Bannister, A. (2001), "Business performance measurement and change management within a TQM framework", *International Journal of Operations & Production Management*, Vol. 21 Nos 1/2, pp. 88-107.
- Oakland, J.S. (1989), *Total Quality Management – The Route to Improving Performance*, Butterworth-Heinemann, Oxford.
- Reed, R., Lemak, D.J. and Mero, N.P. (2000), "Total quality management and sustainable competitive advantage", *Journal of Quality Management*, Vol. 5 No. 1, pp. 5-26.
- Samson, D. and Terziovski, M. (1999), "The relationship between total quality management practices and operational performance", *Journal of Operations Management*, Vol. 17 No. 4, pp. 393-409.
- Shetty, Y.K. (1993), "The quest for quality excellence: lessons from the Malcolm Baldrige Quality Award", *S.A.M. Advanced Management Journal*, Vol. 58 No. 2, pp. 34-40.
- Tena, A., Llusar, J. and Puig, V. (2001), "Measuring the relationship between total quality management and sustainable competitive advantage: a resource-based view", *Total Quality Management*, Vol. 12 Nos 7 and 8, pp. 932-8.
- Wrolstad, M.A. and Krueger, T.M. (2001), "Study shows that quality pays winners", *The Quality Management Forum*, Summer, pp. 11 and 14.