Smaller enterprises' experiences with ISO 9000

Alan Brown
Edith Cowan University, Perth, Australia and
Ton van der Wiele
Erasmus University Rotterdam, The Netherlands, and
Kate Loughton
Edith Cowan University, Perth, Australia

Received April 1997
Revised August 1997

Introduction

While quality assurance in the commercial world extends back many years in the UK with the BS 5750 standards, the 1990s has witnessed an enormous growth of interest in the ISO 9000 series (international version of BS 5750) throughout the world. This has been particularly strong in Australia where the number of Australian organisations with ISO 9000 series certification has passed the 4,000 figures according to recent data in the *Quality Certification News*. This is however, still a small percentage compared to the 100,000 organisations worldwide having their quality management system certified according to the ISO 9000 series standards (Symonds, 1995).

Various reasons for the ISO 9000 drive are identified in the literature (Brown and Van der Wiele, 1995; Street and Fernie, 1993; Wenmoth and Dobbin, 1994). They include: customer demands and expectations, competitive pressures, a regulatory environment and internal forces. This worldwide push has probably impacted more on smaller organisations than larger ones. Many smaller enterprises face strong pressure to gain certification due to either customer requirements or to maintain their competitive position in the industry when other companies are also moving in this direction. Customers are increasingly demanding that their suppliers be certified. In fact, many large organisations have required their suppliers to have ISO 9000 series certification for a number of years. In some Australian states, government departments may require companies to be certified in order to be eligible to tender for contracts.

The implementation and certification of a quality management system according to one of the standards of the ISO 9000 series (certification is possible against one of the three standards ISO 9001, ISO 9002, and ISO 9003, depending

The research has been supported by The Netherlands Organization for Scientific Research (NWO) with a research grant, and support was also provided by the SME Research Center at Edith Cowan University.

The authors would like to thank the reviewers for their valuable comments on the earlier version.

International Journal of Quality & Reliability Management, Vol. 15 No. 3, 1998, pp. 273-285,

on the scope of the organisation, for further explanation reference ISO 9000.1:1994) has come under strong criticism from some sections due to its cost and in many cases limited benefits, particularly for smaller enterprises. Research by O'Brien (1995) and Kean *et al.* (1995) report related costs in Australia ranging from ECU41,000 for small firms to ECU86,000 for medium sized enterprises. Pyra and Preston (1996) report costs of ECU59,000 for a small enterprise and ECU70,000 for a medium one. Average times to implement the quality management system is reported at between 12 to 16 months by Raynor and Porter (1991), and by Pyra and Preston (1996).

As a response to some of these criticisms, the Australian Quality Council (AQC) has introduced a low cost partial ISO 9000 training course specifically for SMEs. While it does not lead to full ISO 9000 series certification, it uses group training courses to provide managers with an understanding of some of the central requirements of a quality assurance system, so they are in an informed position if they wish to pursue full certification. It also addresses elements of a broader approach to quality management. An audit of the organisation is available at the end of the course.

Furthermore, in 1996 the Australian Government announced a revised purchasing policy. This provides a graded approach ranging from ISO 9000 not being required for suppliers of "non critical" items and services through to its requirement for critical areas.

Previous research

Raynor and Porter (1991) report on an interview survey of 20 small to medium sized firms in the UK in the engineering or machinery manufacturing industry. Findings indicate that customer pressure (or marketing factors) is the major driving force behind ISO 9000 series certification. Some firms found that internal benefits such as better internal control (based on improved transparency of processes) and waste avoidance resulted from certification. They conclude that most organisations in their sample found benefits from certification while only a few had a minimal commitment at the start, reflecting the view and the attitude of the chief executive.

O'Brien (1995) found some differences between large and medium and small sized enterprises in an Australian survey on ISO 9000. Four barriers were identified as less significant for small organisations, namely: lack of management commitment, lack of communication between departments, insufficient time spent on training and a targeted time frame which was too short. These suggest that smaller organisations, in particular, may have some advantages which may be partly attributable to using external consultants to introduce ISO 9000 and the fact that there are fewer levels of management. Chan and Jeganathan (1996) found in an Australian study that high costs were the greatest inhibitor to ISO 9000 series certification by small business.

McTeer and Dale (1994) surveyed eight enterprises with less than 50 employees in the UK. Their findings also suggest that customer pressure is the main reason for embarking on ISO 9000 and few of the companies developed

plans for moving to TQM once certified. Time and lack of knowledge were the main problems faced by the smaller companies who placed considerable reliance on consultants to assist them. The cost of developing a quality system and gaining certification was seen as justified. Interestingly, some of these smaller companies relied on past experience with suppliers rather than ISO 9000 when doing their own purchasing.

Research by Taylor (1993) in Northern Ireland found organisations somewhat reluctant to measure and quantify the benefits of certification, which he attributed to the fact that many felt to be driven to certification by external forces. Another survey in the UK by Lloyds Register Quality Assurance (1994) reported a highly favorable reaction to ISO 9000 certification with benefits including it being a valuable public relations and marketing tool, increased ability to bid for contracts, fewer customer audits and that it had helped enter international markets. Only a few expressed negative views about costs and paperwork. Again another UK survey by Vanguard Consulting (1994) found that only 15 percent of respondents believed that they had found the benefits claimed by the British Standards Institution. Respondents were also somewhat more critical about the standards and the expertise which was available to advise on implementing a quality system according to the standards. This study also found that companies who reported success with ISO 9000 introduced it for broader reasons than simply being forced to.

Research methodology and questions

A questionnaire was sent to all enterprises in the state of Western Australia which had gained ISO 9000 series certification (approximately 500 enterprises). The questionnaire was developed following a pilot interview survey of 15 organisations. The survey was exploratory in nature and sought to examine a number of aspects relating to ISO 9000. The general findings regarding the questionnaire survey have been described elsewhere (Brown and Van der Wiele, 1995). Now, the specific research questions regarding the SMEs within the full sample is reported.

Of the 160 respondents (representing a response rate of 32 percent), 91 percent could be defined as small or medium enterprises using the Australian Bureau of Statistics (ABS cat. 1321.0) definition. This classifies an enterprise as small if it has 100 or less employees in the manufacturing industry or 20 or less in the service industry. Medium enterprises have less than 500 employees. This group of SMEs have been selected for the analyses which follow and which focus more on the specific issues related to the SMEs and on the issues related to subgroups within the SMEs.

The following questions are examined:

- Why have organisations sought ISO 9000 series certification?
- How did they achieve certification?
- What benefits have they achieved?

- What difficulties have SMEs encountered and how have they been dealing with these difficulties?
- Are there differences (related to the first four research questions) between those enterprises which have found certification beneficial versus those which have not?

The gathered data have been analysed with use of SPSS (SPSS Inc., 1990). Factor analysis (principal components analysis with a varimax rotation) has been used to find patterns in the responses on various items around specific questions in the questionnaire. Discriminant analysis is also used, with the goal to classify cases into mutually exclusive groups, based on their values for a set of predictor variables. Furthermore, t-tests have been used to find differences between the means of defined subsamples.

The survey sample

Details of the size, turnover and type of company are shown in Table I. It might be interesting that while many are small in terms of employee numbers, annual turnover is reasonably large. Table I also defines the subgroups within the SME sample. It is suggested that there is a good reason to expect strong differences between the subgroups based on number of employees. The smallest ones having more informal structures and procedures, and the larger ones growing towards a more formal organisation.

Results and discussion

Reasons for seeking ISO 9000 series certification

The data on the reasons for seeking ISO 9000 series certification suggest that there are several important driving forces for ISO 9000 series certification. Market related factors, customer service, efficiency and as a "kick start" for quality improvement, all feature as strong motivating forces. Factor analysis of

Table I. Demographic characteristics of the sample

Annual sales turnover			Size of organisations			Spread over industries		
Turnover ECU	Frequency *N*	Percentage %	Employee numbers	Frequency *N*	Percentage %		Frequency *N*	Percentage %
< 400,000	2	2	< 50	71	49	Manufacturing	52	36
0.4m-0.8m	2	2	51-100	35	24	Sales and service	43	29
0.8m-3.8m	37	28	101-250	28	19	Information technology	17	12
3.8m-7.5m	28	21	251-500	12	8	Construction/ transport	18	12
7.5m-38m	42	31	Total	146	100	Mining/ engineering	16	11
> 38 million	22	17				Total	146	100
Total	133	100						

these reasons identified two dominant factors, namely, internal reasons related to quality and efficiency improvement and external or marketing reasons. Table II summarises the factor analysis. Overall the external reasons seem to be far more important (mean value 3.64 on a five point scale) compared to the internal reasons (mean value of 3.01). Discriminant analysis, in relation to the four SME subgroups based on their number of employees, shows three significant differences (at a significance level of ≤ 0.05), see Table III. Larger SMEs are more strongly influenced (or they may often be a branch of a larger company) by headquarters to go to ISO 9000 series certification, and are less concerned about formal demands in relation to tendering. The smallest SMEs differentiate significantly on the point that they are not aiming at changing the culture in relation to ISO 9000 series certification.

Factor 1 "internal forces" Cronbach's alpha = 0.88, mean = 3.01	Factor loading*	Factor 2 "external forces" Cronbach's alpha = 0.57, mean = 3.67	Factor loading*
Base for quality improvement	0.77	Be considered for tenders	0.67
Improve customer service	0.77	Increase market share	0.62
Improve efficiency	0.74	Stay in business	0.52
Be role model to suppliers	0.72	Gain marketing benefits	0.48
Change in culture	0.70		
Combine quality systems	0.68		
New direction after restructuring	0.65		
Getting external audit	0.64		
(Advantage in international markets)**	(0.45)		
(gain marketing benefits)**	(0.43)		
(anticipate future customer requirements)**	(0.40)		

Notes:
* Factor loadings ≥ 0.40 are given
** Excluded from factor 1 according to reliability test
Overall statistics: N = 131, KMO = 0.80, Bartlett's significance = 0.00
Eigenvalues: 5.03 and 1.63
% Variance explained: 31.5% and 10.2%

Table II.
Reasons for seeking ISO 9000 certification: factor analysis

SME subgroup by employee numbers: sample for discriminant analysis	< 50 55	50-100 26	100-250 21	250-500 11
Mean values on a five-point scale				
Forced by headquarters	1.84	2.35	1.90	2.91
To be considered for tenders	4.11	3.96	4.29	2.27
To help develop a culture change	12.78	3.35	3.71	3.73

Note:
Out of the 16 reasons for seeking ISO certification, only the significant factors are mentioned (significance level, probability ≤ 0.05)

Table III.
Reasons for seeking certification: discriminant analysis

Some variation between industries is also apparent, as is illustrated in Table IV.

It is also apparent that while many organisations would see the wider notion of quality management being important, ISO 9000 series certification is considered to be a good basis from which to start the process of quality improvement. Discussions with managers indicate that ISO 9000 series certification is seen as a quality concept which is tangible and has meaning. Hoyle (1994, p. 2) makes the point, "ISO 9000 is only a beginning – it provides a mechanism with which to bring about systematic improvement but it doesn't improve performance by itself".

Rank in total sample	1 Increase market share %	2 Improve efficiency %	3 To be considered for tenders %	4 Improve customer service %	5 As a base for quality improvement %
Information technology	81	75	88	56	60
Sales and service	98	90	88	98	93
Manufacturing	88	83	83	83	75
Transport/construction	100	100	100	100	100
Engineering/mining	100	100	100	100	100
Overall	92	87	87	87	83

Table IV.
Top five reasons for seeking certification by industry

Note:
% indicates percentage of respondents in each subgroup having reason in top five

The majority of respondents see ISO 9000 series certification as preceding TQM and as a relevant first step in implementing a TQM program. The majority felt that TQM and ISO could not be implemented simultaneously and very few thought that TQM should be implemented before ISO 9000 series certification.

How ISO 9000 was achieved

In nearly all respondents' organisations, employees have been involved in developing the documentation for the quality management system. This is positive and in accordance with the generally accepted view that unless employees themselves are involved in the development of the system, they will not live according to the procedures as defined in the system. It is surprising that even in the smallest subgroup of SMEs, a relatively high percentage of organisations do make use of external consultants. The costs of bringing in a consultant are quite often mentioned as prohibitive, however, the pressure to get ISO 9000 series certification combined with the lack of knowledge, and the lack of time, are forcing the SMEs to look for external support. Table V gives an overview of the data related to the involvement in the development of the quality management system.

Benefits of ISO 9000 series certification

If smaller organisations are being forced to gain certification then do they actually benefit from this? The top and bottom listed benefits related to the ISO 9000 series certification as mentioned by our respondents are summarised in Table VI with their mean values and standard deviations, the latter indicating the level of general agreement within the response group. The most significant benefits are in terms of raising quality awareness in an organisation. This is an outcome which is also immediately obvious whereas some of the others may only give benefits in the longer term. This reinforces the view that certification is a good foundation upon which to start the quality improvement process. Even though most SMEs go for ISO 9000 series certification for external reasons (being forced to do so), still the major significant improvements reported are related to internal improvements: greater quality awareness, improved awareness of problems within the organisation, and improved product quality.

Respondents reported that certification had not brought any significant improvements in productivity, costs, wastage rates, staff motivation and staff

SME subgroup by employee numbers:	< 50	50-100	100-250	250-500
Subgroup size, 100% =	70	35	28	12
	%	%	%	%
Own staff/employees	100	91	96	92
Staff from headquarters	14	34	32	17
External consultant	56	69	39	58

Note:
% indicates percentage of respondents within each SME subgroup

Table V.
Parties involved in the implementation

Improvement issue	Scoring on a five point scale Rank	Mean	Std dev.
More quality awareness	1	3.97	0.89
Improved awareness of problems	2	3.90	0.91
Improved customer service	3	3.59	1.05
Improved management control	4	3.58	0.90
Improved product and service quality	5	3.58	0.94
Greater discipline and order	6	3.55	1.00
Consistency across organisation	7	3.49	1.20
Improved market share	18	2.84	1.19
Improved staff motivation	19	2.83	1.10
Ability to stay in business	20	2.82	1.27
Reduced costs	21	2.76	1.21
Improved staff retention	22	2.37	1.14
Helped in international markets	23	2.25	1.37
Reduction in customer audits	24	1.92	1.11

Table VI.
Top and bottom listed benefits from ISO 9000 certification

retention. Overall ISO 9000 series certification had not helped the organisation's ability to stay in business. Furthermore, while improved market share was an important reason for seeking ISO 9000 series certification, many organisations indicated that they had realised only marginal or no improvements at all in this area. Neither had they found improvements in the international marketplace. This would appear to be somewhat disappointing, although perhaps not all that surprising since these types of benefits would take some time to materialise.

Views of those experiencing success with ISO and those who are not

The total sample of 146 SMEs has been separated into two groups, based on the scoring on a prescribed list of 24 improvement items. The first column of Table VII covers the list of those items. Respondents were asked to score on a five point scale from 1 (not improved at all) to 5 (strongly improved) for each of the improvement items. For each respondent the sum of the 24 scores has been calculated and the distribution of those scores have been used to split the total sample into the optimists and the pessimists, respectively below the mean and above the mean value of the distribution of sum scores. The optimists perceive more improvements from achieving certification, the pessimists only a few or none.

Discriminant analysis was then carried out on the main reasons for seeking ISO 9000 series certification, aimed at identifying those variables which might distinguish between the enterprises which reported more or less success following certification.

A significant (at a significance level ≤ 0.05) difference between optimists and pessimists was found for all those items which are related to the internal reasons for seeking certification. A stronger drive from internal reasons to seek certification leads in the end to a more positive perception about the improvements realised. This relation might emerge, at least to a certain extent, because of wishful thinking of the respondents who would like to see improvements emerging from their own initiatives.

The results suggest that the external reasons (forced by customer, forced by headquarter, to stay in business, and to be considered for tenders) were the only ones which are not indicative of success. These results were backed by *t*-tests carried out, for the optimists and pessimists as defined earlier, on the reasons for seeking certification. The results of the discriminant analysis and the *t*-tests are summarised in Table VII.

Disappointments with ISO 9000 series certification

Respondents were asked to rate their disappointments with certification. The results are given in Table VIII.

The greatest disappointment for an enterprise is to discover that, having achieved certification, a non-certified company has been awarded a contract by a customer who required suppliers to be certified. Given that this has been a major driving force for many enterprises, it is likely to lead to disillusionment with ISO particularly given the frequent reference to the high cost of

Reason to seek ISO	Pessimists* mean	Optimists* Mean	Wilks' Lambda	F-ratio	Significance	2-tail probability significance
Forced by (industrial) customer	3.00	2.86	0.994	0.527	0.470	0.637
Forced by headquarters	1.93	2.22	0.992	0.756	0.387	0.322
Stay in business	2.44	2.93	0.977	2.218	0.140	0.090
Be considered for tenders	3.92	3.91	0.999	0.053	0.819	0.991
Anticipate customer requirements in the future	2.89	3.89	0.829	19.330	0.000	0.000*
Help improve customer service	3.48	4.29	0.843	17.560	0.000	0.000*
Maintain/increase market share	3.76	4.26	0.945	5.461	0.022	0.024*
Improve company efficiency/wastage	3.67	4.38	0.879	12.930	0.001	0.002*
Provide an advantage in international markets	2.19	3.07	0.919	8.290	0.005	0.003*
Bring together various quality systems	2.11	3.00	0.867	14.440	0.000	0.000*
Gain marketing benefits	3.26	3.88	0.937	6.341	0.014	0.012*
Help develop a culture change	2.67	3.64	0.896	10.910	0.001	0.001*
Given new direction after major restructuring	1.48	2.43	0.876	13.290	0.000	0.000*
Get external audit of processes and systems	1.65	2.66	0.809	22.260	0.000	0.000*
As a base for quality improvement	3.07	3.95	0.845	17.200	0.000	0.000*
Be a good role-model for our own suppliers	2.26	3.02	0.928	7.310	0.008	0.003*

Notes: *"Pessimists score below the mean of the total sum of scores on perceived improvements from achieving certification, "optimists" score above the mean
Box's M = 227.22, significance = 0.003

Table VII.
Optimists versus pessimists: discriminant analysis and t-test on reasons to seek ISO

certification both in terms of money for consultants and audits and extra employees or overtime required in relation to the certification. Many survey respondents made written comments to this effect.

Respondents also expressed a relatively high level of disappointment with the volume of paperwork required and the relatively high costs involved. Much of the paperwork is required in actually preparing material for audits, although there are also reasonably high on-going recording requirements. Problems are

Disappointment	Rank	Mean score on five point scale, higher score indicates stronger disappointment	std dev.
Companies using suppliers without ISO	1	3.95	1.31
Increase in paperwork	2	3.59	1.13
High costs involved	3	3.56	1.25
Number of questionnaires demanded	4	2.96	1.32
Business increase not as expected	5	2.90	1.30
Consistency among assessors	6	2.73	1.26
Standard difficult to interpret	7	2.66	1.24
Number of customer audits not decreased	8	1.86	1.07

Table VIII. Disappointments with ISO

also apparent with the standards (interpretation) and assessors (knowledge of specific industry). The optimists as defined earlier show significantly higher scores on the importance of the experience of the certification institute in their industry as the (only discriminating) reason to choose a specific certification institute for the certification audit. The *t*-test figures show mean scores on a five point scale from 1 (not important at all) to 5 (very important) are for the optimists and the pessimists, respectively 3.55 and 2.74, at a significance level of 0.004 (2-tail probability).

Problems and how they were dealt with

It could be expected that SMEs would face particular difficulties with gaining ISO 9000 series certification, and may not achieve significant advantages. Respondents were asked to submit and rank what they felt were the greatest problems or issues they experienced. The responses on the open question were categorised and are summarised in Table IX, giving the number of respondents who mentioned the problem and giving a severity index, in which the top three problems have a weighting of respectively three points for the top ranked problem, two points for the second mentioned and one point for the third mentioned problem.

Lack of commitment is the most frequently mentioned problem, and is related to commitment of employees, managers and time commitment. Convincing both managers and employees of the future benefits arising from certification and dealing with a general level of indifference was reported as being a major challenge.

Respondents were also asked how they dealt with those problems. The great diversity of problems and solutions offered as an answer to the open question, makes it difficult to categorise. However, Table IX also gives at least an illustration of the solutions SMEs used to overcome the problems, again the

Problems encountered	Frequency N	Score severity index	Solutions to problems	Frequency N	Score severity index
Employee commitment	50	122	Staff training	31	72
Paperwork/documentation	38	84	External help/ consultants	24	58
Interpretation of standards	35	84	Extra hours/staff	15	33
Time commitment	22	57	Regular meetings/ communication	12	22
Management commitment	18	42	Visible management commitment	8	22
Costs involved	16	30	Records/statistics/ documentation	10	21
Training staff	12	26	Encourage employee participation	8	20
Inflexible standards	11	22	Auditing	7	16
Inflexible auditors	11	22	Increase budget	3	8

Table IX. Problems encountered and dealt with

frequencies and the severity index is given based on similar weighting factors for the top three mentioned solutions.

Training employees and managers and seeking the use of consultants are the primary methods for dealing with problems faced by SMEs during the development of the quality management system. The most common problems of employee commitment, and documentation and paperwork were most frequently dealt with by staff training, and external help and consultants respectively.

Training also takes on an increased importance particularly related to better or adequate and on-going training and to ensure records are kept in order. SMEs also reported increased attention being given to training needs analysis and better training of new employees through improved induction processes. Part of the attention given to training needs is associated with the need to identify any deficiencies with employees and deal with them. It is also reported that training has become more focused in a number of SMEs. Some organisations had employed a training coordinator in relation to the certification process.

Some criticism was directed at consultants and assessors by many SMEs. These included: the lack of assessor's knowledge about particular industries, some assessors being overly pedantic about paperwork, "nit picking" auditors, different interpretations of standards between auditors and the degree of variance between accreditation authority standards. Comments were also made about inflexible standards and assessors and the inability of assessors to relate outside their discipline. A further comment was that because certification bodies are commercially oriented, there is scepticism about their ethics related to the number of faults found in audits.

Other criticisms were levelled at the standards themselves. The most significant was that standards were being seen as more appropriate for manufacturing and less for construction, mineral processing, retail, wholesale transport and distribution. Others include: ISO 9000 series standards not being

written in layman's terms, difficulties in understanding exactly what the standard requires and inconsistencies with the interpretation of standards by consultants and assessors.

For many SMEs the entire concept of the ISO 9000 series certification is a completely new concept, so learning to understand the jargon and objectives also presented a challenge. Many expressed disappointment with the lack of suitable courses or literature available on the subject, so had to often rely on consultants. Others attended courses, visited and talked to other SMEs and in some cases appointed an internal person as a full-time consultant.

Conclusions

The major findings of the research can be summarised in the following way:

- The approach taken to ISO 9000 may impact on results. If it is seen as a means of improving internal efficiencies and involves employees in documenting systems and so on, the outcome is more likely to be a workable system. If ISO 9000 series quality system certification is only a reaction to external pressure from customers or governmental bodies, it will be more difficult to perceive improvements coming from the quality system.
- There are potentially substantial internal benefits from adopting a quality assurance system. While it does not have to be an ISO 9000 series system, it must be workable. The most important benefits mentioned by the respondents cover not only improvements in the quality of the products and services, but also improvements in quality awareness and improved management control.
- Involvement of employees in the process of gaining certification enhances the outcomes and commitment. Although in many SMEs an external consultant was involved in developing the quality system, own staff and employees were also participating in the development of the system.
- While ISO 9000 series certification may be important in gaining access to markets, by itself, it will not guarantee success. Industrial customers and governmental bodies are demanding ISO 9000 series certification as a general rule in relation to their vendor list, however, those general rules are not strictly practised.
- ISO 9000 series certification is generally an expensive process for SMEs as they are more reliant on outside assistance. Sharing expert time with other SMEs and/or involving students who are following quality programs are good solutions to those problems.
- Many SMEs experience disappointment with ISO 9000 series certification, with the increase in paperwork, and the costs involved. The biggest disappointment is that industrial customers and government bodies who forced the SME to go for ISO 9000 series certification, still are using non certified suppliers.

ISO 9000 series certification has provided mixed experiences for SMEs. For many, it is a "necessary evil", forced upon them largely by purchasers, particularly large organisations and government departments. Any competitive advantages to a single enterprise may be short lived as it is usually only a matter of time before many companies in the same industry achieve certification. It is then seen by many as just another cost of doing business without any corresponding improvements in market share.

If however, the manager of the business sees certification as an opportunity to improve internal processes and systems from the outset rather than a mechanism to get a certificate on the wall, it is likely to yield positive results. Furthermore, in this situation, employees are more likely to be involved in developing the system with the assistance from external consultants. It becomes a workable system which has the commitment of employees. SMEs which adopt this approach are also more likely to progress to broader quality concepts such as TQM.

References

Brown, A. and Van der Wiele, T. (1995), "Industry experience with ISO 9000", *Asia Pacific Journal of Quality Management,* Vol. 4 No. 2, pp. 8-17.

Chan, A.M.S. and Jeganathan, S. (1996), "The critical factors inhibiting Victorian small businesses from participating fully in ISO 9000 Certification", in *Proceedings of the First International Research Conference on Quality Management,* Melbourne, February, pp. 136-144.

Hoyle, D. (1994), *Quality Systems Handbook,* Butterworth/Heinemann, Oxford.

ISO 9000.1:1994, *Quality Management and Quality Assurance Standards; Part 1: Guidelines for Selection and Use,* International Organisation for Standardisation, Geneva.

Kean, B., Schofield, S. and Oxley, A. (1995), *Linking Industry Globally – Report of the Committee of Inquiry into Australia's Standards and Conformance Infrastructure,* Australian Government Publishing Service, Canberra.

Lloyds Register Quality Assurance Ltd (1994), *BS 5750/ ISO 9000 – Setting Standards for Better Business,* Lloyds Register Quality Assurance Services Ltd, Croyden.

McTeer, M.M. and Dale, B.G. (1994), "Are the ISO 9000 series of quality management system standards of value to small companies?", *European Journal of Purchasing and Supply Management,* Vol. 1 No. 4, pp. 227-35.

O'Brien, T. (1995), "Special report", *Quality Certification News,* 24 February.

Pyra, B.C. and Preston, A.P. (1996), "Quality assurance: is it worth it?", *Proceedings of the First International Research Conference on Quality Management,* Melbourne, February, pp. 145-56.

Raynor, P. and Porter, L.J. (1991), "BS 5750/ISO 9000 – the experience of small and medium-sized firms", *International Journal of Quality and Reliability Management,* Vol. 8 No. 6, pp. 16-28.

SPSS Inc. (1990), *SPSS Reference Guide,* SPSS Inc., Chicago, IL.

Street, P.A. and Fernie, J.M. (1993), "Costs, drawbacks and benefits – the customer's view of BS 5750", *Training for Quality,* Vol. 1 No. 1, pp. 21-3.

Symonds, S. (1995), *The Mobile Survey of ISO 9000 Series Certificates Awarded Worldwide (Fourth Cycle),* 31 August, Mobile Europe, London.

Taylor, A. (1993), "Outcomes of consultancy interventions for ISO initiatives", *Proceedings EOQ '93 Conference,* Helsinki, June, pp. 38-47

Vanguard Consulting Ltd (1994), "BS 5750/ISO 9000/ EN 29000: 1987, a positive contribution to better business", *The TQM Magazine,* Vol. 11 No. 2, p. 60.

Wenmoth, B.A. and Dobbin, D. (1994), "Experience with implementing ISO 9000", *Asia Pacific Journal of Quality Management,* Vol. 3 No. 3, pp. 9-27.