

ISO 9000 SERIES CERTIFICATION OVER TIME:

WHAT HAVE WE LEARNT?

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ISO 9000 series certification over time: What have we learnt?

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Abstract

The ISO 9000 experiences of the same sample of organisations over a five year time period is examined in this paper. The responses to a questionnaire sent out at the end of 1999 to companies which had a reasonably long term experience with the ISO 9000 series quality system are analysed. These companies were ISO 9000 series certified before 1994 when the authors conducted their first survey on the same sample.

The main aim is to explore the links between the motivation for undertaking the ISO 9000 series and continued certification, with the impact on the type of TQM practices that have been adopted after certification, and what kind of gains have been achieved. Challenges faced by these organisations over time are also addressed.

Some of the findings are:

- an internally based motivation for certification of the quality system tends to stimulate more follow-up activities in relation to the broader concepts of TQM;
- internal motivation to continuously provide attention to the quality management system delivers better benefits from certification;
- the main challenges to the ISO initiative was the need for management to embrace the initiative and provide support;
- the involvement of an external consultant in relation to the ongoing TQM practices and follow up activities tends to give better results for the organisation;
- if responsibility for TQM is given to the management team or the manager it seems to end up in more training than is the case when the quality manager gets the responsibility;
- the frustration of often finding that customers did not really care if the business was certified;
- many companies had maintained a minimalist approach to ISO 9000.

Introduction

Much quality management research up to now has been very much focused on introducing quality systems such as the ISO 9000 series and further extension in the direction of TQM. However, there is very little research available (Romano, 2000) examining the longer term sustainability of the quality philosophy after the ISO 9000 series certification has taken place and the longitudinal effects on business performance. The research outlined here addresses this issue in two ways. Firstly, through the development of the constructs that are considered important to focus on, and secondly, by testing the model with a small sample of organisations that have had the ISO 9000 series quality system in place for more than seven years. The main aim was to see if the adoption of ISO 9000 had stimulated further quality

initiatives in the organisation and, secondly, to examine the impact of differing motivations on quality outcomes.

The data used for this paper is based on a questionnaire survey sent out at the end of 1999 to a sample of companies in Western Australia, predominantly small and medium ones. These companies had been ISO 9000 series certified before 1994 (when we conducted an earlier survey, Brown, van der Wiele and Loughton, 1998) and now have a relatively long experience with the ISO 9000 series of standards.

The ISO 9000 Series and Links to TQM

The ISO 9000 series quality systems and its related certification have been in place now for quite a long time. Developed from the military standards (AQAP) and the British Standards (BS 5750) the first international standards agreed through the International Organisation for Standardisation were published in 1987 and two upgrades have followed since (1987 and most recently in 2000). The initial motivation behind the ISO 9000 series was as an instrument in international trade and business to business transactions to build confidence between suppliers and manufacturers. However, by now they have become a general management practice for all organisations. In broad terms, the standards can be seen as a minimum way of having a system to control your processes in order to deliver the customer what you promise.

The ISO 9000 (2000) series cover one standard for which external certification is possible (ISO 9001), covering now the three old separate standards ISO 9001, 9002 and 9003 (1994), related to the breadth of the quality system. ISO 9004 provides the background and philosophy behind quality systems and can be a good starting point to develop an organisation's quality system. A specific version of the ISO 9004 guidelines have been developed for services. ISO 9004 places the quality system in the perspective of Total Quality Management (TQM) and this has been the major change in the 2000 series.

Apart from the many case examples of companies that have adopted the ISO 9000 series certification, there have also been a variety of research projects focussing on the outcomes of ISO 9000. (Lloyds Registrar Quality Assurance, 1994; Vanguard Consultancy, 1994; Taylor, 1995; Sissell, 1996; Buttle, 1997; Jones et al, 1997; Leung et al, 1999; Dick, 2000). This research in general gives rise to an ongoing discussion about the usefulness of the ISO 9000 series quality system and its certification. Two major issues arise from this debate:

- The standard has to be seen in the context of the underlying philosophy. Thus, the ISO 9001 standard should not be seen in isolation to the quality philosophy behind the twenty norms defined in ISO 9001, and as described for example in the guidelines in the ISO 9004 range.
- The effects of the quality system according to the ISO 9000 series does not depend on the formulation of the norms, but is dependent on the way the company has implemented the norms into its day to day operation and management.

Other research has focused on the link between ISO 9000 series quality systems and broader concepts such as Total Quality Management (TQM). Describing TQM is much more difficult than outlining the prescriptive ISO standards since TQM is more or less a philosophy which includes a package of concepts. Examination of the papers and books on TQM highlight a few principles (continuous improvement, customer orientation, involvement of employees, involvement of suppliers, data driven, process orientation) which form the core concepts, and

a large variety of instruments and organisational arrangements (such as quality improvement teams, quality management self-assessment, quality function deployment, quality policy deployment, and many others) to develop activities in the direction of TQM and to give the core concepts meaning in the practical situation. Furthermore several techniques (like the seven statistical tools, the seven new management tools, failure mode and effects analysis, design of experiments) have been developed for use in these activities.

The debate on the relationship between ISO 9000 series quality systems and the broader quality management systems and approaches related to TQM has two camps. In one, (Binney, 1992; Corrigan, 1994; Seddon, 1997) we have those who consider that ISO 9000 series quality systems are causing standardisation and bureaucratisation, through which the organisation becomes internally focused and paralysed with the standards, without being able to adapt continuously in a rapidly changing environment. In the opposing camp (Bradley, 1994; Sheard, 1992; Safosky, 1994; Skrabec, 1999) we find those who believe that it is first necessary to clean up the organisation before work starts on continuous improvement, and the ISO 9000 series is a good tool to do this by describing processes, clarifying goals and making the organisation more transparent.

Brown and Van der Wiele (1996) developed a typology of different ways companies take the road to quality. Organisations decide to become certified for a variety of reasons which will generally determine their response to adopting TQM. Based on these options, the following five types of companies have been developed, the typology being tested based on a questionnaire survey project amongst an Australian sample in 1994:

- *Minimalists (Forced to ISO 9000 series certification, no TQM)*

These organisations are unlikely to have had TQM in place prior to ISO 9000 and are unlikely to move to a TQM approach as a consequence of gaining certification.

Features of organisations in this group include:

- considered that they are forced to become certified, either by Government policies or customers.
- find few benefits from certification and consider it to be a costly exercise.
- often use outside consultants to assist in certification
- usually smaller organisations
- there hasn't been much involvement of employees at all levels during the development of procedures and manuals

- *Converts (Forced ISO, and TQM)*

These are initially sceptical about certification, and usually forced to become certified, but in the process of doing so discover beneficial outcomes, mainly of an internal nature such as forcing people to think quality or improve systems. Many find that the process of involving employees in the ISO process prepares the way for further progress down the quality maturity path. They, like the cynics, are unlikely to have had TQM prior to moving down the ISO 9000 path.

Characteristics of this approach to ISO and TQM are:

- the goal of the organisation is to develop a useful quality system
- employees are involved in developing the procedures and work instructions
- attention is placed on making employees aware of the importance of the system and how to use the system
- from the outset and during the development of the system there is a positive perception of the benefits for the organisation of a quality system.

- *Committed/Wider view of quality (Voluntary ISO and TQM)*

These organisations embark on ISO 9000 because they see it as a means of improving business operations and efficiency rather than being purely market driven. Others see QA as an essential first step in moving into TQM. Features may include:

- have some aspects of a quality system in place prior to seeking certification
- see ISO certification as a small part of the total quality drive
- don't see ISO 9000 as a major contributor to business success. It is not a recipe for customer satisfaction or expanding market shares.

- *Simultaneous ISO and TQM*

The committed group as described above may also fall into this category if they embark on both QA and TQM simultaneously. Another alternative might be to embark on both ISO and TQM at the same time but for different reasons. Organisations in this group may have only recently discovered the potential benefits of both ISO and TQM and have made a decision that both are required to advance the quality drive. They consider that one without the other will not maximise benefits and that pursuing ISO provides a more tangible, measurable and external measure of quality systems while TQM provides support for a more general approach to quality by developing an organisation culture.

Features may include:

- a broader view on TQM and the development of activities (e.g. plans, teamwork, training) for the broader quality approach
- focus on developing a TQM culture in the organisation.

- *TQM First*

Organisations falling into this category typically have commenced TQM some time ago, for example, at least five years ago, before ISO had become such a significant issue. In the past few years they have been put under pressure to gain ISO certification either because their customers are demanding it, they are seeking to enter markets where it is required (eg EC, government contracts) or they are expecting their suppliers to be certified.

Features may include:

- public sector organisations
- larger private organisations
- may be considering applying for a quality award
- only parts of the organisation may be certified
- may operate in overseas markets
- have generally had TQM in place for three or more years

The relevant issue here is where does the sample of organisations fit and how have they progressed and how do these different motivations for pursuing quality impact on the quality outcomes.

Methodology

The sample used for the research in this paper can be linked to the typology outlined above because the starting point was the total sample of respondents from a questionnaire sent out in 1994. The respondents to this survey were checked if the company still existed at the end of 1999 and if so, were sent the latest questionnaire. The sample size and response rates are summarised in Table 1. The sample size for the second survey was much smaller due to, firstly, the fact that only the respondents to the initial survey were of interest in order to be

able to make comparisons over time, and secondly, company closures, mergers and takeovers between the two surveys meant that not all 160 earlier respondents were available.

Table 1: Sample size and response rates

- Sample size for the 1994 questionnaire survey on the relationship between ISO 9000 series certification and Total Quality Management:	500
- Response to the 1994 survey (response rate 32%)	160
- Sample size for 1999 questionnaire on the longitudinal effects of ISO 9000 series and TQM	94
- Response to the 1999 survey (response rate 32%)	30

Table 2 provides a comparison of the response groups of 1994 and 1999 using the ISO-TQM typology as outlined above and shows that a higher proportion of the later sample were classified as minimalists. Also, fewer of the current group were engaged in broader quality concepts such as TQM.

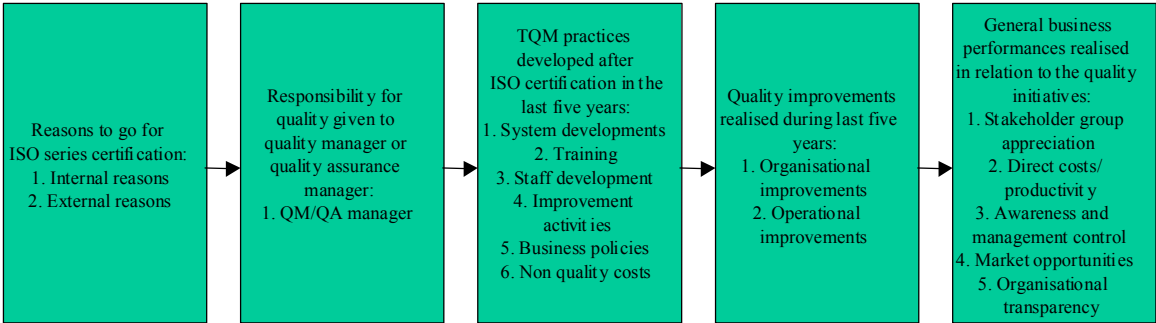
Table 2: Response groups defined by the ISO-TQM typology

	Responses 1994		Responses 1999	
	N	%	N	%
Type 1: minimalists	79	49%	18	72%
Type 2: converts	14	9%	2	8%
Type 3: committed	13	8%	3	12%
Type 4: simultaneous ISO and TQM	21	13%	-	-
Type 5: TQM first, then ISO	22	14%	2	8%
Total	149	100%	25	100%
Missing	11		5	
Overall total	160		30	

The research model and the empirical evidence for the constructs

The framework we used to guide our analysis is shown in figure 1. The underlying premise is that results (either specific quality gains or general business performance improvements) can only be achieved if things are done different than before, therefore TQM practices are identified as intermediate “boxes” between the drivers for ISO 9000 series certification and the gains.

Figure 1: A model of the ISO certification and performance link



So, our main goal is to identify the links between the reasons and motivations to go for ISO 9000 series and to continue registration, with the effects on the type of TQM practices that have been adopted after certification, and what kind of gains have been achieved. We used size of the company as a control variable to identify specific influences on the reasons for adopting ISO. The effects of giving specific responsibility for the quality initiatives to the quality manager (as opposed to the manager or a management team or a manager not being the quality manager) are part of the model (figure 1) as an intermediate box. Our earlier research had shown that size and the existence of a quality manager impacted on quality outcomes.

For the TQM practices we used size of the company and the respondent's perception of the importance given to quality by the stakeholder groups (customers, suppliers, employees, shareholders) as control variables. Also the TQM practices might be directly influenced by the fact that the responsibility has been given to the quality manager instead of another manager. For the general business gains we use indications about the trend in sales, market share and profit to check the perceptions on the general business gains.

Analysis and Discussion

The constructs as indicated in the research model (figure 1) have been drawn from the 1999-questionnaire. Factor analysis was used to reduce the number of variables and to build the constructs. Table 3 gives an overview of the constructs and the underlying questions, together with the relevant statistics.

Based on the variables defined in table 3 the correlations between the constructs in the research model were calculated. It needs to be acknowledged that we are using only a very small sample, therefore, it is necessary to focus on the significant outcomes. What is not significant might be a consequence of the small sample size, however, what is significant in this small sample will be an important issue.

The conclusions from the correlation analyses can be summarised as follows:

- internal gains from ISO 9000 series certification are more strongly correlated with internal reasons to commence and continue certification, than external reasons;
- external gains from certification correlate with external reasons for continuing certification;
- if the quality manager is given responsibility for follow-up TQM activities there will be fewer training activities developed in the company than when other managers get the responsibility; or when managers other than quality managers get the responsibility then they more frequently rely on training as a way to move to TQM;
- strong internal reasons and motivation to continue certification is significantly positively correlated with nearly all TQM follow-up activities;
- being driven by customers to go for certification is negatively correlated with follow up training activities;
- some of the TQM follow-up activities are significantly positively correlated with quality benefits;

Table 3: Constructs and statistics from the 1999 questionnaire on longitudinal effects of ISO 9000 series (all five point scales except Q21)

	N items	mean	std deviation
Reasons to continue ISO 9000 series registration (Q07):			
- Pressure from customers (V07_cus)	1	3.22	1.45
- Pressure from headquarters (V07_hq)	1	3.16	1.57
Factor analyses on the following group of questions gave two components (KMO = .686)			
- internal oriented reasons (cronbach alpha= .88) (F07_int) to maintain internal discipline; to improve company efficiency; to bring together various systems in the company; to help develop a culture change; as a base for business improvement	5	3.80	.83
- external oriented reasons (cronbach alpha= .87) (F07_ext) forced by customers; to stay in business; to be considered for tenders; to anticipate customer requirements in the future; to help improve customer service; to maintain/increase market share; to gain marketing benefits	7	3.55	.92
Worthwhile achievements of ISO 9000 series certification (Q08):			
Factor analyses on the following group of questions gave two components (KMO= .692)			
- internal gains (cronbach alpha= .77) (F08_int) it served as a basis for further management initiatives; it helped to define quality; it provided a workable system; it has brought greater discipline to our activities; employees have become more conscious of the importance of quality	5	3.78	.66
- external gains (cronbach alpha= .91) (F08_ext) it gave marketing advantages; it helped in gaining new contracts	2	3.42	1.23
Activities/tools/instruments that have been part of the follow-up activities during the past five years (Q12):			
The factor analysis on a long list of issues did not produce a positive defined matrix. Still the outcomes of the factor analysis could be used as indication for grouping. Also the correlation matrix gave indications for groupings. The following components have been created:			
- activities related to systems (cronbach alpha= .71) (F12_sys) changing the reward system; changing the recognition system; applying one of the excellence models; applying self-assessment against an award model; applying activity based costing; applying customer satisfaction surveys; applying flowcharting/process mapping; applying ISO 14000 or other related initiatives	8	2.31	.64
- activities related to training (cronbach alpha=.92) (F12_tra) training in the seven statistical tools; training in the new management tools; training in statistics and/or reliability; training in the general quality management philosophy; training in leadership style; training at management level in quality issues; training at supervisory level in quality issues; training at operational level in quality issues	8	2.56	.84
- activities related to staff development (cronbach alpha= .73) (F12_sta) teamwork; changing the way new staff are selected; changing the way training and development is planned; changing job descriptions; applying employee satisfaction surveys	5	3.21	.67
- improvement activities (cronbach alpha= .78) (F12_imp) implementing a structured problemsolving approach; developing design improvements; developing process improvements; developing product improvements; developing service improvements	5	3.20	.74
- activities related to business policies (cronbach alpha= .76) (F12_pol) aligning policies (eg. hrm, financial, maintenance); presentations given by (top)management on quality issues; changing the importance of the quality function; changing the co-operation with suppliers; changing the role towards society; changing the structure of the quality manual; reducing the number of suppliers	7	2.72	.69
- measuring the costs of non-quality (V12_coq)	1	2.59	1.09
Improvements realised as a result of the quality initiatives during the past five years (Q15):			
Factor analyses on the following group of questions gave two components (KMO= .480 is too low; however, the factoranalysis gave a good indication for grouping):			
- organisational improvements (cronbach alpha= .91) (F15_org) employee satisfaction; employee attendance; employee turnover; suggestions received from employees; costs of non quality; cost savings; overall customer satisfaction; market share; sales per employee; return on assets; return on sales	11	2.96	.64
- operational improvements (cronbach alpha= .89) (F15_ope) safety/health of employees; reliability of operations; on-time delivery; order-processing time; error or defects; product lead time; inventory turnover; customer complaints; customer retention	9	3.52	.55
General business benefits realised during the past five years (Q16):			
The factor analysis did not produce a positive defined matrix. Still, the factor analyses gave good indications for grouping, together with the correlation matrix, the following components have been created:			
- stakeholder group appreciation (cronbach alpha = .87) (F16_app) improved customer service; improved public relations/advertising/marketing; increased customer satisfaction; improved staff retention; improved staff motivation; reduced in customer audits; maintained quality system based on external appraisal	7	3.11	.63
- direct costs/productivity (cronbach alpha = .87) (F16_pro) improved efficiency; improved productivity; reduced waste; reduced costs; eliminate problems; improved product/service quality	6	3.32	.58
- managerial benefits (cronbach alpha = .85) (F16_man) improved management control; improved planning; improved organisational structure; improved awareness of problems; more quality awareness	5	3.34	.64
- market opportunities (cronbach alpha = .80) (F16_mar) ability to stay in business; not excluded from tenders; expanded/improved market share; helped in international markets	4	2.78	.81
- transparency/organisational consistency (cronbach alpha = .79) (F16_tra) consistency across the organisation/sites; greater discipline/order; more systematic work flow	3	3.51	.64
Reaction of stakeholder groups to the fact that you have an ISO 9000 series quality certified system an follow up quality activities (Q17):			
Factor analysis gave only one factor:			
- all stakeholder groups (cronbach alpha = .85) (F17_rea) consumers, industrial customers, suppliers, employees, and shareholders	5	3.48	.49
Respondents perception about the importance given to quality during the past five years (Q18):			
Factor analysis gave only one factor:			
- all stakeholder groups (cronbach alpha = .86) (F18_imp) customers, suppliers, employees and shareholders	4	3.44	.68
Responsibility given to manager, management team, or quality manager (Q21=two point scale):			
- the extent to which responsibility is given to the quality manager (no=1; yes=2) (V21_qmr)	-	1.64	.49

Overall, we can conclude from our sample that those organisations who are internally motivated and driven to seek certification are also internally driven to maintain certification. The extent to which TQM activities have been developed as a follow up after certification, tends to be associated with a strong internal motivation for certification and is also shown to have a positive effect on a number of business performance indicators as a direct result of the quality initiatives.

Mean scores on internal reasons to continue ISO 9000 were higher than external factors along with internal achievements from it. For instance it was seen as something which improved company efficiency, served as a basis for business improvement and brought about various operating systems in the company.

In terms of activities over the past few years, organisations had tended to focus on improvement activities along with those relating to staff development.

Improvements which respondents identified as stemming from the quality activities over recent years could be seen in terms of two factors, namely organisational and operational improvements. The greatest benefits had been achieved with direct operating costs, organisational consistency and managerial control.

Having an external consultant involved in developing TQM activities after the ISO 9000 certification reinforces the internal reasons to continue certification and the internal gains from certification and is associated with giving greater involvement of stakeholder groups. There is also a significantly higher level of performance on business results where consultants are involved.

Longitudinal Impact

In order to test the sequential relationship between the boxes as defined in the research model (figure 1) a hierarchical regression analysis was used (Guest et al., 2001). Because the sample size is small, the number of variables is reduced and the regression model simplified. Instead of using the six factors identified for the TQM practices through the use of a standard factor analysis, a two-factor solution was applied to the original data on TQM practices. This gave one factor covering items which were all related to training activities, presentations by (top) management etc. and another factor covering the various items related to improvement activities, e.g. improvement in design, process, product, job descriptions, policies etc. For the hierarchical regression we used these two regression factors directly saved from the factor analysis (with suppression of items loading less than .05 on the two factors). The results are summarised in table 4.

The results from table 4 support the earlier conclusions regarding the positive association between internal reasons to go for ISO series certification and quality performances; also the negative association between the quality manager and the level of training is found again. Surprisingly, a strongly significant negative association is found between the level of quality improvement activities and the operational quality performances. The higher level of defects and problems that become visible when attention is given to improvement issues in the first instance might explain this. Further research is needed to clarify this effect. There is some support for the sequential steps in the model of figure 1. However, the appointment of a

quality management or quality assurance manager does not seem to be influenced by the reasons that companies go for ISO series certification.

Table 4: Results of the hierarchical regression on the figure 1 model

	QM	TQM practices		Quality Performances		General Business Performances					
		3	4	5	6	7	F16_stak	F16_prod	F16_mngt	F16_mark	F16_tran
(constant)											
1 F07_INT	-0.20	0.40	0.67	0.18	1.12	0.21	-0.16	-0.47	0.18	-0.22	
sig.			0.02		0.01						
2 F07_EXT	0.14	-0.20	-0.12	0.21	-0.16	0.03	0.16	0.18	0.49	0.44	
sig.									0.08		
3 V21		-0.46	0.25	-0.21	0.28	-0.18	-0.20	-0.36	0.15	-0.13	
sig.		0.05									
4 Training act				-0.08	0.05	-0.53	-0.05	-0.20	0.46	0.26	
sig.											
5 Improvement act				0.17	-1.06	0.15	0.11	0.53	-0.38	-0.04	
sig.					0.00						
6 F15_ORG						0.17	0.65	0.25	0.51	0.30	
sig.							0.07		0.09		
7 F15_OPER						0.44	0.22	0.85	-0.19	0.35	
sig.								0.04			
adj R-square	-0.06	0.32	0.23	-0.14	0.46	0.07	0.36	0.45	0.51	0.33	
F	0.39	3.62	2.67	0.60	3.72	1.14	2.21	2.72	3.25	2.06	
sig.		0.04	0.09		0.03			0.09	0.06		

Overall, this sample of organisations had not embraced wider quality initiatives such as TQM after having initially sought and gained ISO 9000 certification. In fact a higher portion of the respondents in the latter survey could be classified as minimalists in their approach to quality. This would tend to suggest that organisations have tended not to embrace wider quality initiatives following ISO 9000 certification. Some possible reasons for this were gained from an examination of open-ended questions.

Open-ended questions in the survey sought company experiences with the ISO 9000 drive. A mixed range of responses were received, although there was some common agreement on several issues. Many companies felt some disappointment in that their quality efforts were in vain primarily due to their perception and experience that customers were not all that interested in whether they were ISO certified or not. It may be that companies involved in supplying to the private consumer market had different views than for those who had no option but to become certified in order to supply either governments or large organisations. Earlier research had indicated that the latter groups often paid lip service to quality and still purchased on the basis of price.

A question asking respondents to identify the major challenges to their quality (ISO) initiatives tended to identify management as a key factor. Specifically, the need for management to lead by example and to have management support and embrace the quality initiatives were listed as issues. Other challenges which companies had faced included;

integrating ISO with other systems, gaining employee commitment, making it relevant to everyday work and the time devoted to it.

Dealing with these challenges was primarily done through training and awareness sessions and workshops and communication on relevant issues. Some companies used a core quality group to manage the process.

A question asking about quality challenges in the next five years identified the following themes; maintaining the motivation for QA amongst the entire workforce, the cost of ISO compliance vs productivity, keeping the QA system up to date with new business arrangements and integrating it with other systems.

Given that a large portion of the sample were small to medium sized enterprises (SMEs) the cost versus productivity issue surrounding ISO compliance particularly if a minimalist approach was adopted is not all that surprising.

Conclusion

Using a previously identified sample of companies (from a 1994 survey) and knowing their position on a typology of approaches to the ISO 9000 series and TQM, follow-up research examined the longitudinal impact of ISO 9000. Besides a number of interesting specific conclusions from the statistical analysis, the general picture is that these companies had not advanced far in terms of using ISO as a launching pad for more extensive quality activities. The apparent emphasis still remains strongly on keeping the certificate on the wall, paying some more attention to customers and customer satisfaction (stimulated by the new 2000-version of the ISO series), without a much better understanding of the overall quality management philosophy in these companies. There is evidence in the literature (Taylor, 1995; Wiele van der, 1998) that even with a focus on the ISO 9000 series it is possible to improve business performance, however, it is also evident that companies have to move beyond the certification level to reach those improvements. A minimalist position tends to suggest that few companies in this survey found major benefits from the ISO 9000 experience. Caution needs to be exercised due to the small sample.

This survey also found that continuous support and stimulation from management is a key ingredient for successful quality ventures and this may be problematic since the direct benefits from the exercise may be difficult to identify. Furthermore, motivating managers and employees to adopt something which, on the surface, would appear to mean more work and more bureaucracy, is a challenge. The survey also identified other challenges which organisations had faced in developing ISO 9000 which had been dealt with in a variety of ways.

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