

ISO 9000 certification and the bottom line: a comparative study of the profitability of Basque region companies

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Abstract

Registrations to the ISO 9000 standard have grown rapidly in recent years with 343,643 certificates in 150 countries at the start of 2000, a growth of 71,769 on the previous year, of which 23,900 were in Europe. This suggests that there is a widespread belief in the business benefits of ISO 9000 accreditation. However, failure to realise business performance improvement in practice could have a negative effect on the future credibility of quality certification and lead to ISO 9000 eventually becoming just another failed management panacea. Although there is much research describing implementation of ISO 9000 quality systems, there is little empirical research that examines whether ISO 9000 is linked to improvement in audited financial performance. This paper contributes to closing this gap in the literature by comparing the audited financial performance of 400 accredited and 400 non-accredited Basque firms over a period of five years.

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Introduction

Throughout Europe and the rest of the world, the quality paradigm, or movement, has become a considerable force. Although methods to improve and manage quality are numerous, the literature suggests that it is predominantly based on the two pillars of ISO 9000 Quality Management Systems and Total Quality Management (TQM). Although interest in TQM appears to be static, or even fading, registrations to the ISO 9000 standard have grown rapidly in recent years with 343,643 certificates in 150 countries at the start of 2000, a growth of 71,769 on the previous year, of which 23,900 were in Europe (ISO, 2000). This suggests that there is a widespread belief in the business benefits of ISO 9000 accreditation. However, failure to realise these benefits in practice could have a negative effect on the future credibility of quality certification and lead to ISO 9000 registration becoming just another failed management panacea; doomed to being eventually repudiated, or eclipsed by a new panacea.

Although there is a plethora of research articles describing implementation of ISO 9000 quality systems and examining success stories, there is little empirical research that examines whether ISO 9000 has led to improvement in audited financial performance. As Juran (1999), a critic of some aspects related to the standard, notes, "there is a lack of research that can shed light on the benefit we are getting from all that costly certification to the ISO 9000 series of standards". In this article, we aim to contribute to closing this gap in the literature, by comparing the audited financial performance of 400 accredited and 400 non-accredited Basque firms over a period of five years. Our analysis of these

firms indicates that certification to ISO 9000 is associated with better financial performance since certified firms had superior performance in four out of the five years analysed.

Literature review

Quality and business performance

Our examination of the literature found that the vast majority of the articles that do address the business value of certification are, unfortunately, either anecdotal, case study based, or report only descriptive statistics. Case studies are an ideal way of illustrating success stories and the realities of implementation. However, they do not provide proof that quality certification is likely to lead to improved performance, only that it is possible. Descriptive statistics also have their problems, since they cannot demonstrate causal links, and so provide weak evidence at best of the links between quality certification and business performance improvement. Due to these concerns, we focus on empirical research using statistical data analysis.

Empirical research such as the PIMS studies (Schoeffer *et al.*, 1974; Buzzel and Wiersema, 1981; Craig and Douglas, 1982; Phillips *et al.*, 1983) and more recent findings (Maani *et al.*, 1994; Jacobson and Aaker, 1987; Flynn *et al.*, 1995, 1997; Forker *et al.*, 1996; Adam *et al.*, 1997) all support the proposition claimed by the quality gurus (Crosby, 1979; Juran, 1982; Deming, 1986) that better quality has a positive relationship with business performance. This is also true for the service sector. Capon *et al.* (1990) identify 20 service studies that find a positive relationship between quality and business performance. Rust *et al.* (1994), who review the marketing literature on service quality and performance, come to the conclusion that a link exists between quality and financial returns. Caruana and Pitt's (1997) study of 131 UK service firms suggests that better quality

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does have a positive effect on the overall performance of the firm, relative to its competitors. However, we note that although there is agreement in these studies on the link between quality and performance, there is little commonality in how performance is measured or how quality is defined.

Derived from our study of the above literature we discern two factors that relate to business performance: first, those that improve the product or service quality differential against competitors and, second, those factors that reduce the cost of quality. An effective quality assurance system will have product and service quality conformance as its primary goal. The research reviewed found that better conformance quality was associated with sales growth and better sales margins. It was also found that good quality control was related to competitive advantage. An effective quality assurance system will have process control as an essential activity. Better process control will, the research suggests, be consistently associated with less rework and hence lower costs. These lower costs will lead to better comparative business performance (for a more detailed analysis see Dick, 2000). This is in line with Deming (1986), who reasons that as quality improves, waste is eliminated, costs are reduced, and financial performance improves.

Inferred in the pursuit of quality certification is the assumption that it is associated with good quality systems, leading to better quality, improved business performance and hence better profitability. The expected links are shown in Table I. The model shows the approved quality assurance system bringing an increased emphasis on quality, which leads to less waste or duplication of effort, and improved quality. These improvements lower costs while the improved quality means fewer customer defections leading to increased sales volume. In turn these benefits lower the cost of sales,

and improve sales volume while lowering the average cost of acquiring new business.

Indeed, even if all the quality benefits do not materialise we would expect the possession of the "Quality Badge" to lead to increased sales opportunities and hence improved profitability from increased volume. Hence, we should expect that firms that are accredited to ISO 9000 would enjoy superior levels of profitability.

However, the research we now examine on the links between quality certification and improved performance, reveals that the performance gains expected are not consistently achieved.

ISO 9000 certification and business performance

Although there are many studies reporting expectations of increased market share and improved product quality from ISO 9000 implementation (for example, Ebrahimpour *et al.*, 1997), there are far fewer empirical studies on the business performance benefits actually achieved. The UK research of Mann and Kehoe (1994) noted that quality certification was associated with improved business performance at the operational level, while Buttle's (1996) survey of 1,220 certified UK companies found that improving operations as well as marketing gains were claimed by most of the firms following quality certification. Similar findings were found by Casadesús *et al.*'s (2000) study of 500 Spanish firms. Further afield in Singapore, Quazi and Padibjo (1998) found in addition to marketing gains, improvements in product quality. However, the large-scale descriptive studies of Lloyd's Register of Quality Assurance Ltd (1993), the Institute of Quality Assurance (1993), and Breka (1994), report that the greatest gain from quality certification is widening market opportunities rather than improvements in quality itself.

Table I

The expected links between quality certification and business performance

ISO certification	Quality management system	Quality improvement	Business performance	Profitability
Certificated to ISO 9000 standard	The approved quality assurance system brings an increased emphasis on quality and how it may be achieved consistently	Internal. Less waste and duplication of effort External. Quality received by customers improves	Reduced costs improve competitiveness Fewer customer defections so sales increase Badge of quality opens more sales opportunities	Cost of sales reduced leading to increased profits Profitability benefits from scale economies, and lower sales acquisition costs

In contrast to the studies reporting business benefits, Batchelor's (1992) study of over 600 registered UK firms, found that only 15 percent of firms achieved gains from quality certification. These benefits were largely internal, such as reduction in error rates and procedural efficiency, rather than external dimensions such as market share. This is supported by a recent rigorous empirical study (Terziovski *et al.*, 1997) of 1,000 firms in Australia and New Zealand, which found that quality certification had no significant, positive relationship with business performance. They noted that the principal motivation for pursuing quality certification was the ability of the certificate to open customers' doors that were previously closed, or would close, if quality certification were not achieved. Seddon's (1997) case study research in the UK goes further to suggest that if ISO 9000 has any effect on performance, then it is negative.

It appears that few studies report the full range of benefits suggested by the model presented in Table I. Could this be due to organisations reacting to external pressure to be certified? Some studies (for instance, Gore, 1994) have suggested that when firms are reacting to external pressure for certification they may see ISO 9000 registration as the prime objective and adopt a minimalist approach to achieve it. These firms may possess quality certification but they do not value the quality assurance system that quality certification requires so will achieve limited benefits. Support for this proposition is found in the Science and Engineering Policy Studies Unit's (1994) study, which reviewed 28 surveys relating to ISO 9000. It concluded that there appears to be a relationship between managers' motives for adopting certification and gains achieved in business performance. Companies that cited customer pressure as their reason for pursuing certification were less likely to report improvements than those who gave other reasons for adopting quality certification.

These studies infer that the motive for seeking certification is an important predictor of performance. Insights into this motivation variable are provided by a recent empirical study of 272 Australian firms by Jones *et al.* (1997). It found evidence that firms that sought quality certification because of externally imposed perceptions of the necessity to "obtain a certificate" were found to experience fewer beneficial outcomes of certification than firms who had a "developmental" view of quality improvement. These developmental firms' motives included a desire to use quality

certification to improve the company's internal processes, and/or help lower quality costs and increase customer focus.

In contrast to Jones *et al.*'s (1997) findings indicating that a developmental or strategic orientation is a moderating variable, Terziovski *et al.* (1997) found that their variable "TQM environment" (indicative of a developmental view of quality) had no significant influence on the relationship between quality certification and business performance.

ISO 9000 certification and profitability

The vast majority of studies rely on self-reporting by respondents of the benefits or otherwise of quality certification. We next review the few empirical studies that avoid the potential bias of self-reporting through the use of objective indicators of profitability obtained from annual audited reports.

Lloyds Register of Quality Assurance Ltd's (1996) survey found that profit margins and return on capital employed of certified companies averaged more than double the industry average. Financial benefits were also found in a Danish study where the ISO certified companies had a significantly higher rate of return than before they were certified (Häversjö, 2000).

A summary of the research on ISO 9000 certification and business performance is presented in Table II. The summary reveals that only a minority of surveys find that costs or waste are reduced, suggesting that for most firms quality does not improve as a result of quality certification. It is surprising that the only consistent benefit found is an increase in sales or market share. This benefit could be due to the marketing benefits of the "badge of quality" rather than fewer customer defections due to improved quality. The lack of surveys finding improved quality (lower warranty costs) supports this view. In contrast, the few studies that have used audited financial measures do find that firms with quality certification do exhibit superior financial performance. Overall, no consistent evidence is found to support the broad range of benefits suggested in Table I that showed quality certification leading to lower costs through reduced wastage and quality improvement or increased market share through perceived higher quality and improved market opportunities.

Our research aims to add to the sparse literature on the links between quality certification and better financial results.

Methodology

The research analysed in this paper studies the comparative financial performance of ISO 9000 certified firms compared to those without certification. The research was undertaken in the Basque Autonomous Community, which is considered to be one of the regions in Spain where ISO 9000 certification has had the greatest impact. The data for this study was gathered from the Ardán database, an Entrepreneurial Information Service of the Consortium of the Exempt Zone of Vigo. The Ardán database is one of the most complete at domestic level in Spain, for both economic and financial information, since it includes data for more than 100,000 companies, and more than 500 items of annual data for each company and year. This data is recorded from, among other sources, the outcome and balance sheets that the companies submit to the Mercantile Register. For this investigation, we used two samples from the Ardán database; one sample of 400 ISO 9000 certified companies, and another sample of 400 non-certified companies. Data was available for the years 1994, 1995, 1996, 1997, and 1998, and included the sales revenue for each accounting year, as well as the profitability ratio (the ratio of net profit before interest and tax on total assets). In addition, for the certified companies, the data set included information on their last quality certification registration date.

Possible sources of bias in the two samples were checked. First, we noted that the two samples were not homogeneous. Certified firms had on average larger sales turnovers than non-certified firms did (this is also true

for the total population of certified companies in the Basque Autonomous Community (Casadesús *et al.*, 2000)). Since the two samples were not homogeneous, it could be argued that any difference in profitability of the certified companies is a direct result of their larger average size. To test for this distortion we used the statistical *z*-test of proportions, with a level of significance set at $\alpha = 0.05$, as well as a *t*-test for differences in means, since information on sales revenue was available. Both the *z*-test and *t*-test calculations corroborate that the proportions are not significantly different. Consequently, we were able to avoid having this possible bias distorting the fundamental conclusions of this study.

Discussion of findings and conclusions

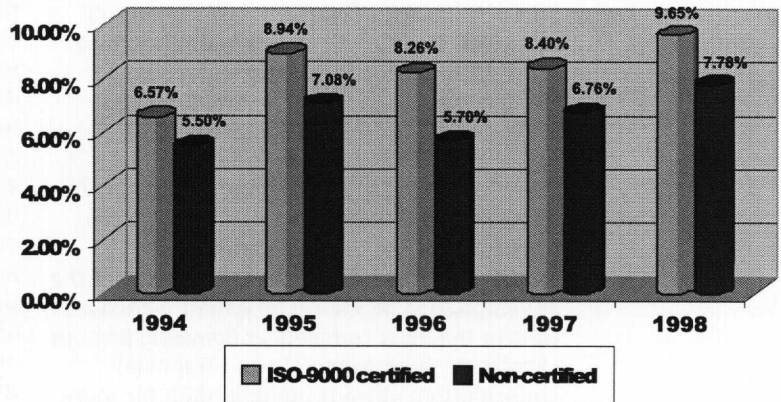
Using the return on assets employed (ROA), the average level of profitability was calculated for the 400 certified firms and the 400 non-certified firms for each of the years 1994, 1995, 1996, 1997, and 1998. The results are presented graphically in Figure 1. In all five years, it can be observed that the average profitability of the certified firms is superior.

To check the statistical validity of the difference in profitability we used *t*-tests for differences in means with a significance level set at 0.05. The tests found the differences were statistically significant for four of the five years, the 1994 difference in means being the exception. As Table III demonstrates, there are statistically significant differences in the profitability of the ISO 9000 certified companies and the non-certified companies, except for the year 1994. Our *z*-tests confirm

Table II
Summary of research on ISO 9000 certification and business performance

First named author	If variable present	Reduced costs or lower waste	Improved quality	Increase in sales or share	Audited profitability improves
Institute of Quality Assurance (1991)				Yes	
Lloyd's Register of Quality Assurance (1993)				Yes	
Breka (1994)					
Mann and Kehoe (1994)		Yes			
Buttle (1996)		Yes		Yes	
Lloyd's Register of Quality Assurance (1996)					Yes
Quazi and Padibjo (1998)			Yes	Yes	
Terziovski <i>et al.</i> (1997)		No	No	No	
Casadesús <i>et al.</i> (2000)		Yes		Yes	
Häversjö (2000)					Yes
Science and Engineering Policy Studies Unit (1994)	Customer driven			No	
Jones <i>et al.</i> (1997)	Developmental view	Yes	Yes	Yes	
Chapman <i>et al.</i> (1997)	Strategic integration			Yes	Yes
Terziovski <i>et al.</i> (1997)	TQM environment	No	No	No	

Figure 1
 Average profitability of ISO-9000-certified companies and non-certified companies



Note: Average profitability is defined as ROA (Net profit before tax and interest payments on assets employed)

that the difference in profitability is not due to the average size of firm being larger in the certified sample than the non-certified ones. Thus, we can conclude that the ISO 9000 certified companies are more profitable than the non-certified companies.

So how does the scale of the improvement in profitability that we observed compare with previous studies? Lloyd's Register of Quality Assurance Ltd's (1996) survey found that profit margins and return on capital employed (ROC) of certified companies averaged more than double the industry average; while the ROC found in Häversjö's (2000) Danish study for the ISO certified companies improved by an average of 15 per cent. We have found a return of assets employed (ROA) that is between 24 and 45 per cent higher in certified than in non-certified companies (1995, 26 per cent; 1996, 45 per cent; 1997, 24 per cent; 1998, 24 per cent). Although ROC and ROA are not equivalent measures, they are roughly comparable with a bias towards ROC figures being higher than ROA in most instances. Our findings suggest profitability improvements closer to those found by Häversjö (2000) rather than the substantial gains suggested by the Lloyd's

Register of Quality Assurance Ltd's (1996) survey.

However, these results must be interpreted with caution. We recognise that there are a number of limitations that need to be considered. First, we must consider the multitude of variables that influence or can influence a company's performance. To assert that a company's greater profitability is only and directly related to ISO 9000 certification is clearly unsound, since one would have to be sure that no other variables could possibly cause the difference, and that there is no other plausible explanation for the identified relationship.

Second, the characteristics of the samples used needs to be analysed in greater detail, since it is clear from our earlier research that certified companies have some significant differences from the non-certified ones. For example, certification is concentrated in greater relative proportion in certain industrial sectors and in the production of certain types of goods. Therefore, it is possible that the higher profitability of the certified companies may be the result of certified firms being in industrial sectors that enjoy greater levels of profitability.

Third, there is the important issue of the cause-and-effect relationships. Even if, as in this article, it can be statistically proven that the certified companies have a greater average level of profitability than the non-certified companies, it cannot be concluded that the ISO 9000 certification leads to higher profitability performance. If causality is to be established the causal factor must precede the effect; otherwise, the opposite of the cause-and-effect relationship could be established, i.e. the most profitable

Table III
 Profitability means of ISO-9000-certified and non-certified companies

	Profitability mean scores				
	1994	1995	1996	1997	1998
ISO-9000-certified (%)	6.57	8.94	8.26	8.40	9.65
Non-certified (%)	5.50	7.08	5.70	6.76	7.78
t-test	1.5687	2.640 ^a	3.5783 ^a	2.3549 ^a	2.2036 ^a
Significance level	0.05	0.05	0.05	0.05	0.05

Note: ^a Positive, significantly different

companies are those that have a greater propensity to be certified according to ISO 9000 standards. Indeed evidence of this has been found in a study of Danish companies where the certified companies' profitability was higher than the industry average both before and after registration (Häversjö, 2000). To avoid this problem it would be necessary to analyse a longer time-series of performance that included the initial date of ISO 9000 accreditation. This would allow us to test if the differences in profitability for these companies were significant before the initial registration to the ISO 9000 standard. This would allow us to confirm that certification was a factor that led to higher profitability. Unfortunately the dates held on ISO 9000 registration in the Ardán database are a mixture of initial registration dates and renewal dates which has confounded any meaningful analysis of pre- and post-registration financial performance. However, we plan to overcome this problem by researching the Spanish registration bodies' archives in our future research, so that we can analyse the relation between ISO 9000 and profitability before and after certification.

We conclude, despite these limitations, that our findings provide objective proof of an association between ISO 9000 certification and superior financial performance. The implementation of any type of tool, system, or program related to quality tends to pay off in the long, rather than the short run. Achieving the benefits from an ISO 9000 quality management system is a process that takes time, and is most unlikely to cause a swift reversal in a company's commercial or financial results. However, despite the fact that many of the firms in our study have not been registered to the standard for long, we have found that a statistically significant superior financial performance has been achieved by the certified companies in the last four out of the five years studied. Thus our research provides support for the findings of Lloyd's Register of Quality Assurance Ltd (1996) and Häversjö (2000), regarding quality certification's link to better financial performance.

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