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# Does ISO 9000 Give a Quality Emphasis Advantage? A Comparison of Large Service and Manufacturing Organizations

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*This research examines the relative importance attached, by the chief executives of 93 service and 112 manufacturing organizations, to internal and external dimensions of quality. It analyzes the relationship of these quality dimensions to the importance placed on the possession of Quality Certification (QCert value).*

*The analysis finds evidence that the emphasis on quality increases in service firms with higher QCert value scores, so as to provide a greater balance between internal and external dimensions of quality. In contrast, increased emphasis is only found on internal quality in manufacturing firms. This suggests that accreditation to an ISO 9000 standard has a more profound effect on service firms than on manufacturers.*

*Thus, it can be concluded that ISO 9000 quality management systems can give a significant quality emphasis differential to service firms. In contrast, there is little gain in differential in manufacturing. The lack of any marked quality differential in manufacturing firms suggests that any competitive advantages gained will be much weaker than for service firms.*

*Key words: quality certification, quality dimensions*

## INTRODUCTION AND OVERVIEW

Since 1987, when the International Organization for Standardization first published the ISO 9000 series of quality standards, the worldwide take-up of quality certification to the ISO 9000 standard (QCert) has increased rapidly. At the end of 1998, more than 270,000 firms, in over 143 countries, were certified to the standard, an increase of 48,000 on the previous year (ISO 1999). In the third quarter of 1999 in North America (Canada, Mexico, and the United States), over 40,000 firms were registered as certified to an ISO 9000 standard. This North American total represents a real growth of 32 percent from the total a year earlier and indicates the rapidly growing number of companies in the region that perceived value in adopting ISO 9000 quality management systems. The progressive increase in applications from manufacturing firms in the United States for approval to standards such as ISO 9000 suggests that QCert is viewed as important to competitive position by manufacturing organizations.

Recently, in Europe, the popularity of QCert has spread into service industries. No doubt, the increasing globalization of the service sector will see this trend spread to North America where only 13 percent of registered firms are from the service sector (Anderson 2000).

Implied in the pursuit of quality certification is the assumption that quality certification is associated with improved quality. However, although it is clear, from the research reviewed on business performance factors that

quality does have a consistent positive relationship with better performance, the research reviewed on the link between quality certification and business performance suggests that no link is proven. Combining these findings leads to the inference that quality certification is not consistently associated with a greater emphasis on quality. Given the growth in ISO 9000 applications, it is clearly important to explore the relationship between quality certification and quality emphasis.

The research data analyzed in this article were obtained by questionnaire survey of 500 of the United Kingdom's largest service and manufacturing companies. The survey examines the relative importance attached by chief executives to internal and external dimensions of quality. The relationship between these quality dimensions and the importance placed on the possession of QCert is analyzed.

The survey findings indicate that ISO 9000 quality management systems can give a significant quality emphasis differential to service firms. In contrast, there is less to be gained in manufacturing. The lack of such a marked quality differential in manufacturing firms suggests that any competitive advantages gained will be much weaker than for service firms.

## LITERATURE REVIEW

### Quality and Business Performance

The contribution of quality to business performance has consistently been claimed by the quality gurus (Crosby 1979; Juran 1982; Deming 1986). Empirical research such as the PIMS studies (Schoeffler, Buzzel, and Heany 1974; Buzzel and Wiersema 1981; Craig and Douglas 1982; Phillips, Chang, and Buzzel 1983) and more recent findings (Maani, Putterill, and Sluti 1994; Jacobson and Aaker 1987; Flynn, Schroeder, and Sakakibara 1995; Flynn et al. 1997; Forker, Vickery, and Droge 1996; Adam et al. 1997) all support the proposition that better quality has a positive relationship with business performance. This is also true for the service sector. Capon, Farley, and Hoening (1990) identify 20 service studies that find a positive relationship between quality and business performance. Rust, Zahorik, and

Keiningham (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 does have a positive effect on the overall performance of the firm, relative to its competitors.

The factors that relate to business performance can be summarized into two categories: 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. This is in line with Deming (1986), who reasons that as quality improves, waste is eliminated, costs are reduced, and financial performance improves.

### Quality Certification and Business Performance

Implied in the pursuit of quality certification is the assumption that quality certification is associated with improved quality systems, leading to better quality and hence to better business performance. However, the research reviewed for this study, on the link between quality certification and business performance, reveals contradictory results. To provide an understanding of this contradiction, the intermediate links between quality certification and business performance variables are also explored.

Many studies report expectations of increased market share and improved quality from ISO 9000 implementation (for example, Ebrahimpour, Withers, and Hikmet 1997). The UK research of Mann and Kehoe

(1994) noted that QCert was associated with improved business performance at the operational level. Buttler's (1996) survey of 1220 certified UK companies, which included 415 service sector firms, found that improving operations and marketing gains were claimed by most of the firms following QCert. However, the large-scale descriptive studies of Lloyd's Register of Quality Assurance (1993), The Institute of Quality Assurance (1993), and Brecka (1994), report that the greatest gain from quality certification is widening market opportunities rather than improvements in quality itself.

In contrast to the studies reporting business benefits, Batchelor's (1992) study of more than 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, Samson, and Dow 1997) of 1000 firms in Australia and New Zealand, which found that QCert had no significant, positive relationship with business performance. They noted that the principal motivation for pursuing QCert was the ability of the certificate to open customers' doors that were previously closed, or would close, if QCert were not achieved. Seddon's (1997) case study research in the United Kingdom goes further to suggest that if ISO 9000 has any effect on performance, then it is negative.

Insights into the reasons for pursuing QCert, and the effect this has on subsequent business performance, are provided by the Science and Engineering Policy Studies Unit (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 that gave other reasons for adopting QCert. Other studies (for instance, Gore 1994) have suggested that organizations reacting to external pressure may see QCert registration as the prime objective and adopt a minimalist approach to achieve. These firms may possess QCert but they do not value the quality assurance system that QCert requires.

These studies suggest that the motive for seeking cer-

tification is an important predictor of performance. Insights into this motivation variable are provided by a recent empirical study of 272 Australian firms by Jones, Arndt, and Kustin (1997). It found evidence that firms that sought QCert because of externally imposed perceptions of the necessity to "obtain a certificate" were found to experience fewer beneficial outcomes of QCert than firms that had a "developmental" view of quality improvement. These developmental firms' motives included a desire to use QCert to improve the company's internal processes, and/or help lower quality costs and increase customer focus. Unfortunately, differences between service and manufacturing sectors were not reported.

An insight into the importance of having a developmental orientation toward quality is provided by the study by Chapman, Murray, and Mellor (1997) of large service and manufacturing firms in Australia. These authors found that improved financial performance (sales per employee) was linked to greater integration of quality plans into strategic business plans. This relationship was found to be stronger in service firms than in manufacturing ones.

In contrast to Jones, Arndt, and Kustin's (1997) and Chapman, Murray, and Mellor's (1997) findings indicating that a developmental or strategic orientation is a moderating variable, Terziovski, Samson, and Dow (1997) found that their variable "TQM environment," (indicative of a developmental view of quality) had no significant influence on the relationship between QCert and business performance. However, the quality staircase model of Kim, Miller, and Heineke (1997) provides an argument against the similarity of a "developmental orientation" and TQM. In firms with a strong TQM environment, QCert may not make much difference to business performance, because it is focused on mastering conformance to specification, which is at the bottom of the staircase, so QCert may do little more than document what are already good quality attitudes and systems. Conversely, firms with a weak TQM environment, who have a "developmental orientation," may improve their business performance through adoption of QCert because of the need to establish the foundation step of mastering conformance quality before moving up the staircase to TQM.

Overall, it would seem that possession of QCert has little or no explanatory power in terms of organizational performance, unless complex variables such as motives or orientations are taken into account.

A more direct variable that captures whether the ISO 9000 quality management system is embedded in the firm's thinking could have the potential to avoid these measurement problems. If a firm has an embedded quality system and has QCert, then it could be expected that the firm would rate QCert as important to the way it defines quality. Therefore, in this research, the intent is to measure the "value" placed on QCert's contribution to an organization's definition of quality. How this is operationalized will be detailed in the methodology section.

### Differences Between Manufacturing and Services

Other research suggests that the perception of service and manufacturing sector managers of the link between quality dimensions and business performance are different. Madu, Kuei, and Jacob (1996) and Gowen and Tallon (1999) found that manufacturing firms tend to perceive a positive correlation between quality improvement and business performance but service firms do not. Does this suggest that the correlation between quality certification and quality emphasis will be greater in service firms than in manufacturing ones? Service firms that see no value in quality certification are unlikely to put much emphasis on quality, as they perceive no business advantage in doing so. In contrast, manufacturing firms will tend to emphasize quality, whether they value quality certification or not, because they recognize the contribution of quality to business performance.

From this, it could be theorized that the quality dimension differential due to quality certification will be greater among service firms than manufacturing firms.

### RESEARCH QUESTION AND METHODOLOGY

#### Quality Dimensions

The literature suggests that there are significant quality similarities between service and manufacturing sectors

(Ghobadian, Speller, and Jones 1994; Dotchin and Oakland 1994). This view has guided the authors to propose quality dimensions that combine those of Garvin (1987) and the SERVQUAL ones of Parasuraman, Zeithaml, and Berry (1988). Since Garvin's dimensions are focused on an operations/internal perspective, while Parasuraman, Zeithaml, and Berry's are rooted in a marketing/external one, then any set of quality dimensions used across manufacturing and services must include both perspectives.

The findings on the relative importance of the SERVQUAL dimensions (Parasuraman, Zeithaml, and Berry 1988 and 1991; Zeithaml, Parasuraman, and Berry 1990) consistently found their reliability dimension (the ability to perform the promised service dependably and accurately) to be the most critical driver of service quality. This service dimension equates to the conformance dimension of Garvin (1987). Naturally, Garvin's terminology for this dimension is used. Other intangible dimensions of SERVQUAL, assurance, and empathy, all relate to the way in which the customer interface is managed, and are combined in this research under a quality dimension named "interactive." This dimension equates to the interactive quality dimension suggested by Lehtinen and Lehtinen (1991) and the core attributes dimension of Phillip and Hazlett (1996). It is intended to cover all the aspects of quality that originate in the interaction between the consumer and the service organization. (See Chandon, Leo, and Phillippe 1997 for how interactive quality can be broken down into components.)

The final dimension is less clear cut in its equivalence. Garvin's reliability (dependability) dimensions are combined with the service failure/recovery elements of Parasuraman, Zeithaml, and Berry's responsiveness dimensions. To avoid ambiguity the term "post-sale" is used to describe this dimension.

The proposed quality dimension may be criticized for not adequately emphasizing the range of quality dimensions in services found by Parasuraman, Zeithaml, and Berry (1988). While customer contact itself has a strong bearing on perceived quality, the views of a growing body of literature criticizing the five-dimension conceptualization of service quality (for instance, Carman 1990; Babakus and Boller 1992;

Dabholkar, Thorpe, and Rentz 1996; Caruana and Pitt 1997; Mels, Boshoff, and Nel 1997) are reflected in this research. All these critiques agree that the five dimensions of quality are not immutable, while some suggest the need for an internally focused quality measure.

Therefore, in this research, only three dimensions that reflect the dominant quality focus in the post-design quality cycle are used. They are defined as follows:

1. Conformance—Meeting specifications, tolerances, or standards
2. Interactive—Quality at the customer interface; the customer's satisfaction with the service encounter
3. Post-sale—After-sales performance; meeting and maintaining the performance expectations of customers

### Research Question

From the literature reviewed, it is deduced that QCert will only be associated with a greater emphasis on quality where firms value the quality assurance system that QCert requires. This understanding is used to frame the research questions used in the survey so as to distinguish respondents by their rating of the importance of QCert in contributing to their definition of quality, rather than by their possession of QCert. This variable is termed "QCert value." Firms with a minimum QCert value may or may not have QCert. Higher ratings indicate degrees of importance of QCert in contributing to the firm's definition of quality. Where QCert value is high, firms are implying that their certified quality assurance system is making a valuable difference to the way in which they define and achieve good quality.

Derived from the literature the following two hypotheses are defined for testing.

1. The importance of the quality dimensions will be greater in firms with higher QCert values.
2. The quality dimension differential (between firms with high versus low QCert values) will be greater among service firms than manufacturing firms.

### Methodology

The research data were obtained by a questionnaire survey of the United Kingdom's largest companies (*The*

*Times 1000* 1996). The organizations were selected to give a systematic sample across the major industry classifications and to represent, equally, manufacturing and service industries. This framework limited the population to be sampled to 500 firms. A review of Cohen's (1988) sampling size planning tables showed that for correlation above 0.2, at a significance level of 0.05, nearly 200 cases would have to be returned to achieve a power of 0.8. Fortunately, 205 usable responses were received (93 service and 112 manufacturing) with a response profile that reflected the sample frame.

The cover letter requested completion of the questionnaire by the chief executive. Three reasons determined this decision. First, the chief executives are more likely to provide objective responses because they are free from the functional bias of quality professionals. Second, the chief executive's views on QCert and quality are likely to pervade the organization. Finally, Hambrick (1981) strongly advises the use of only the CEO, should the researcher have no option but to access only a unique respondent. The questionnaire was addressed by name to the chief executive of each organization surveyed. A consideration was how many questionnaires would actually be completed by the named individuals. The majority of the returns were either signed or had accompanying compliment slips, the latter often containing a handwritten note. In most cases the signature on these documents was that of the chief executive, although in a few cases, the questionnaire had been passed on to quality managers/directors or company secretaries.

To improve internal reliability, each quality dimension was measured as a composite of the responses to three questions that rate in importance.

1. The dimension's contribution to competitive position
2. The dimension's contribution to the firms' definition of quality
3. The dimension as a quality measurement

Reliability testing of the internal consistency of the components of the additive scales for each quality dimension using Cronbach's alpha resulted in coefficients meeting the minimum level of 0.7 suggested by Nunnally (1978).

All of the questions could be answered on a four-

point Likert-type scale, ranging from “important” to “unimportant.” The questions of relevance to this paper can be found in the appendix.

## DISCUSSION OF FINDINGS

### Manufacturing and Services QCert Value Differences

As expected, the findings in Figure 1 indicate that the importance placed on QCert is higher in manufacturing firms than in service organizations. The most substantial difference is that three times more service firms consider QCert unimportant (24 percent) than manufacturing firms (8 percent).

**Figure 1** The importance of quality certification to a firm’s definition of quality.

QCert	Manufacturing	Service
Unimportant	8%	24%
Minor	29%	31%
Moderate	37%	26%
Important	26%	19%
<b>Number of cases</b>	112	93

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The growing importance of QCert in services is clear; only a minority (24 percent) of firms consider it unimportant to their definition of quality. No doubt customer pressures for quality certification have played a part in this growth, but the increased production orientation (Ritzer 1995) in services must also be considered a factor. This increased production orientation leads to an increased emphasis on the conformance dimension in many service firms, an appreciation of the relevance of formal quality assurance systems, and efforts to introduce quality assurance systems to meet internal needs. Firms that have been unaffected by these factors are likely to take a more limited view of the importance of quality.

### Hypothesis 1

*The importance of the quality dimensions will be greater in firms with higher QCert values.*

This is supported if a significant positive correlation exists between the quality dimensions and QCert value.

Correlation analysis uses Spearman’s rho with two-tail significance testing.

The analysis (Figure 2) found that for manufacturing firms there was no significant correlation with QCert value except for the conformance dimension with a 0.22 correlation ( $p = 0.022$ ). In contrast the service firms had significant correlations on all dimensions, conformance (0.41,  $p = 0.000$ ), interface (0.30,  $p = 0.004$ ), and post-sale (0.22,  $p = 0.038$ ). The results provide support for the hypothesis that the importance of the quality dimensions will be greater in firms with higher QCert values, but only for service firms. In manufacturing firms, the relationship is limited to conformance quality. This suggests that ISO 9000 standards are interpreted in a profound way by services firms. It appears that manufacturing firms find it easy to relate to conformance quality and concentrate on it, while service firms are inclined to seek the application of their quality system to external dimensions of quality.

**Figure 2** Quality dimensions relationship to QCert value by service/manufacturing classification.

QCert dimensions	Manufacturing firms	Service firms
Number of cases	112	93
<b>Conformance</b>		
Correlation	0.22*	0.41***
Significance	.022	.000
<b>Interactive</b>		
Correlation	0.06	0.30**
Significance	.560	.004
<b>Post-sale</b>		
Correlation	.11	0.22*
Significance	.267	.038

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Spearman’s Rho two-tail significance:

\*\*\*<0.001, \*\*<0.01, \*<0.05

### Hypothesis 2

*The quality dimension differential (between firms with high versus low QCert values) will be greater among service firms than manufacturing firms.*

This is supported if the differences between the means of firms that have high QCert and low QCert value are greater in services than manufacturing, with a significant *t*-test value. Lower QCert value is defined

by firms scoring on the two points on the unimportant end of the scale (not important and minor importance). High QCert value is defined by firms scoring on the two points on the important end of the scale (important and moderately important).

An examination of Figure 3 shows that the hypothesis is supported strongly for the conformance dimension. The difference between the means for service firms with high QCert value and low QCert value is significant ( $t$ -value 2.78,  $p = 0.007$ ) while those for the manufacturing firms is lower and not statistically significant ( $t$ -value 1.89,  $p = 0.061$ ). A similar but weaker differential is found on the external quality dimension interface and post-sale. The interface dimensions means have a significant  $t$ -test value ( $t$ -value 2.31,  $p = 0.023$ ), while the manufacturing firms are less, and not significant ( $t$ -value 1.70,  $p = 0.092$ ). The post-sale dimension has a significant  $t$ -value of 2.04 ( $p = 0.044$ ), while the manufacturing firms have a  $t$ -value of 1.93 that is not significant ( $p = 0.057$ ).

**Figure 3** Quality dimension mean scores.

Quality dimensions	Manufacturing mean	Service mean
Number of cases	112 (71 high 41 low)	93 (42 high 51 low)
<b>Conformance</b>		
QCert value high	11.07	10.33
QCert value low	10.56	8.82
$t$ -value	<b>1.89</b>	<b>2.78**</b>
significance	.061	.007
<b>Interactive</b>		
QCert value high	11.16	11.36
QCert value low	10.66	10.75
$t$ -value	<b>1.70</b>	<b>2.31*</b>
significance	.092	.023
<b>Post-sale</b>		
QCert value high	11.07	10.86
QCert value low	10.56	10.14
$t$ -value	<b>1.93</b>	<b>2.04*</b>
significance	.057	.044

Two-tail significance: \*\*\*<0.001, \*\*<0.01, \*<0.05

The findings show that the service firms that have higher QCert values rate the quality dimensions significantly higher than those service firms with lower QCert values. This differential is greater than that found in

manufacturing firms. These findings support the hypothesis that the quality dimension differential (between firms with high versus low QCert values) is greater among service firms than manufacturing firms. This is in line with the predictions made from the research of Madu, Kuei, and Jacob (1996) and Gowen and Tallon (1999), which highlighted the different perceptions of service and manufacturing sector managers. It was predicted that service firms with lower

*Companies that cited customer pressure as their reason for pursuing certification were less likely to report improvements than those that gave other reasons for adopting QCert.*

QCert values are unlikely to put much emphasis on quality, as they perceive no business advantage in doing so. In contrast manufacturing firms will tend to emphasize quality whether they have high or low QCert values, because they recognize the contribution of quality to business performance.

A complementary explanation is provided by considering the mature nature of quality in manufacturing firms relative to service firms. It has been the norm for many years in large manufacturing organizations to have quality professionals, quality assurance systems, and often, functional representation at board level. All these are indicative of maturity and the acceptance of the importance of quality. In service firms, this has not been the case. It is only recently that quality has started to receive similar recognition. This leads to the conclusion that relative to manufacturing, service firms are much lower on Kim, Miller, and Heineke's (1997) quality staircase, where the first step is mastering conformance to specification. Therefore, service firms moving up the steps have more scope to achieve a large quality gain from QCert than manufacturers.

## CONCLUSIONS

In this research, firms have been analyzed by their rating of the importance of QCert in contributing to their definition of quality rather than by their possession of QCert. This QCert value has been found to be a signifi-

cant variable. The variable is more a direct measure of a firm's view of QCert than those used previously, which have considered the firms' motives (Jones, Arndt, and Kustin 1997), strategic integration (Chapman, Murray, and Mellor 1997), or TQM environment (Terziowski, Samson, and Dow 1997). Although it has proved to be a significant variable, the limitation of a direct variable such as the one used here, is that it provides no explanation for why firms consider QCert important or not. Additional insights likely could be gained by using a combination of explanatory and direct variables in future research into ISO 9000 and performance improvement.

The findings show that the importance of all the quality dimensions is significantly greater in service firms that consider QCert value to be important. In contrast, in manufacturing firms the increase only applies to conformance quality. This suggests that ISO 9000 standards are applied in a deeper way by service firms than manufacturers. Manufacturing firms find it easy to relate to conformance quality, and concentrate on it, while service firms are inclined to extend the application of their quality system to external dimensions of quality. These findings are confirmed by the greater differential found in service firms than in manufacturers. It was found that the service firms that value quality certification place much more emphasis on quality than other service firms do. In contrast, there is not such an extreme differential in manufacturing firms. This is in line with the predictions made from the research of Madu, Kuei, and Jacob (1996) and Gowen and Tallon (1999). The differential between service firms with high and low QCert values was large, since service firms with lower QCert values perceive no business advantage in emphasizing quality. In contrast, manufacturing firms tend to emphasize quality whether they have high or low QCert values, because they recognize the contribution of quality to business performance.

Thus, it can be concluded that ISO 9000 quality management systems can give a significant quality emphasis differential to service firms. In contrast, there is less to be gained in manufacturing. The lack of such a marked quality differential in manufactur-

ing firms suggests that any competitive advantages gained will be much weaker than for service firms. These conclusions support those of Chapman, Murray, and Mellor (1997), who found greater performance gains in services than manufacturing firms from the adoption of QCert.

## APPENDIX: QUESTIONNAIRE TO THE CHIEF EXECUTIVE

All questionnaires were pre-coded with the respondent's firm's industrial sector. All questions were answered on a Likert four-point scale with polar labels "unimportant" and "important."

Please rate in importance the following quality measurements:

1. Failure rate in meeting specifications, tolerances, or standards
2. Levels of customer satisfaction with the customer supplier interface
3. Failure rates in meeting customer performance expectations

Please rate in importance the following in contributing to your definition of quality:

1. Conformance to specifications, tolerances, or standards
2. Customer perception of the customer supplier interface
3. The ability of a product/service to maintain initial performance expectations
4. Possession of a recognized quality certificate (for example, BS5750, ISO 9000)

Please rate in importance the following in contributing to competitive position:

1. Quality of product/service
2. Quality of customer supplier interface
3. Quality of after-sale performance

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