



# Quality management: a cross-cultural perspective

Quality  
management

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## Abstract

**Purpose** – The aim of this paper is to present the results of a survey administered across 23 countries that examines quality priorities, practices and performance by adopting Hofstede's national cultural framework. The purpose of this study is to test the validity of the "culture-specific" argument as an explanatory construct for explaining quality management.

**Design/methodology/approach** – Data were collected in 2006 as part of the IV iteration of the International Manufacturing Strategy Survey. The methodology involved the use of a self-administered questionnaire to director/head of operations/manufacturing in best practice firms within the sector of firms classified by ISIC codes (rev.3.1) Divisions 28-35.

**Findings** – From the findings it emerges that whereas differences in priorities can be affected by masculinity and uncertainty avoidance to a very small degree, all the four dimensions of culture significantly affect quality practice and three of the four dimensions affect performance to a greater extent.

**Practical implications** – The paper contributes to the validation of the "culture-specific" hypothesis in relation to quality management by addressing its managerial implications. In particular it calls for a fuller appreciation of cultural dimensions which will in turn help firms to better align their quality practices towards the attainment of improved quality performance.

**Originality/value** – Whereas the traditional literature on quality practices in its attempt to explain existing differences across countries addresses the issue of convergence or divergence of quality practices across countries, this paper analyses similarities and differences by comparing quality priorities, practices and performance across Hofstede's four cultural dimensions. The paper also proposes an original interpretative framework where variations in both quality practices and performance can be explained by some identifiable mechanisms either of "better fit" or "compensation".

**Keywords** Quality management, Culture, Strategic manufacturing, Cross-cultural studies

**Paper type** Research paper

## Quality management research: an overview of the literature

A significant strand of the literature seeks to assess the diversity of quality practices amongst countries. The increased complexity of today's business environment and heightened international competition make it necessary for firms to improve quality performance by aligning their quality practices in their attempt to capitalise on all possible traditional and non-traditional sources of competitive advantage. In line with this trend, the quality management literature has devoted considerable attention to the issue of quality management and this includes a series of empirical studies of quality management across countries which report contrasting conclusions. Traditionally in the field of comparative management research, there have been three main approaches: the empirical work has been aimed towards testing the "convergence" hypothesis (Form, 1979), the "divergence" hypothesis (Child and Kieser, 1979) and the "culture-specific" hypothesis (Hofstede, 1980).

The "convergence" hypothesis (Form, 1979) asserts that learning will lead managers from different cultures to adopt the same efficient management practices. Competitive pressures will eliminate those who resist convergence. In addition with the increased dissemination of information about best quality practices around the world, one would expect similarities across countries where each country's respondents would be expected to embrace the same approach as their overseas counterparts.



Overtime numerous studies have attempted to substantiate the evidence for “convergence” in the field of quality management research. Zhao *et al.* (1995) for instance, examined the quality management practices of three developing countries India, China and Mexico and compared them with those in developed nations. The results of their study show that the majority of the manufacturers in these developing countries are aware of the modern quality management practices and that their quality improvement efforts were not much lower than those in the developed countries. Similarly, Abdul-Aziz *et al.* (2000) by comparing quality practices in the manufacturing industry in the UK and Malaysia, find that there is a common reliance on inspection and relatively low use of programs for quality improvement. According to the authors, there are a few significant differences (e.g. the use of quality improvement teams) between the two countries and those differences are related to the types of quality practices promoted by their respective governments. In line with this argument, Chin *et al.* (2002) carry out a comparative study on quality management practices in Hong Kong and Shanghai manufacturing industries. The findings support the hypothesis that there are not any visible differences in terms of quality practices, although in Shanghai companies seem to pay more attention to environmental impact while in Hong Kong their counterparts pay more attention to market and customer feedback. A similar argument has been brought forward by Ismail and Ebrahimpour (2003). Their study examines and compares the critical factors of total quality management (TQM) across countries and their findings suggest that top management commitment and leadership, customer focus, quality information and analysis, training, supplier management, strategic planning, employee involvement, human resource management, process management, teamwork and others were the most common factors affecting quality practices and performance. More recently, Rungtusanatham *et al.* (2005) also found that TQM is a comprehensive management paradigm with many definitional elements that transcend cultural and national boundaries.

The “divergence” hypothesis (Child and Kieser, 1979) questions the universal applicability of any standardised business practice. According to this perspective, any organisational practice must be adapted to the national context to maximise its effectiveness. The different extent to which organisational practices are adapted to the national context results in the observed divergence of practices across nations.

In the field of quality management research several studies have attempted to substantiate the evidence for the “divergence” and within this perspective the role of culture is acknowledged but often plays a very marginal role. Raghunathan *et al.* (1997) for example compare the quality management practices of three different countries – the USA, India and China. Although quality practices were considered very important by all the respondents, the ANOVA results point to statistically significant differences among the three countries with respect to quality practices. According to the authors, these differences can be explained by the fact that in both China and India quality awareness is relatively new and quality standards may not be as high as in the USA. Similarly, Subba Rao *et al.* (1997) analyse both quality practices and performance in India, China and Mexico. Again the results point to statistically significant differences with respect to quality practices among these countries. According to this study, top management support turned out to be a very significant factor affecting all quality practices, while information and analysis as well as quality assurance practices were affected by the length of quality experience within companies. Corbett *et al.* (1998) discuss the findings from a survey of 599 managers in five countries in the Asia/South Pacific region in an attempt to unveil how similar the practices and the resulting

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performance were. The results indicate more divergence by countries from the region's mean scores on practices than on performance. Hong Kong firms, for example had a distinctly different set of outcomes with quality costs influenced by high levels of inspection. Tata *et al.* (2000) for instance analyse quality management practices in Costa Rica and compare them to those in the USA. The results indicate that Costa Rican companies are still lagging behind US operations in terms of human resource development, customer focus and satisfaction. According to this study, given the unique economic, cultural, and geographic variations among countries, companies can be more successful in adopting and implementing quality practices if they account for these regional differences.

The "culture-specific" argument (Hofstede, 1980) contends that even if managers located in different societies face similar imperatives for change, deeply embedded cultural factors will still affect the way managers approach quality and react to the need for change. In particular, Hofstede identifies four main cultural dimensions, namely power distance, individualism, uncertainty avoidance and masculinity. Although we do have extensive evidence on how these cultural dimensions affect specific organisational outcomes, very little effort has been devoted to assess the impact of these cultural dimensions on quality management.

On the one hand, we have extensive research assessing the effects of national culture on organisational outcomes. By adopting Hofstede's model, for example, Garg and Ma (2005) attempt to link national culture to organisational performance. Their findings show that there are significant differences in management systems, leadership and style within the national cultures of three types of organisations (foreign-owned, joint ventures, and Chinese-owned and operated firms). In relation to the effects of culture on the use of information within organisations, Wacker and Sprague (1998) attribute great importance to masculinity. In particular, they found that the type of information used to support decision-making in masculine national cultures was dependent on its expected effectiveness in gaining advantage over competitors. By contrast, feminine countries tend the use information more extensively to support decision making. Flynn and Saladin (2006) show that while in countries characterised by high power distance, power tends to be centralised as well as decision-making, countries characterised by uncertainty avoidance have an emotional need for rules. Vice-versa, national cultures that score low in uncertainty avoidance dislike formal rules, setting them only when it is necessary. This leads to more emphasis on formal methods for gathering and analysing external information. Differently, Snell and Hui (2000) emphasise the importance of individualism: while members of individualist countries are autonomous and confident, tending to rely primarily on their own ideas, members of collectivist countries are more likely to rely on information provided by others in formulating their opinions.

On the other hand, in the field of quality management research, a very limited amount of studies has looked at Hofstede's four main cultural dimensions. One of the major efforts in this area can be attributed to Krosolid (1999) who contends that the development of quality management has followed two distinct paths, the deterministic school and the continuous improvement school. He further argues that the dominance of these two schools is different according to different national cultures. In a similar fashion, Sousa-Poza and colleagues (Sousa-Poza *et al.*, 2000) assess the application of TQM in USA, Switzerland and South Africa to investigate the relationship between national culture and the implementation of TQM. Their results show that in each country, several distinct relationships between the dimensions of TQM implementation

and national culture exist. They therefore imply that the application of TQM should take into account different characteristics of national cultures. In a major study Mathews *et al.* (2001) studied quality management practices in the UK, Finland and Portugal and their evidence indicate that the existing differences in quality management practices could be related to national culture. Similarly Lagrosen (2002) shows how quality management assumes different connotations across different countries with power distance and uncertainty avoidance playing an important role on how quality is pursued. Additionally, further evidence proves that masculinity plays a crucial role in determining the overall quality strategy where masculine countries seem to focus more on the internal operations and feminine countries displaying more a customer focus (Kyoon Yoo *et al.*, 2005).

Overall we argue that quality management research that had an international focus has primarily focussed on differences between countries, regions or different organisational cultures while generally overlooking the importance of national culture as a means to explain and predict quality management in a global context. Although it appears that no real substantial effort has been made to study whether quality is, or should be, managed differently in different national cultures we argue that national culture is equally a relevant lens through which the systematic comparison of similarities and differences would considerably improve our understanding of quality management implementation in a global context. Therefore, the purpose of this study is to test the validity of the “culture-specific” argument as an explanatory construct for explaining quality management. Since we endorse the idea that the different dimensions of national culture are likely to bear important implications for the broader issue of quality management in a global context, we therefore examine the following three research questions:

- (1) Could the “culture-specific” argument be used as an explanatory construct for explaining quality management?
- (2) Is there a difference in quality priorities, practices and performance across national cultures?
- (3) What are the managerial implications?

### **Research design**

One of the most problematic issues confronting the researcher in quality management is the search for an appropriate definition (Fynes, 1998). More precisely, defining “quality” as a construct is difficult given the number of possible alternatives available (Hardie and Walsh, 1994). To this purpose, Reeves and Bednar (1994) suggest a four-way taxonomy of quality definitions that incorporates excellence, value, conformance to specifications and meeting and/or exceeding customer requirements. The diversity that these definitions embrace, they contend, implies that “the quality construct space is so broad and includes so many components that there would be little utility in any model that tried to encompass them all” (p. 441). Conversely, they argue that “the complexity and multiple perspectives historically associated with the concept have made theoretical and research advances difficult” and that ultimately the “search for a universal definition of quality and a statement of law-like relationships has been unsuccessful” (p. 441). In addressing this problem, Flynn *et al.* (1994) argue that a crucial issue in theory development is the articulation of the distinction between quality management practices (input) and quality performance (output), which has been blurred under the broad heading of quality. More recent studies also place emphasis on priorities – manufacturing strategies may be

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articulated through competitive priorities which are then operationalised through improvement goals as well as action programs and demonstrated by performance improvement (Lindberg *et al.*, 1998).

Drawing on our previous work on innovation and performance particularly of Irish based manufacturing (Crowe *et al.*, 2007; Brennan *et al.*, 2002, 2003) as well as work on quality priorities, practices and performance between indigenous and foreign firms (Vecchi and Brennan, 2006; Brennan *et al.*, 2005), this paper endorses the view that a fuller understanding of quality can be reached only by embracing these concomitant perspectives, namely priorities, practices and performance. In particular we endorse the idea that the means by which priorities are transposed into practices, and how these practices are assessed (performance) are likely to be affected by national cultures.

To this end, Hofstede's (1980, 2001) four dimensions of national cultures seem particularly relevant to address these questions. First the construct validity of the four dimensions has been reconfirmed by an impressive number of successful replications (for an overview see Pagell *et al.*, 2005). Second, Hofstede's work is widely used as a theoretical framework for guiding cross-cultural comparisons (Flynn and Saladin, 2006). National culture provides a fruitful area for research in quality management. There is a substantial body of literature available about national culture and very few focuses on its effects on quality management. We believe that extending this line of thinking to quality management issues holds great potential to gain a fuller insight on whether quality should be managed differently across different national cultures.

### Methodology

Whereas previous research on quality management often relies on comparing data across two or three countries or different regions we intend to use a large scale survey covering a wide range of countries. To this end, primary data from the fourth iteration of the International Manufacturing Strategy Survey (IMSS) is employed in this paper. The IMSS was founded in 1992 to gather data related to manufacturing strategy in a global setting (see Voss and Blackmon, 1998 and Frohlich and Westbrook, 2001 for more details). To date four iterations of the IMSS survey have taken place. The first iteration of this project (IMSS I) was carried out and completed in the 1992-1994 period, with the participation of over 20 leading institutions and 600 firms in 20 different countries, and the second iteration (IMSS II) was carried out in the 1996-1998 period, with the participation of 25 leading institutions and 703 firms in 23 different countries. The third iteration (IMSS III) of the project was carried out in the 2000-2002 period, with the participation of 15 leading institutions and 585 firms in 17 different countries. The fourth iteration (IMSS IV) was carried out in 2006 with the participation of 711 firms in 23 countries (see Table AI in the Appendix for a list of the 23 IMSS countries). The motivation behind the project is to create possibilities for comparative analyses of manufacturing strategies in the engineering and assembly industries, and to analyse specific hypotheses within this context. The IMSS survey focuses on the ISIC divisions 381-385, which include manufacturers of fabricated metal products, machinery and equipment. Best practice firms from this sector have been chosen for three main reasons. First, due to their considerable financial and competitive strengths, these companies are able to adopt a variety of advanced manufacturing strategies and timely embrace technological innovations. Second, the large added value of their outputs affects and is affected by the social and economical capabilities of any given country. Third, due to their highly standardised industry classification it is easy to compare them with their counterparts in other countries. Overall, given its scope, its cross-comparative nature, its rationale, its

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international and sectoral focus, the IMSS was deemed as a valuable instrument to assess the validity of the “culture-specific” argument as an explanatory construct for explaining quality management.

As for the IMSS data collection, the directors of operations were contacted since they were deemed to be competent to respond to the questionnaire as it covers many strategy domains of the participating plants. The response rate for the total sample was approximately 20 per cent; the sampling method was convenient sampling with some random participants. Given that one of the goals of the IMSS project is to establish a longitudinal database of participating plants, the sample has been held constant as far as possible across iterations. Every time a plant could not take part in the survey, the sample was completed by random selection with a purposeful bias towards high-performing plants. Due to this sampling strategy with its preference towards plants that have survived over time or that have been identified as high-performing, there is an overall bias towards high-achieving plants. Completion of the questionnaire took place in the participants’ plants. In countries where English was not the native language the surveys were translated by full-time operations management professors who were highly familiar with the field of quality management. Questionnaires were distributed by email or by fax, often after establishing contact by phone.

In particular, the survey is divided into four main sections:

- (1) Strategic objectives and costs of the plant, exploring strategies, markets, main forms of competing and structure-related costs.
- (2) Current manufacturing practices and their integration, exploring firms’ manufacturing facilities, capacity, technology processes adopted, degrees of integration with customers and suppliers, staffing, planning and control systems, quality and product development.
- (3) Past and future manufacturing programs and activities, focussing on the use of universal practices such as TQM, Just in Time and others.
- (4) Assessment of manufacturing function performance, reflecting performance levels and improvements achieved over time.

Most questionnaire items were in the form of perceptual measures where respondents were asked to rate specific priorities, practices and performance in terms of use or importance on five-point Likert scales. These scales can be treated as quasi-ratio scales (Gaski and Etzel, 1986). The constructs’ validity of quality practices, quality performance and quality practices employed in the questionnaire and measured by the five-point Likert scale is supported by substantial empirical evidence. Both content validity and construct measurement for quality priorities, practices and performance have been widely discussed elsewhere (see for example Frohlic and Westbrook, 2001; Frohlic and Robb Dixon, 2001; Grossler and Grubner, 2006; Vereecke and Muylle, 2006).

In the area of quality priorities, respondents are asked to assess the change of priorities of customers in relation to the importance of superior product design and quality as well as superior conformance quality based on numerical scales (1-5). Respondents are also asked to rate the importance of quality improvement goals (manufacturing conformance and product quality and reliability) for the next three years on a scale from 1 = not important to 5 = very important.

In the section of the questionnaire related to quality practices, the respondents were asked to indicate the percentage breakdown between preventive and corrective quality

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costs as well as the allocation of costs among inspection/control (sampling, supervision, lab tests), control (e.g. scrap, losses), preventive (training, documentation, preventive maintenance) and external (e.g. warranty costs, returns).

The role of quality in supplier selection is also assessed. This section on quality practices also include questions on the use of quality improvement and control programs (such as TQM, 6-Sigma and quality circles), equipment productivity programs (e.g. Total Productive Maintenance programs), environmental performance programs and continuous improvement programs as well as action programs over the previous three and the next three years (level of use is also given as a numerical scale 1 = no use; 5 = high use).

Finally, quality performance is measured in relation to how companies perform relative to competition and to the importance companies attach to different performance parameters. Quality performance improvement goals such as manufacturing conformance and product quality and reliability to win competitors over the previous three years are rated on a scale of 1 = not important to 5 = very important. The same two variables are also rated in relation to their degree of improvement in the last three years on a scale of 1 = deteriorated to 5 = improved.

This paper specifically examines the role of quality priorities, practices and performance among all the 23 IMSS countries, classified according to Hofstede's four cultural dimensions.

Since we assume that these different dimensions of national culture are likely to bear important implications for the broader issue of quality management in a global context, the 23 IMSS countries (Argentina, Australia, Belgium, Brazil, Canada, China, Denmark, Estonia, Germany, Greece, Hungary, Ireland, Israel, Italy, New Zealand, The Netherlands, Norway, Portugal, Sweden, Turkey, UK, USA, Venezuela) were classified according to these four dimensions by taking into account each individual score and its difference to their respective IMSS mean (see Table AI in the Appendix). For example, the Hofstede's scores for Argentina are: 46 for power distance, 46 for individualism, 56 for masculinity and 86 for uncertainty avoidance. If we compare these scores with their respective IMSS means, Argentina scores high across all the cultural dimensions, except for individualism. Chi-square analysis and the Kruskal-Wallis test were used to assess possible significant differences. In particular, as suggested by Bryman and Cramer (2001) the choice of conducting non-parametric tests was mainly driven by the fact that our sample is biased by the presence of high-performing firms and any assumptions on the distribution of their scores would be highly hazardous.

### **Main findings**

Table AII (see Appendix) shows the main findings in relation to the main four cultural dimensions, namely power distance, individualism, masculinity and uncertainty avoidance. It provides some descriptive statistics in relation to the mean scores for quality priorities, practices and performance as previously described in the methodology section.

*The "culture-specific" argument can be used as an explanatory construct to explain variations in quality management*

The "culture-specific" argument can be used as a useful explanatory construct to explain variations in quality practices and performance: whereas differences in priorities can be affected by masculinity and uncertainty avoidance (see Table AII in the Appendix) to a very small degree (i.e. lower levels of significance for all the

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differences observed), all the four dimensions of culture significantly affect quality practice and three of the four dimensions affect performance to a greater extent.

*There are differences in the priorities, practices, and performance across national cultures*

*Quality priorities.* Differences in priorities can be affected by masculinity and uncertainty avoidance to a very small degree (i.e. lower levels of significance for all the differences observed). The few differences observed could reflect that the world is globalizing; thus the market is likely to span beyond the national market. This is confirmed by IMSS data on the external environment, where in relation to geographical focus the IMSS mean is 4.16 on a scale of 1-5 (1 = national; 5 = international).

*Quality practices.* In terms of quality practices, our findings confirm that quality practices tend to vary very significantly across the all four dimensions of culture (see Table AII in the Appendix).

Power distance affects both current and future use of quality programs with high power distance countries mostly implementing actions programs more extensively (except for the current use of quality improvement and control programs). The higher commitment of high power distance countries to action programs could be explained by the fact that workers do not possess the effective tools for effective process management because of the high degree of centralisation. In this sense, in line with Flynn and Saladin (2006) our findings confirm that a more extensive use of action programs could be a suitable means to overcome the limitations that a higher level of centralisation often entails.

As for individualism and quality practices, whereas collectivist countries are very much more committed to action programs, individualist countries display a significantly lower level of engagement in quality improvement and control programs, equipment productivity programs, environmental performance programs and future use of continuous improvement programs. The higher commitment and less myopic approach of collectivist countries to action programs could be explained by the fact that strategic planning is very consistent with collectivism as widely documented in the literature (Pagell *et al.*, 2005; Lagrosen, 2002; Flynn and Saladin, 2006).

Masculinity also significantly affects quality practices in two main ways. First, masculinity affects quality costs with masculine countries spending considerably more resources in inspection and less in external quality. In contrast, feminine countries tend to devote more resources to external quality rather than to inspection. This difference might reflect the different foci that the different cultures possess: masculine countries focussing more on the internal operations and feminine countries displaying more a customer focus (Kyoon Yoo *et al.*, 2005). Second, as for engagement in action programs, feminine countries plan to use more extensively equipment productivity programs and continuous improvement programs as well as having a higher level of deployment of environmental improvement programs. In this sense, feminine countries show a more genuine environmental concern as well as a more proactive attitude toward cooperation.

In similar ways, uncertainty avoidance significantly affects quality practices. As for quality costs, as expected high uncertainty avoidance countries tend to spend considerably more on inspection costs. As for engagement in action programs, high uncertainty avoidance countries tend to rely on them more than low uncertainty avoidance countries except for the future use of equipment productivity programs and continuous improvement programs.



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*Quality performance.* In terms of quality performance, our findings confirm that quality performance tends to vary very significantly across three out of four dimensions of culture. Quality performance has been measured in relation to both how companies perform relative to competition and to the importance companies attach to different performance parameters. Only masculinity does not affect quality performance since there are no significant differences across masculine and feminine countries.

Power distance affects quality performance. High power distance countries tend to perform better than competitors in relation to both manufacturing conformance and product quality and reliability. This might reflect the fact that the high level of centralisation that is associated with high power distance countries requires higher level of compliance. In contrast when assessing major areas of change in performance criteria low power distance countries rate manufacturing conformance as one of the areas of major improvement, but the same does not apply to product quality and reliability.

Individualism also affects quality performance: collectivist countries tend to perform better than competitors in relation to both manufacturing conformance and product quality and reliability. Again this could be explained by the higher level of compliance that is often associated with collectivist countries. In contrast when assessing major areas of change in performance criteria individualist countries rate manufacturing conformance as one of the areas of major improvement, but the same does not apply to product quality and reliability where collectivist countries display a significantly higher improvement.

As for uncertainty avoidance, both manufacturing conformance and product quality and reliability rank higher with high uncertainty avoidance countries in order to win competitors. This might reflect the higher level of compliance that is often associated with high uncertainty avoidance countries.

#### *What are the managerial implications?*

Table AIII in the Appendix summarises the relative emphasis that countries' cultural dimensions attribute to individual quality practices, quality priorities and quality performance. The "culture-specific" argument contends that even if managers located in different societies face similar imperatives for change, deep-embedded cultural factors will still affect the way managers approach quality and react to the need for change. By providing some empirical evidence to support this hypothesis our findings also raise the interesting issue of whether this perception of relative emphasis stems from a better fit between practice, priority or performance and the national cultural dimension positioning or from a compensation by which firms engage in practice, or attain performance as a deliberate attempt to compensate for specific limitations of any of their cultural dimensions.

Although this is a first descriptive analysis of the data, which will need to be refined at a later stage through further analysis, our findings illustrate that whereas differences in priorities can be affected by masculinity and uncertainty avoidance to a very small degree, all the four dimensions of culture significantly affect quality practices and with the exception of masculinity, also significantly affect performance. In particular, variations in both quality practices and performance seem to be driven in many cases by some identifiable mechanisms either of better fit or compensation. We argue that a fuller appreciation of these mechanisms will help firms to better align their quality practices towards the attainment of improved quality performance.

Through an accumulation of scientific knowledge relevant to the applicability of quality management across national settings, we could also help managers to better

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understand how to transfer best quality management practices from one country to another. Additionally, we are able to identify which element in terms of priorities, practices and performance should be modified during the transfer process to maximise the opportunity to achieve the desired quality performance. In this sense, more attention to the cultural impacts on quality management and performance may reap rich rewards in terms of effective implementation of quality practices and accordingly outstanding quality performance.

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### **Conclusions and directions for future research**

Managers must understand how and what dimensions of national culture influence operation decisions. Such understanding will better prepare global firms to more effectively manage the global supply chain.

Based on the cultural dimensions suggested by Hofstede (1980, 2001), this study shows that national culture is a valid construct to explain quality management. While some previous research portrays quality management as a comprehensive management paradigm with elements and relationships that transcend cultural and national boundaries, the current study provides some preliminary evidence that shows how the adoption of certain quality practices across different countries can possibly follow distinctive patterns.

This study represents a first attempt at using national culture to explain differences in quality management. The results of this study support that some cultures are more suitable to implement specific quality programs than others, different aspects of national culture have facilitating or inhibiting consequences on the implementation of quality management. Although quality management may be viewed as a vehicle for change, research indicates that national culture is highly resistant to change (Hofstede, 2001). Thus, although quality practices can be easily changed, the fundamental values that underlie those practices are very difficult to change. This would suggest a strong need for global firms to adapt their quality practices to the local national culture. This does not necessarily entail compromising the integrity of their world-wide quality management policies, rather they should develop programs that can be most effectively implemented in the local culture.

While the results have clearly indicated the significant relationship between cultural dimensions and quality management, several limitations need to be reconciled in future research to confirm our findings. First we assume that national culture is the same for all plants within the country. However it is possible that that different corporate, organisational, industrial and/or sectoral cultures may co-exist within the same firm and might as well conflict and counterbalance the national one. Furthermore, today in many IMSS countries such as Canada, Israel and Belgium different ethnic or national cultures co-exist (Au, 2000). This is likely to be intensified as the result of increased human mobility that globalisation entails. In particular, within the same country different sub-cultures might persist, but they might also still stand apart for religious reasons (e.g. Ireland), because of their language (e.g. Belgium) or their ethnicity (USA, France, Turkey). In this sense, the four dimensions of national cultures could be far from being reliable proxies for cultural homogeneity for a given national culture. In particular future research needs to focus on the true blending of cultures and managerial values that may affect quality management. Second, since our sample is biased towards best-performing firms, future research should target all kinds of firms regardless of their performance. This should provide a more robust representation of the state-of-the-art of quality management across different countries.

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### Further reading

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### Appendix

IMSS IV country	Number of respondents	Power distance	Individualism	Masculinity	Uncertainty
Argentina	44	46 H	46 L	56 H	86 H
Australia	14	39 L	90 H	61 H	51 L
Belgium	32	65 H	75 H	54 H	94 H
Brazil	16	69 H	38 L	49 L	76 H
Canada	25	39 L	80 H	52 H	48 L
China	38	80 H	20 L	66 H	30 L
Denmark	36	18 L	74 H	16 L	23 L
Estonia	21	40 L	60 L	30 L	60 L
Germany	18	35 L	67 H	66 H	65 H
Greece	13	60 H	35 L	57 H	112 H
Hungary	54	46 H	80 H	88 H	82 H
Ireland	15	28 L	70 H	68 H	35 L
Israel	20	13 L	54 L	47 L	81 H
Italy	45	50 H	76 H	70 H	75 H
New Zealand	30	22 L	79 H	58 H	49 L
The Netherlands	63	38 L	80 H	14 L	53 L
Norway	17	31 L	69 H	8 L	50 L
Portugal	10	63 H	27 L	31 L	104 H
Sweden	82	31 L	71 H	5 L	29 L
Turkey	35	66 H	37 L	45 L	85 H
UK	17	35 L	89 H	66 H	35 L
US	36	40 L	91 H	62 H	46 L
Venezuela	30	81 H	12 L	73 H	76 H
Total/IMSS average	711	45	62	50	63

**Table AI.**  
Hofstede's measures of national culture and country classification

**Note:** (L) Low = index score  $\leq$  IMSS average; (H) high = index score  $>$  IMSS average

**Table AII.**  
Quality priorities,  
practices and  
performance and  
cultural dimensions

	Power distance			Individualism			Masculinity			Uncertainty avoidance			
	Low	High	Total	Low	High	Total	Low	High	Total	Low	High	Total	
	Significance	Significance	Significance	Significance	Significance	Significance	Significance	Significance	Significance	Significance	Significance	Significance	
<b>Quality priorities</b>													
<i>Change of priorities of customers</i>													
Superior product quality	82	81	82	84	81	82	83	80	82	78	84	82	* KW
Superior conformance quality	82	82	82	84	81	82	82	82	82	85	79	82	* KW
<i>Improvement goals in the next three years</i>													
Manufacturing conformance	67	100	83	100	67	83	0	100	83	0	83	83	*/ * KW
Product quality and reliability	70	72	70	77	68	70	69	71	70	67	72	70	
<b>Quality practices</b>													
<i>Maintenance</i>													
% Preventive	45	46	45	44	45	45	46	44	45	46	45	45	
% Corrective	55	54	55	56	55	55	54	56	55	54	56	55	
<b>Quality costs</b>													
% Inspection	33	36	34	36	34	34	31	36	34	31	36	34	** KW
% Internal	24	23	24	23	24	24	25	23	24	25	23	24	
% Preventive	24	24	24	25	24	24	24	25	24	25	24	24	
% External	18	17	18	15	19	18	20	16	18	18	17	18	* KW
Quality and supplier selection	87	91	87	92	86	88	87	88	88	86	89	88	
<b>Quality improvement and control programs</b>													
Current use	34	31	37	51	32	37	40	35	37	33	40	37	*/ ** KW
Future use	59	69	62	72	58	62	64	60	62	59	64	62	
<b>Equipment productivity programs</b>													
Current use	26	42	30	40	26	30	34	27	30	27	32	30	**
Future use	52	65	55	66	51	55	61	51	55	59	52	55	**
<b>Environmental performance programs</b>													
Current use	22	40	27	42	21	27	30	24	27	22	30	27	**
Future use	28	36	35	61	26	35	33	36	35	28	41	35	***
<b>Continuous improvement programs</b>													
Current use	30	38	32	37	30	32	33	31	32	35	30	32	**
Future use	56	62	57	63	55	57	64	52	57	63	54	57	**

(Continued)

	Power distance			Individualism			Masculinity			Uncertainty avoidance		
	Low	High	Total	Low	High	Total	Low	High	Total	Low	High	Total
<i>Quality performance</i>												
<i>Relative to competitors</i>												
Manufacturing conformance	18	32	22	35	17	22	21	22	22	20	23	22
Product quality and reliability	21	41	26	43	20	26	24	27	26	23	28	26
<i>Change in performance criteria</i>												
Manufacturing conformance	100	0	86	0	100	86	100	50	86	75	100	86
Product quality and reliability	36	48	39	51	35	39	41	38	39	37	41	39

**Note:** Significance: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$  chi-square test/KW = Kruskal-Wallis test

Table AII.

**Table AIII.**  
Quality priorities,  
practices and  
performance and  
cultural dimensions

	Power distance		Individualism		Masculinity		Uncertainty	
	Low	High	Low	High	Low	High	Low	High
Quality priorities								
<i>Change of priorities of customers</i>							☑	
Superior product quality							☑	
Superior conformance quality						☑		
<i>Improvement goals in the next three years</i>								
Manufacturing conformance								
Quality practices								
<i>Quality costs</i>								
% Inspection						☑		
% External								☑
<i>Quality and supplier selection</i>								
<i>Quality improvement and control programs</i>								
Current use				☑				☑
Future use				☑☑				☑
<i>Equipment productivity programs</i>								
Current use				☑☑				☑
Future use				☑☑		☑		☑☑
<i>Environmental performance programs</i>								
Current use				☑☑		☑		☑☑
Future use				☑☑		☑		☑☑
<i>Continuous improvement programs</i>								
Future use				☑				☑
Quality performance								
<i>To win competitors</i>								
Manufacturing conformance				☑☑				☑☑
Product quality and reliability				☑☑				☑☑
<i>Change in performance criteria</i>								
Manufacturing conformance								
Product quality and reliability								
		☑						☑

**Note:** ☑ = significant difference in emphasis

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