Total Quality Management
Vol. 17, No. 6, 775–794, July 2006

Routledge
Taylor & Francis Group

How Quality Management Models Influence Company Results– Conclusions of an Empirical Study Based on the Delphi Method

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ABSTRACT *In this article, the authors analyse the influence on companies' performance of the two most important models for Quality Management practice popularized in Europe in recent years–the ISO 9000 and the EFQM models–based on a qualitative survey carried out using the Delphi method. The results of this survey were analysed and triangulated with the results of other surveys carried out previously, as well as with information gathered during several in-depth interviews of the experts that participated in the Delphi panel.*

KEY WORDS: ISO 9000, EFQM, Delphi, quality management models, Spain

Introduction

The past decade has witnessed the forceful emergence onto the business scene of the quality culture movement. Originally, it was a movement whose impact was limited to the industrial sector; nevertheless, over the years, these initiatives spread and became popularized, reaching almost all sectors of the economy: financial services, education, social services, health care, etc. The rise of Quality Management (QM) in the world of business is normally associated with the implementation of Quality Systems based on the ISO 9000 international standards and, in Europe, of the Excellence Model of the European Foundation for Quality Management (EFQM), one of the international models for establishing Total Quality Management (TQM) systems in companies. As will be seen, Spanish companies, the object of analysis of this study, have not remained unresponsive to this important rise in quality; quite the contrary, they have positioned themselves among the leaders of this movement.

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1478-3363 Print/1478-3371 Online/06/060775–20
DOI: 10.1080/09593960600597768

Adopted in 2003 (ISO, 2003) by nearly 250,000 companies in Europe, the ISO 9000 standards have come to be associated with the implementation of Quality Assurance Systems (QAS), although in its new version for the year 2000 (the ISO 9000:2000 standards) concepts like client satisfaction and continuous improvement have greater weight, and key terminological changes have even been made. In accordance with what is included in the standard itself, QAS has become Quality Management Systems (QMS). It is important to emphasize that, while global in scale, in the early stages these standards spread primarily through the countries of the EU, and especially the United Kingdom. For good reason the European Commission established them as a priority objective (Hardjono *et al.*, 1997). By 1996 the countries of the EU had obtained more than 62% of the worldwide certificates, of which more than 50% had been issued in the United Kingdom.

Nevertheless, in that same year, spectacular growth began in many countries, among which Spain stands out. This can be seen in Table 1, which also shows how, in 2001, the United Kingdom continued to be the country with the greatest certification intensity, although it has decreased from 2.82 to 1.57 with respect to the EU mean. On the other hand, Italy has converted itself into the country with the second highest certificate

Table 1. Global evolution of the certification process following the ISO 9000 regulations in the EU

	1995	1999	2003	% Registr. (2003)	GDP PPS (2002)	% GDP	Intensity
EU-25	89.088	177.758	244749	100	9625,302	100	1
Austria	1133	3421	3204	1,31	209,215	2,17	0,60
Belgium	1716	3495	4032	1,65	255,261	2,65	0,62
Cyprus	7	184	328	0,13	12,552	0,13	1,03
Czech Republic	180	1500	8968	3,66	146,02	1,52	2,42
Denmark	1314	1962	935	0,38	139,393	1,45	0,26
Estonia	1	77	261	0,11	13,433	0,14	0,76
Finland	772	2105	2058	0,84	124,826	1,30	0,65
France	5536	16028	18007	7,36	1464,076	15,21	0,48
Germany	10236	30150	24889	10,17	1990,3	21,77	0,47
Greece	248	1050	2000	0,82	180,209	1,87	0,44
Hungary	309	3289	7921	3,24	125,949	1,31	2,47
Ireland	1617	3100	1645	0,67	110,254	1,15	0,59
Italy	4814	21069	64120	26,20	1318,802	13,70	1,91
Latvia	0	39	75	0,03	19,285	0,20	0,15
Lithuania	2	91	324	0,13	31,134	0,32	0,41
Luxembourg	48	113	118	0,05	20,085	0,21	0,23
Malta	12	56	223	0,09	6,225	0,06	1,41
Netherlands	5284	10620	10309	4,21	417,241	4,33	0,97
Poland	130	1012	4127	1,69	369,35	3,84	0,44
Portugal	389	1131	4035	1,65	168,415	1,75	0,94
Slovakia	59	560	1231	0,50	58,514	0,61	0,83
Slovenia	99	521	466	0,19	31,795	0,33	0,58
Spain	1492	8699	33215	13,57	811,732	8,43	1,61
Sweden	1095	3786	3107	1,27	216,857	2,25	0,56
United Kingdom	52595	63700	49151	20,08	1477,149	15,35	1,31

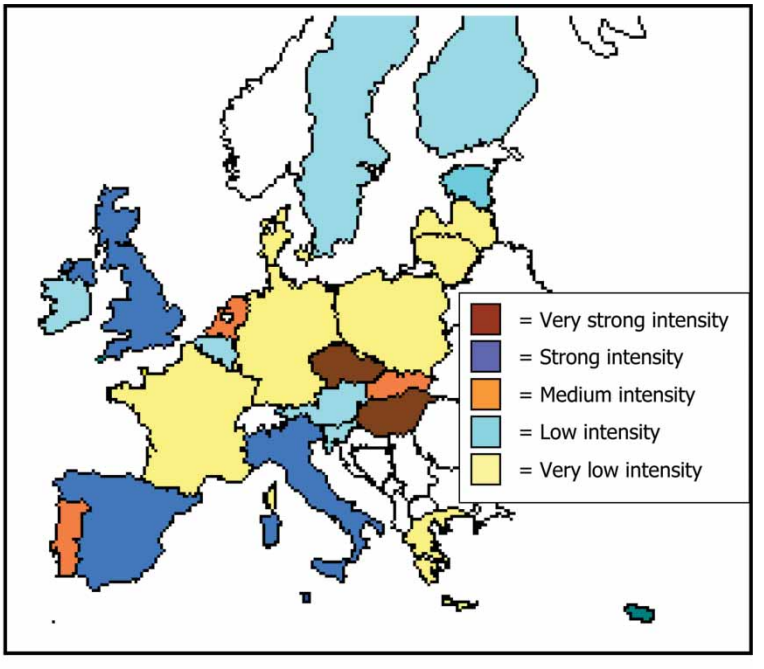
Source: Prepared from data obtained in ISO (2003) reports and information from EUROSTAT (2004).

intensity, and during the 1996–2001 period it was the country where the largest number of new certificates were issued.

In order to compare certification levels in each country, a new indicator based on certification intensity with respect to GDP (Casadesús *et al.*, 2005) has been elaborated. This indicator is defined as the relation between the percentage of ISO 9000 certificates from each country and its percentage of contribution to the European GDP. The analysis of this indicator provides an initial approximation of the average 'level of quality' of companies from each country. Figure 1 provides a graphic illustration of that indicator.

In order to analyse the use of the EFQM in the European companies, an analysis like the one carried out for the ISO 9000 cannot be completed because it is not a certifiable model and there is no unified record of the number of companies that have implemented it. However, some relative and interesting data can be extracted from the information regarding the recognition granted to it by various national and international organizations.

Analysing the question at the European level, for example, there are the 'European Quality Awards' granted by the EFQM for the implementation of TQM. The EFQM database includes information about companies that have been successful in terms of quality ('Successful Organisations Database'). It is organized into four different categories (from lowest to highest level: 'Committed to Excellence', 'Recognized for Excellence', 'European Quality Awards Finalist' and 'European Quality Awards Winner'). Among the 226 companies within this database from 2000 to 2004 there are 41 Greek companies (35 in the lowest category), 31 German companies (20 in the lowest category),



Source: Prepared from data obtained from ISO (2003) reports, information from EUROSTAT (2004).

Figure 1. Certificate intensity in the countries of the EU in 2003

28 companies in the United Kingdom (seven in the lowest category) and 28 Spanish companies (seven in the lowest category). A summary of that information is presented in Figure 2.

Objectives

The aim of this article is to analyse the results of QM implementation among Spanish companies and, according to the models most commonly used in recent years, ISO 9000 and EFQM.

First of all, we have to consider that the rise in QM during the last few years has been extensively analysed through numerous empirical studies in the academic area. An important part of these empirical studies has been the effort to analyse the main effects of the implementation of some of these models, especially the ISO 9000 standard and the EFQM model, on business results or performance. The majority of the studies have been quantitative, based on surveys addressed to managers of companies who have participated in the process of Quality Systems implementation, as will be shown in the next section. However, the studies analysing the effects of QM in this way include, in our opinion, a possible weakness and methodological distortion of the effects of the process itself by basing themselves only on the opinions of the managers of the companies involved in the implementation, producing results that might be biased, as has been emphasized by various researchers (see, for example, Wayhan *et al.*, 2002).

For these reasons, in this research we have considered it necessary to use a methodology that takes into account the opinions of a wide range of experts having a variety of functions in the implementation of QM models: the Delphi method. The information thus obtained can be compared and triangulated with information obtained in previous empirical studies carried out with traditional methodology.

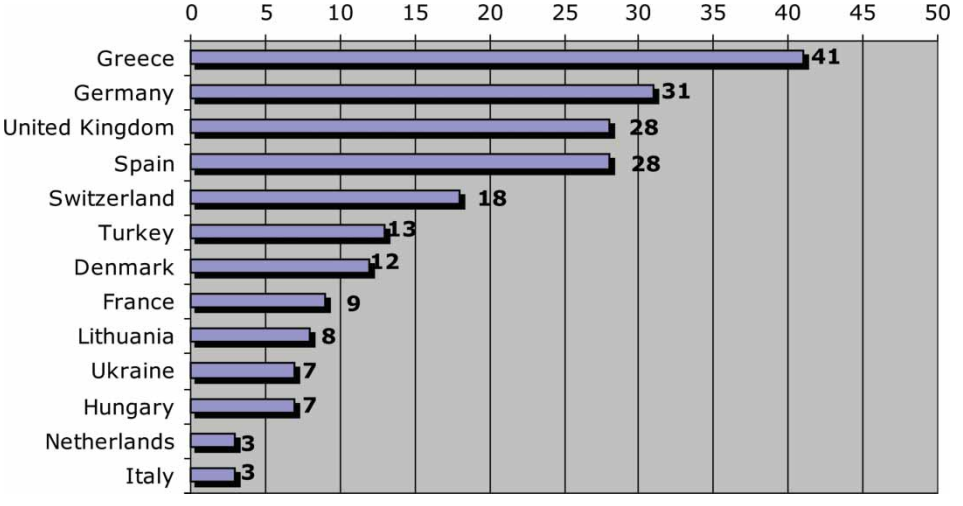


Figure 2. Organizations recognized by the EFQM as successful in terms of quality (2000–2004)
Source: Prepared from the Successful Organizations Database (EFQM, 2005).

Once the background to and the objectives of the research have been analysed, a review of the empirical studies carried out in recent years will be undertaken in the next section of this paper so that, in the subsequent section, we can focus on an analysis of the methodology used in the empirical study. In the fifth section we present, in a summary, the main results of the study, and in the sixth section the conclusions and general contributions derived from it are presented.

Review of the Literature

The academic literature of empirical studies that have analysed the effects on company results of the implementation of quality systems based on the ISO 9000 and TQM models is very extensive. Table 2 presents a brief summary of the principal empirical studies carried out around the world in recent years. In addition to the research studies cited in the table, many others related to the same topic were carried out in earlier years. In the interests of brevity, we have chosen only to include a selection of the most relevant studies from the past 8 years.

In Table 2, it can be seen that most of the studies on QM were quantitative and based on surveys directed at managers; and most of the surveys were addressed specifically to managers and/or staff responsible for quality management. In our opinion, these researches are possibly weakened and methodologically distorted by basing themselves only on opinions about the effects of the process of the company managers who had participated in the implementation process of the quality systems. As a result of this possible bias, the use of commercial economic and financial databases as sources of information to verify the impact of QM models on company results has grown in recent years. Even so, these studies are very limited when establishing causes for the relationships analysed, as is all too well known and emphasized in the studies (Haversjö, 2000; Wayhan *et al.*, 2002; Heras *et al.*, 2002, 2004; Dimara *et al.*, 2004).

For these reasons, in the study summarized in this paper it was considered necessary to use a method taking into account the opinions of experts responsible for a variety of functions in the QM implementation process, in order to analyse results in a more wide-ranging way.

Methodology

In the early stages, the Delphi method was focused on studies of market technology, which is why it has been associated with this study, although its potential is much greater. (In this respect, the examples of practical applications of the Delphi method reported in Linstone & Turoff, 2002 are very interesting.) In fact, this method has been applied from the beginning in the analysis of questions related to education, public administration or other economic and business issues (Helmer, 1966; Campbell, 1966). Currently, according to our knowledge of the field of QM in Spain, the use of the method is growing little by little (see, for example Rodríguez Antón *et al.*, 2004).

The academic literature containing the methodological foundations of this method of research is extensive. Internationally, various monographs coordinated by Professors Linstone & Turoff (2002) and MacCarthy & Atthirawong (2003) stand out. Next we will try to carry out a summary of the methodological bases of the Delphi method.

Table 2. Principal studies analysing the effects on results of QM implementation (1996–2004)

Study	Methodology	Main conclusions
Adam *et al*. (1997) 977 companies	Survey mailed to managers	There is a positive relationship between the QM dimensions and the financial and operating results.
Forker (1997) 264 companies in the USA	Survey mailed to managers	There is a positive relationship between the seven dimensions of QM and the relative efficiency of the operating results.
Terziovski *et al*. (1997) 1,341 companies in Oceania	Survey mailed to managers	It has not been demonstrated that there is a positive relationship between ISO 9000 and TQM implementation and operating results.
Easton & Jarrel (1998) 108 companies in the USA	Survey mailed to managers	In the long term the companies putting TQM into practice are more profitable than the control sample.
Hendricks & Singhal (1999) 600 companies in the USA	Database analysis	The price of the company shares established by TQM models would not vary significantly during the implementation period, but would increase significantly during the post-implementation period.
Simmons & White (1999) 7,598 companies in the USA	Commercial database analysis	Certified companies are more profitable than non certified companies in the US electronics industry. There is no evidence of improved operations.
Haversjö (2000) 800 Danish companies	Database analysis	Certified companies are more profitable than non-certified companies, although certification does not seem to be the cause of the increase in profitability.
Lima *et al*. (2000) 129 Brazilian companies	Database analysis	No evidence of greater profitability was found among the certified companies with respect to the control group of non certified companies.
Romano (2000) 100 Italian companies	Survey mailed to managers	ISO 9000 certification contributes to improving quality costs, internal and external quality and production times, although it increases inspection costs.
Aarts & Vos (2001) 43 public companies in New Zealand	Database analysis	The differences between the value of the companies before and after certification were analysed, and it was concluded that companies view their situation worsening.
Casadesús *et al.* (2001) 502 companies in Spain	Survey mailed to managers	65% of the companies obtained improvements, internal as well as external, following implementation of the ISO 9000. The profit-motivation relationship stands out, given that the companies certified for internal reasons obtain greater profits.
Merino (2001) 1,000 companies in Spain	Survey mailed to managers; case study	There are significant sectoral differences between QM practices and their influence on results. The companies reaching the highest indexes of QM implementation obtain the best results.

(*Table continued*)

Table 2. Continued

Study	Methodology	Main conclusions
Withers & Ebrahimpour (2001) 11 European companies	Case study	QM contributes to improving the quality of products, communication, employee relations, the time cycle, competition and market share.
Álvarez *et al.* (2002) 1,200 companies in the USA	Commercial database analysis	The companies certified in accordance with ISO 9000 are more profitable and obtain increased sales, primarily during the period of implementation.
Brah *et al.* (2002) 124 companies from Singapore	Survey of managers	The implementation of TQM is related to improvement in company results.
Gotzamani & Tsiotras (2002) 85 large Greek companies	Survey mailed to managers	In the opinion of the managers, ISO 9000 contributes to improving internal company organization and operating results.
Tarí & Molina (2002) 106 companies in Spain	Survey mailed to managers	The companies in Alicante that have put QM into practice have improved business results, client satisfaction, employee satisfaction and social impact.
Wayhan *et al.* (2002) 96 companies in the USA	Database analysis	The profitability of certified companies is slightly higher than in other, non-certified companies.
Dimara *et al.*(2004) 94 Greek companies	Survey of managers and database analysis	The financial results of certified and non-certified companies are analysed, taking into account their strategic orientation, which is, in the end, the variable affecting company profitability.
Costa & Lorente (2004) 442 Spanish companies	Survey mailed to managers and databases	TQM has a positive effect on the operating results. However, the simultaneous application of ISO 9000 and TQM systems cancel those positive effects.

Source: Prepared from the published studies presented in the table.

The Delphi method, according to the classic definition, is a general way of structuring the group communication process and making it effective enough to allow a group of individuals, functioning as a whole, to deal with complex problems (Linstone & Turoff, 2002). As MacCarthy & Atthirawong (2003) point out, it is a systematic process that attempts to obtain group consensus resulting in much more open and in-depth research, since each member of the group contributes new aspects of the problems to be researched during the post-research phase. The renowned sociologist Manuel Castells (1999) claims that one of the bases of the Delphi techniques is rooted in the fact that they are more socially representative than statistics based on the opinions of experts in the field. Nevertheless, forming the foundation of this social representation are large numbers of quantitative studies in which specific agents/players from the institutions studied participate as representatives of a specific organization (a business, for example).

One of the keys to success in this type research is the appropriate selection of panel members (Reid, 1988): they should be selected for their capabilities, knowledge and

independence. In addition, it is advisable to form these groups with a minimum of seven and a maximum of 30 members (Denzin & Lincoln, 1994; MacCarthy & Atthirawong, 2003), even though studies have been carried out with much more numerous groups of hundreds of people, and one study was even done with several thousand people in Japan. Some authors have pointed out, however, that in the larger groups, many of the experts do not demonstrate sufficient knowledge or capability and, in addition, in these cases the proportion of experts who prematurely withdraw from the research increases (Reid, 1988). To avoid these withdrawals, it is essential that the experts selected receive information about the objectives of the study, the estimated time required for their participation, the potential of the research and possible benefits they can obtain by participating in it, regardless of the means of communication used to contact them.

On the other hand, to achieve effective communication, it is necessary to avoid the dominant influence of any one member of the group over the others. The Delphi method, according to numerous authors, manages to reduce this danger (Ray & Sahu, 1990; Klassen & Whybark, 1994; Green & Price, 2000; MacCarthy & Atthirawong, 2003). To accomplish this, the participants must not know the identities of the other members of the group when expressing their opinions.

Another basic aspect of the successful use of this methodology is rooted in the writing of the questions to be included in the different questionnaires. They must be clear and concise, and correctly understood by the experts. In the first phase, it is advisable to begin with open-ended questions, so as to extract from their responses the items and questions upon which the continuation of the work will be based. In the next phase, the questions should be directed towards the assessment, the hierarchical comparison of items, or even towards specific quantitative estimations. That is, it must be possible to measure the results of the surveys with established criteria. Once the responses have been received, the work with the results begins. As has been previously pointed out, the objective of the successive questionnaires is to try to diminish any dispersion of opinions and specify the average opinion agreed upon. Therefore, when the responses are received the group coordinator begins to add up the various individual estimations and extracts from them a measurement of the central tendency of the distribution, generally the median, which is then accepted as the group response. In the questions permitting it, the interquartile range of the responses is also estimated, as a measurement of its dispersion. Once the results of each survey have been analysed, it will be decided whether another survey is necessary or, on the contrary, whether a high degree of consensus has already been reached.

In case another enquiry is necessary, the experts are normally sent information about the median and the interquartile range together with their previous, individual responses. Furthermore, additional information required or provided by one or more of the experts is occasionally attached or simply made available by the group coordinator if it is considered to be of interest and related to the purpose of the investigation. In light of this new information, the experts are requested to reconsider their first estimations, if they consider it necessary. The process is repeated until the responses stabilize, that is, when the median shows practically no oscillation and the interquartile space stops getting narrower. This indicates that, following an anonymous exchange of information, maximum consensus has been reached (MacCarthy & Atthirawong, 2003).

There are several important advantages or strengths to this method (Denzin & Lincoln, 1994; Linstone & Turoff, 2002), but that discussion would obviously extend beyond the

objectives of this article. We will limit ourselves to pointing out, as a means of reflection, that the limitations created by this subjectivity and this dominance of value judgements – in other words the regulatory bias of this research method – can also be attributed, to a great extent, to the conventional use of quantitative methodologies in our field, only very recently the focus of any criticisms. For example, data for a large part of the empirical research in this field are obtained from surveys given to managers or people responsible for quality. These data can also be made to look ridiculous, due to limitations of the use of questionnaires as tools, or to the possible biases referred to previously, among other factors now coming out in the literature (see, for example, Boys *et al.*, 2004, and Wayhan *et al.*, 2002). It is a limitation that is well known to researchers in the field of management and becoming increasingly appreciated by researchers and editors.

Empirical Research

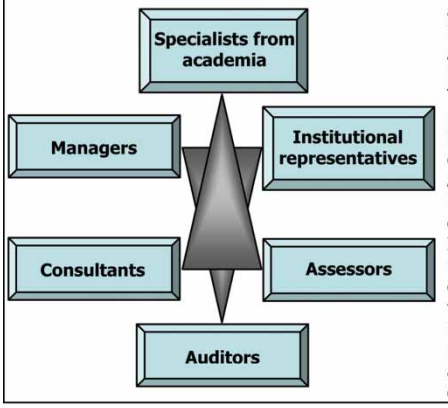
This research has been carried out between May of 2003 and December of 2004. First of all, it has to be considered that before working on a Delphi research the authors already had a certain amount of research experience carrying out empirical studies analysing QM system implementation processes and results. These studies were focused on the analysis of implementing the ISO 9000 standards using quantitative techniques, questionnaires directed at the managers of certified companies (Casadesús & Heras, 1999; Casadesús *et al.*, 2004; Heras, 2001), and commercial economic and financial databases (Heras *et al.*, 2002, 2004). Likewise, Heras (2001) carried out a quantitative study in the Basque Country, an Autonomous Region of Spain, in which not only managers but also others involved in the ISO 9000 implementation process (workers, clients, suppliers, certifying bodies and consultancy firms) were involved. However, owing to the limited participation of some of those involved, the established goals were not achieved (Heras, 2001).

In order to carry out this qualitative research, a panel of experts was formed in May and June 2003. In this panel were 27 QM professionals and specialists (see Table 3) from the Basque Country (the region of Spain where QM has experienced the greatest boost and development (Heras *et al.*, 2003)) with extensive experience in the field of QM: company managers, consultants, certifiers, academic specialists, assessors and members of institutions such as *Euskalit* (an organization that advocates management improvement and innovation by promoting the Total Quality Management culture in the Basque Country) and the Knowledge Cluster (an association dedicated to promoting and supporting the development and use of management knowledge in the Basque Country).[1]

An initial questionnaire was sent to the panel of experts. Included in it was a series of very open-ended questions, based on the experience of the researchers and the contributions collected from the summarized literature. The pilot version of the questionnaire was reviewed and corrected by an assessment group formed by a manager, a consultant, an assessor and two academics with extensive research experience.

Once the questionnaires had been circulated twice, group consensus was high and the circulation phase was considered finished. However, and as can be seen in the literature on the method, two rounds of consultations with the experts were anticipated, with the possibility of a third round, if the consensus reached was not adequate. The procedure was then repeated several more times until the responses were refined and a convergence of responses over the occurrence of a series of events was arrived at. In each round the

Table 3 Members of the panel of experts

Members of the panel	Selection criteria
	The panel contained a group of specialists from the field of academia, prestigiously renowned for their work in both the implementation and dissemination of QM. Also, institutional representatives of organisations promoting QM in the Basque Country. The Euskalit Foundation was crucial for the formation of the panel of experts, participating were 4 assessors with experience in EFQM model implementation assessment in a variety of types of companies. Also, a group of auditors belonging to the 4 principal accredited bodies operating in the Basque Country, which had issued 75% of the ISO 9000 certificates. In addition, 6 consultants with extensive experience in the implementation of QM systems. Some of them were from large consultancy agencies while others were from smaller agencies that employed different working methods. Finally, 6 high level managers with experience in the implementation of QM systems. They came from companies with a variety of characteristics and objectives that had reached different levels of QM system implementation.

Source: Prepared by the authors.

median was calculated as a measurement of concentration and the interquartile distance was calculated as a measurement of dispersion of the various assessments carried out by the experts. This, in turn, formed part of the information that, in order to reach consensus, was subsequently provided to the experts.

In the autumn of 2003, once the study and the analysis based on the contributions of the panel were concluded, a new complementary phase of the research was initiated. This phase consisted of two steps: in the first one, in-depth interviews with the experts who participated in the panel were carried out. These interviews were structured according to the questionnaires used by the panel, with the aim of qualifying and completing some of the commentaries collected throughout the research period. This phase of the research, arduous although fruitful, concluded in June 2004. During the second step of the complementary research, we shared the final results of the research with the more active panellist, in order to take into account the last impressions and commentaries of them. This second step was finished in December 2004.

After this empirical work, we think that the obtained results in this research can be extrapolated to other regions of Spain, evidence of which has been presented in previous research efforts by the same authors (Casadesús *et al.*, 2001; Heras *et al.*, 2002).

Research Results

In this section, the analysis of the effect of the implementation of QM models on business results is presented in two different parts: the first makes reference to an analysis of the effect of ISO 9000 implementation on results, while the second analyses the effect of the EFQM model.

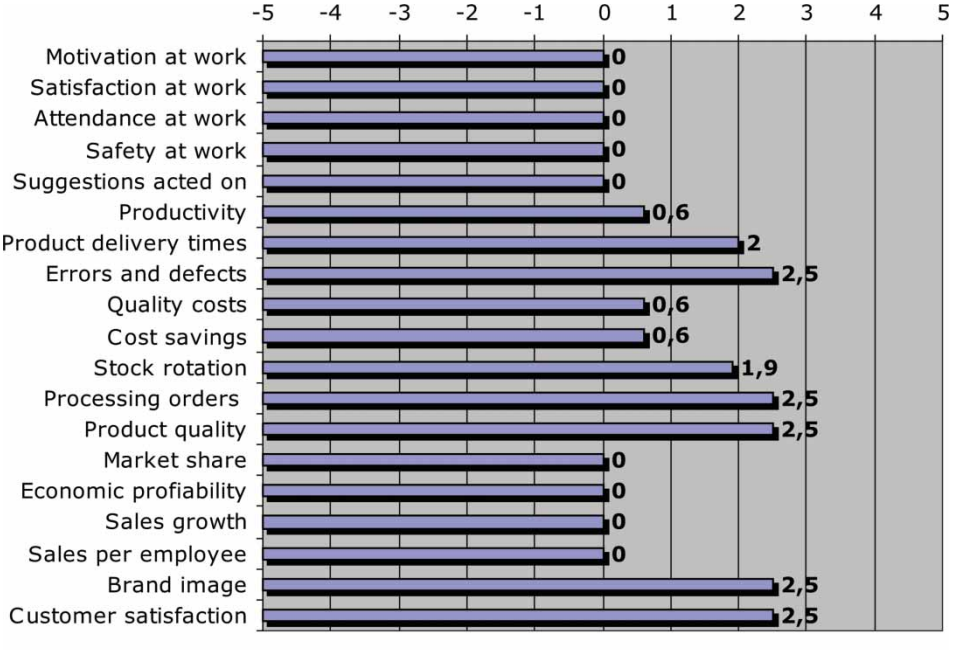
In the first case, the panellists were openly asked about the effects of these models on the operating and economic results of their companies, with normally very wide-ranging differences as cited in the studies mentioned above. The experts had to indicate which

items, elements or indicators of study were most relevant in terms of both the operating and economic results and how they would score them. From the beginning, the degree of consensus was, as will be seen, very high. As for the operating results, the most valued indicators were productivity, errors and defects, quality costs, processing orders, product delivery times, safety, and stock rotation. Regarding the economic results, the valued indicators were economic feasibility, increased sales, sales per employee, and market share. All of the indicators are frequently mentioned in the literature (Simmons & White, 1999; Haversjö, 2000, Álvarez *et al.*, 2002; Heras *et al.*, 2002; Wayhan *et al.*, 2002).

In addition, the experts were given the possibility of highlighting another set of results, indicators or factors on which the implementation of QM models had had a notable effect. In the case of both the ISO 9000 and the EFQM model, there was high consensus among the experts regarding the selection of new items to be analysed. They indicated that it would be relevant to analyse the effect on worker performance, client relations and on company image.

The first step of the research was to analyse the effect of the implementation of the ISO 9000 standards on operating results. According to the panel of experts, the result of the implementation of the ISO 9000 on operations was positive, although the assessment given was not very high, as seen in Figure 3.

The panel thinks that the ISO 9000 contributes, above all, to a decrease in errors and defects and to an improvement in safety. According to some of them, this is due to the fact that 'there is greater control over and follow-up to the processing of the orders'.



Source: Prepared by the authors.

Figure 3. Effects of the ISO 9000 on operations

The following statement, from one of the interviews given to an auditor, perfectly sums up many of the opinions collected from the members of the panel:

> . . . the implementation of the ISO 9000, if done correctly, contributes to unifying the workers' ways of working and the criteria to be followed, with positive effects on the operations. A system of working is established and improvisation is set aside. This, and no other, is the main contribution of this kind of system to improved operations.

In the empirical studies based on surveys directed at managers (Casadesús *et al.*, 2004) a similar assessment is made. Specifically, the reduction of inconsistencies and compliance with delivery times were the two factors on which the ISO 9000 had the most positive influence, according to the managers.

Considering the relation with the customers, we should point out that according to the experts, the implementation of the ISO 9000 standards seems to have positive consequences on clients as it contributes to a decrease in complaints and to clients repeating their purchases. One expert offered an interesting comment:

> . . . a greater repetition of purchases – in many cases an indicator used to measure satisfaction – was due to the fact that for clients whose suppliers are certified, it means in many cases them being saved from having to authorise suppliers. Therefore, in many cases, repeat purchases are due to this reason more than to them offering a better service.

At the same time, the experts indicate that the ISO 9000 standard helps to increase client satisfaction, which is due in part to increased control over the operations, contributing to an improvement in the quality of the products and services offered. These results confirm what has generally been stated in traditional studies in the literature, and particularly in studies carried out by the authors of this study (Casadesús *et al.*, 2001, 2004; Heras, 2001).

Another important effect that ISO 9000 certification produces on company results consists of an improvement in the brand image offered by the company. The opinions about it show a very high degree of consensus for all the subgroups of experts consulted, except for the case of company managers, where answers show some divergence. For instance, one auditor made a categorical and interesting statement about it:

> If having the certificate did not contribute to improving their image, companies would not have such a tendency to display it [. . .] even, on occasions, damaging the very rules established by ISO to advertise the certificate, and using it as if it were a label, instead of a company certificate.

Another statement of great interest, which received the approval and consensus of the group, was when the experts were unanimous in stating that the image that the certificate transmits is changing. As one expert told us:

> . . . the ISO 9000 certificate is losing value in many cases, since it has stopped being a factor that makes a difference due to the increase in certificates issued in recent years.

Analysing the effects of ISO 9000 implementation on economic results, the opinion of the experts was unanimous: a direct causal relationship could not be established between the implementation of these standards and an improvement in economic results. This opinion is diametrically opposed to that held by various authors in the theoretical literature, as well to the results emerging from the empirical studies carried out (see earlier). However, some management experts argued that there was a relationship between obtaining the certification and increased sales.

Other experts consulted felt that the costs of implementing and certifying the regulations exceeded the benefits in some sectors. With regard to this, one consultant indicated that:

> . . . in certain sectors, the certification contributes to an increase in sales. For other companies, however, particularly those that manufacture end products, those that are not subject to direct demands from clients, for example, for submitting tenders, it not only means no benefit, but also becomes a fixed annual expense.

It is also very interesting to look at the impact the application of Quality Systems had on the quality improvement of the products and services offered by companies, a question that had already been analysed in the empirical literature (see, for example, Gotzamani & Tsiotras, 2002), although it is not exempt from important conceptual discussions. In both the questionnaires circulated among the panel and in the subsequent interviews, very different opinions about this point were observed. Thus, a large number of the panellists did not feel it was relevant to look at the influence of QM models on the quality of products or services, because it seemed to them somewhat *redundant* in the following sense:

> What is a quality product or service? A product or service that satisfies the client. Well, the QM models aim to satisfy the client, in other words, to improve the quality of the products or services.

On the other hand, other experts–mainly consultants and managers–did establish a certainnuance, as they differentiated between 'the quality of the management system that the company implemented in its organisation' and the 'intrinsic quality of the products or services the company offers; understanding quality to be a set of technical characteristics such as product reliability, durability, the characteristics of the raw materials it includes, etc.'

As you can see, underlying this disparity of criteria of the experts is the classical discussion of the object of the study (quality of what? of a product? of a service? of a company's productive processes? or of company management?), as well as a discussion of concepts (dimensions of the quality, quality in terms of consistency, quality in terms client satisfaction, etc). This is a central issue, repeatedly dealt with in the theoretical literature (see, for example, Dale, 2002) and worthy of greater attention in practical studies.

Table 4 shows us a synthesis of the general opinion of the panel of experts on the influence of the ISO 9000 on company results. It is a chart that is innovative in the literature of studies using this methodology, in which the general opinion of the panel on the objective of the study is summarized in one column and, to the right, in another column, the degree of consensus for each subgroup of the panel is marked from 1 to 5 (1 being a very weak degree of consensus; 5 being a very high level of consensus).

Table 4 Summary of the main opinions of the ISO 9000 standards

	Degree of consensus		General opinion (ISO 9000)
Effects on operations	M ●●●●○ C ●●●●● Au ●●●●○	A ●●●●○ As ●●●●○ Mi ●●●●○	- It has positive effects as it exercises greater control and follow-up on the processing of orders and improves the security of the operations.
	M ●●●○○ C ●●●●● Au ●●●●●	A ●●●●○ As ●●●●○ Mi ●●●○○	- It contributes to a decrease in delivery times and in errors and defects.
Effects on economic results	M ●●●●● C ●●●●● Au ●●●●●	A ●●●●● As ●●●●● Mi ●●●●●	- The implementation of the ISO 9000 standards does not have significant consequences on economic and financial results.
Effects on the workers	M ●●●●○ C ●●●●○ Au ●●●●○	A ●●●●○ As ●●●●● Mi ●●●●○	- The implementation of the ISO 9000 standards does not have significant consequences on the workers, although in many cases they feel more controlled.
Effects on clients	M ●●●○○ C ●●●●○ Au ●●●●○	A ●●●●● As ●●●●● Mi ●●●●●	- It has positive effects as it helps to decrease complaints and to increase repeat purchases.
Effects on image	M ●●●○○ C ●●●●● Au ●●●●●	A ●●●●○ As ●●●●● Mi ●●●●○	- Certification leads to improved image. Therefore, in many cases it is used as an important advertising tool.
Effects on the quality of products and services	M ●●●○○ C ●●●●● Au ●●●●○	A ●●●●○ As ●●●●○ Mi ●●●●●	- By increasing the control over operations and materials, it reduces defective products and also improves the quality of the final products and services.

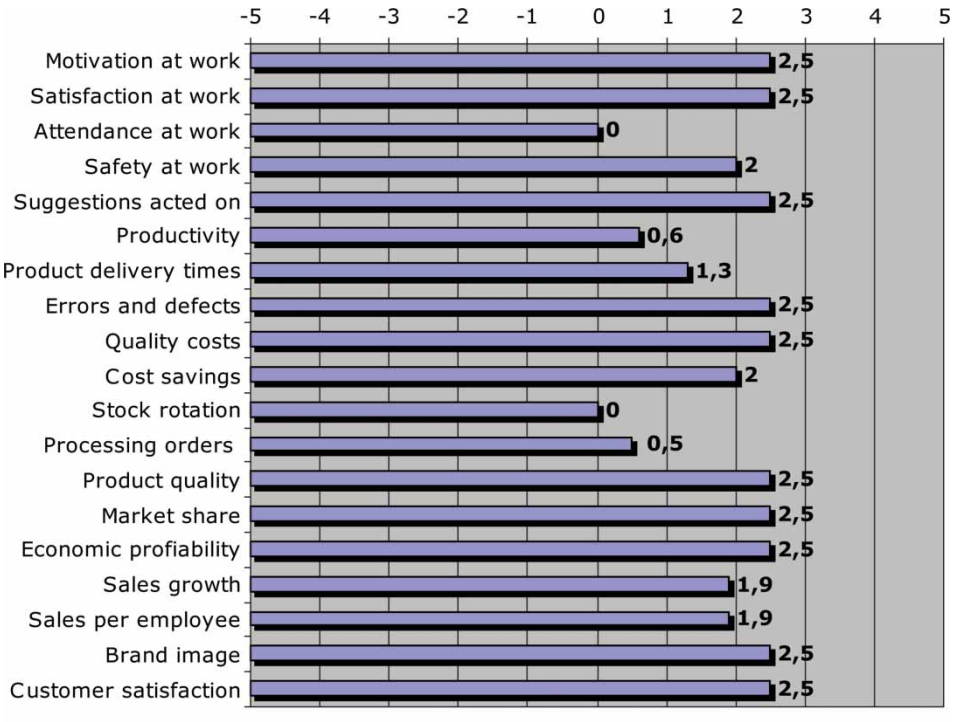
Source: Prepared by the authors.
Notes: M: Managers; C: Consultants; Au: Auditors; A: Assessors, As: Academic specialists and Mi: Members of institutions.

As far as the influence of TQM implementation in accordance with the EFQM model on business results is concerned, the different assessments made by the experts of the implementation of TQM on operating results compared with the operating effects of ISO 9000 implementation is noteworthy, as seen in Figure 4.

The panel of experts indicate, with a higher degree of consensus than in the case of the ISO 9000, that the implementation of the EFQM model contributes to a reduction in inconsistencies and quality costs, to cost savings and to an increase in the security of operations which, taken together, contribute to a decrease in errors and defects produced. This set of statements corroborates the results of traditional empirical studies in the literature (see, for example, Forker, 1997; Adam *et al*, 1997 and Romano, 2000). Regarding the results obtained with the ISO 9000, it is worth noting the generally lower grades given to the effects of the EFQM model on more specific issues in the area of the management of operations, such as stock rotation, processing orders and delivery times.

Related to this, a company manager established a close relationship between the motivating factor of implementing the EFQM model and its impact on operating results:

> The operations mainly improve thanks to the attitude of the workers, who are much more motivated and participate more in the process of detecting and resolving problems.



Source: Prepared by the authors.

Figure 4. Effects of the implementation of the EFQM model

This statement, also backed up by the rest of the managers and by most of the other experts on the panel, has not been analysed very much in the academic literature, although it has been summarized (see, for example, Withers & Ebrahimpour, 2001).

With regard to economic results, the members of the panel pointed out positive influences, since increased contact with suppliers and clients as well as increased motivation among workers contribute to improving company performance, which in turn increases economic feasibility and sales. To this effect, one consultant made the following statement, which summarizes very well the general opinion of the panel:

> The EFQM model allows us to establish a much closer relationship with clients and suppliers which is more beneficial for all of us and which will undoubtedly have a positive effect on turnover figures and profitability.

At this point we should make special mention of the various criteria used by the experts to assess the relationship between the implementation of QM models in accordance with ISO 9000 and EFQM, and in particular those criteria used by the subgroup made up of assessors as well as by some managers and experts from the academic world. In fact, between these two subgroups, both in the questionnaires circulated and in the interviews carried out, there are clear differences of criteria, as the experts emphasized at all times the important differences between the impact of the EFQM model and the ISO 9000 standards

generally and, more specifically, on economic results. In short, these experts wanted to make quite clear the distance between the two models.

This is an often repeated viewpoint of many of the experts consulted. It could be due, in part, to the effort made by various organisations in the field to highlight this difference. For example, the Basque Country Public Administration has repeatedly defended this point of view that underlines the goodness of the EFQM model as compared to the ISO 9000 (see, for example, Departamento de Industria, Agricultura y Pesca, 1997), both by Euskalit's support to the diffusion of the EFQM model, as well as by the financial support to the companies in order to implement the model. Obviously, it is an interesting aspect worthy of future study, and one that has been studied very little in the QM literature, i.e. the impact of Public Administration's support of QM models in the diffusion process.

The most direct influence of the implementation of these models on employees is that the employees see themselves as much more involved in the company, which leads to a tendency to offer more suggestions. In addition, they feel safer and more recognized, aspects that have a direct influence on them feeling more motivated and satisfied in their jobs. These results agree entirely with results obtained in other studies (Withers & Ebrahimpour, 2001, among others) and with the theoretical literature (Dale, 2002; Desmarets, 1995). However, some experts – particularly in the subgroups of assessors, auditors and consultants – made some interesting clarifications on the matter. According to one auditor interviewed:

> . . . the magnitude of these consequences is not of the size presented in many means of communication, since there is interest, from various areas, in trying to create a wave of implementations.

With regard to the effects on clients, the experts state with a high degree of consensus that they see their satisfaction increasing, due to the fact that, as one assessor said:

> . . . the client is the main figure for these models of TQM, and although the skill and effort required when introducing these models may be greater or lesser, the work carried out always has some degree of bearing on improved satisfaction.

In addition, in the opinion of the experts, this increase in client satisfaction could be due to the fact that:

> [There is] greater co-ordination and communication between the various groups that are involved in the process of designing and transforming the products, which enables them to adapt continuously to the needs of the clients, whether internal or external.

Other effects pointed out by the experts, also with a high degree of consensus, were the decrease in the number of complaints and the greater tendency of clients to repeat purchases in companies that function with TQM models.

Considering the brand image of the company, there was a very high degree of consensus as most of the experts indicated unquestionable improvement. According to them, there are two main reasons: on the one hand, the improvement in external client satisfaction inherent in the application of a TQM model; and on the other, the fact that in different

means of communication these companies are shown as a business reference group, in other words, as an example of a model of company management to be followed, an aspect that undoubtedly improves the image that these companies have in the public eye.

Finally, with regard to the impact of the application of the EFQM model on the quality of products and services offered by companies, it should be noted that the degree of consensus achieved was not so high, mainly due to the discussions of terminology and concepts discussions mentioned previously. For the experts, the model improves the quality of the products or services offered to the extent that 'the model is fully aimed at satisfying the client'.

In order to summarize the opinions of the panel of experts, Table 5 presents, as was similarly done for the ISO 9000 model, the influence on company results of the implementation of TQM in accordance with the EFQM model.

Conclusions

This research has analysed the effects on company results of the implementation of the ISO 9000 and the EFQM Model, using the Delphi method – a new research methodology in the area of empirical studies into QM. Not only have we applied the Delphi model with all its pros and cons, but we have also applied it to form a panel of experts with subgroups of different profiles, with the idea of enriching the opinions collected, completing them with structured personal interviews. We believe the methodology to be interesting, not only for validating statements gathered from the theoretical and practical literature, but also for collecting new points of view and proposals that could be the objects of future study.

Table 5 Summary of the main opinions about the EFQM model

	Degree of consensus	General Opinion (EFQM Model)
Effects on operations	M ●●●○○ A ●●●●○ C ●●●●○ As●●●●● Au●●●●○ Mi●●○○○	- It has positive effects as it contributes to the reduction of costs, errors and defects and of delivery times, as well as to increased safety of the operations.
Effects on economic results	M ●●●●○ A ●●●●● C ●●●●○ As●●●●● Au●●●○○ Mi●●●○○	- The TQM contributes to strengthening the relationship between clients and suppliers, positively affecting turnover and profitability.
Effects on workers	M ●●●●○ A ●●●●● C ●●●●● As●●●●○ Au●●●●○ Mi●●●○○	- Greater employee involvement is observed in the companies, contributing to improving the suggestions they make, their safety at work, their motivation and their satisfaction.
Effects on clients	M ●●●●○ A ●●●●● C ●●●●● As●●●●● Au●●●●○ Mi●●○○○	- Client satisfaction increases after the implementation. In addition, among other aspects, there are more repeat purchases and fewer complaints made.
Effects on image	M ●●●●● A ●●●●○ C ●●●●● As●●●●● Au●●●●● Mi●●●●●	- The brand image improves for two reasons. On the one hand, it contributes to increased client satisfaction and, on the other, the recognitions obtained by some of these companies allow them to achieve preferential status.
Effects on the quality of products and services	M ●●●○○ A ●●●○○ C ●●●●● As●●●●● Au●●●●○ Mi●●○○○	- Implementation contributes to approximating to a greater extent the clients' objectives, improving the quality of the products and services.

Source: Prepared by the authors.

Notes: M: Managers; C: Consultants; Au: Auditors; A: Assessors, As: Academic specialists and Mi: Members of institutions.

First of all, and summarizing the opinion of the panel of experts, it seems that the implementation of both QM models has a positive influence on company results, mainly through the improvement of operations, efficiency and the costs of companies' internal activities. However, in their opinion, the direct effect on economic results is not so clear, especially in the case of the ISO 9000 implementation.

On the other hand, there is a very high degree of consensus on emphasizing the importance of the implementation of the models on the company's market quality image. Taken together, according to some of the experts consulted, the image per se that the recognition associated with these models transmits is not static. In this respect, the economic-financial analogy seems clear: the value of the certificate or award is inversely proportional to the number of certificates or awards in circulation. It would seem, therefore, that the ISO 9000 standards are coming close to the decline stage, if we analyse their development from the point of view of the life cycles of management tools (see Marimón *et al.*, 2004). We must wait and see whether the new version of the standard for 2000 will mean its reactivation, 'a new wave of certifications', in the words of one expert consulted.

Given the way things are, we believe that the bodies *promoting* and *motivating quality* (foundations, associations, certifying bodies, consultancies, etc) should make a special effort to try to prevent further extension of the habit of using one of the many added values of the process of introducing a quality model – obtaining certificates or awards – as an aim in itself, or in other words, quality as a mere advertising tool which means nothing more than short-term success, something that could have a negative bearing on the expansion of what has come to be known as the *quality movement*.

Finally, to our understanding, what is particularly interesting is the difference in points of view about the impact of the implementation of the ISO 9000 and the EFQM model on the quality of products and services offered by companies. Further empirical studies are necessary to analyse the real perceptions of the various agents (consumers, managers, suppliers, intermediary clients, workers, etc) with regard to the different concepts, systems, models or tools related to quality.

Acknowledgement

This article was written as part of a research project entitled 'Impact of Quality Management on Spanish Companies' (SEC2003-06634) financed by the Ministry of Science and Technology within the aid programme for R + D projects.

Notes

1. We would like to take the opportunity to thank all the experts for their participation in the group and, especially, Euskalit for the assistance provided.

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