

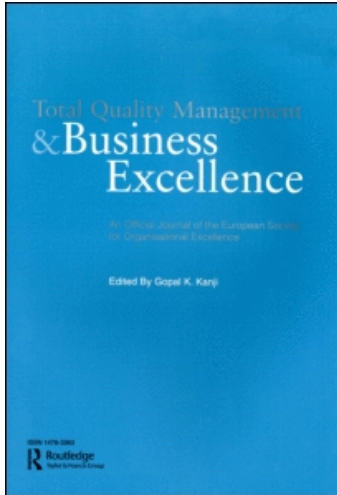
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What happened to the ISO 9000 lustre? An eight-year study

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What happened to the ISO 9000 lustre? An eight-year study

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The evolution of the benefits and costs of ISO 9001 registration over time is analysed through a four-year follow-up on the research published earlier in this journal (Casadesús & Karapetrovic, 2005a). A longitudinal empirical study was developed and conducted over a period of eight years, with three surveys administered in 1998, 2002 and 2006, respectively. More than 1000 companies based in Catalonia (Spain) took part in the study, which asked for their perceptions regarding the resources involved in and the outcomes of the implementation and registration of an ISO 9001-compliant quality management system. The results show a continued decrease in the benefits of ISO 9001 registration overall. However, the benefits which are directly related to the objectives of an ISO 9001 quality management system, as stated in the ISO 9001:2000 standard, are still dominant and reported by a large majority of companies. The study also found an additional decrease in the costs of implementing and maintaining the standard, and a further reduction in the average time needed for implementation, with reference to the initial (1998–2002) longitudinal research.

Keywords: ISO 9000; ISO 9001; benefits; quality assurance

Introduction

Standardisation of business management practices through international management system standards has accelerated tremendously in the last decade. This boom was largely created by the publication of standards in different areas of a company's operations, including quality, environment, safety, information security, supply chain security and social responsibility. Following the proposal put forward by Professor Uzumeri (1997), most academic literature today refers to these Management System Standards (MSSs) as 'metastandards' (see, for instance, Yeung & Corbett, 2005).

Models from the ISO 9000 family, established in 1987 as ISO 9001, ISO 9002 and ISO 9003, first revised in 1994 and then reduced to the sole ISO 9001 standard in 2000, are considered to represent the first global MSS (Guler et al., 2002). European Community institutions and, in particular, the European Commission, actively promoted the adoption of ISO 9001/2/3 by European companies within the reconciliation process established for the purpose of creating the European Common Market in 1992 (Crowe et al., 1998; Tsiotras & Gotzamani, 1996). That promotion finally led to incorporation of these standards into the business directives of what was then known as the European Union (EU) (Mendel,

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2002). Although these standards were initially adopted to a much lesser extent in the USA and Japan, and had even been heavily criticised in those countries as major non-tariff trade barriers, they have experienced a major boom since. This was due to the fact that companies exporting to the EU had to become registered to ISO 9001/2/3, and also due to the adoption and promotion of these standards by major governmental and professional bodies.¹

By the end of 2005, there were already 776,608 companies registered to the ISO 9001:2000 standard in the world (ISO, 2006). However, it is also true that, especially in recent years, the number of ISO 9001 registrations has decreased in the majority of countries with historically large numbers of registrations (see, for instance, data for Germany in the ISO (2006) survey of certificates, or the analysis carried out by Marimon et al. (2006) from the 2005 version of the ISO survey). This is probably due to organisational perceptions that there is no difference in terms of the benefits obtained between receiving a certificate and implementing the management system itself without registration.

Parallel to these practical developments and due to the widespread influence of ISO 9000 standards throughout the world, the academic study of their implementation and effects has included much empirical research. Such studies included a clear division of the study populations into registered and non-registered companies. For the first time in research into strategic and operational management systems, there was a parameter that distinguished those organisations that had applied a specific methodology or model, in this case, a quality management system, from those which had not done so. This meant, as Haversjo (2000) pointed out, a genuine 'gold rush' for academic researchers. A general assumption was that most companies that had implemented the standard would actually register their system, since, especially within the first few years of implementation, increased competitiveness or improved image offered by certification would prove sufficiently attractive and balance out the cost of obtaining and maintaining it.

Historically speaking, most empirical studies on ISO 9000 at first referred to the companies' motivations to implement the standard. Subsequently, the implementation process and, finally, the standard's impact were analysed. Focusing on the last item, even a fairly quick analysis reveals how large the empirical body of work on the effects of ISO 9000 registration actually is. In particular, after a thorough search, we were able to locate 115 different mail-survey studies, which were published in operations and quality management journals. Examples of such studies include Eisen et al. (1992) in Australia and in Taylor (1995) in Northern Ireland. Table 1 summarises the most important articles, according to the total number of certifications in each country where the survey had been conducted and the number of participating companies in the survey. Although it seems that there are not many countries left in the world where such studies have not been already carried out, Withers and Ebrahimpour (2001) state that most benefits, obstacles and other issues related to ISO 9001 implementation do not differ to any great extent from one culture or country to another.

However, the analysis of ISO 9000 benefits does not end with mail surveys. Many references which analyse the impact of this standard by looking at commercial databases can also be found, for example the studies carried out by Corbett et al. (2005), Haversjo (2000), Heras et al. (2002), Lagodimos et al. (2005), Lima et al. (2000), Simmons and White (1999), Wayhan et al. (2002). In addition, some authors study specific company cases, such as Douglas et al. (1999), Pheng and Wee (2001), Vouzas and Gotzamani (2005) and Withers and Ebrahimpour (2001). Furthermore, there are field-work reports made by consulting companies, for instance, CIRIA (1996), Mobil Oil (1993), Morrow (1993), Quality Systems Update (1996), Vanguard Consulting Ltd (1994). Although consultant studies can frequently count on the participation of many

Table 1. Empirical studies of ISO 9000 impacts in different countries.

Year	Country	No. surveyed companies	Reference
	Saudi Arabia	175	Magd (2006)
1991–1993–1996	Australia		Sohal and Terziovski (2000)
1994	Belgium	689	Vloeberghs and Bellens (1996)
	Canada	872	Boiral and Roy (2007)
	China	156	Zeng et al. (2007)
1997	China (Hong Kong)	383	Leung et al. (1999)
1996	China (Taiwan)	376	Huang et al. (1999)
2002	Egypt	52	Magd and Curry (2003)
1995	Germany	2100	Blind and Hipp (2003)
1996	Greece	111	Lipovatz et al. (1999)
	Holland	773	Van der Wiele et al. (2005)
2001	Iceland	21	Gunnlaugsdottir (2002)
	India		Acharya and Ray (2000)
1996	Ireland	260	Ismail and Hashmi (1999)
2001	Japan	294	Arauz and Suzuki (2004)
2003	Libya	30	Mezher et al. (2004)
2001	Lithuania	31	Ruzevicius et al. (2004)
1999	Malaysia	307	Yahya and Goh (2001)
1996	New Zealand	121	Lee and Palmer (1999)
1991	North Ireland	115	Taylor (1995)
1997	Norway	316	Sun (1999)
1990	Scotland	52	Street and Fernie (1992)
1995	Singapore	39	Quazi and Padibjo (1998)
	South Africa		Steenkamp (1999)
	South Korea	37	Park et al. (2007)
2002	Spain	399	Casadesús and Karapetrovic (2005)
2000	Sweden	135	Poksinska et al. (2003)
1996	Thailand	207	Krasachol et al. (1998)
1998	Turkey	73	Beskese and Cebeci (2001)
1996	UK	1220	Buttle (1997)
1996	USA	541	Withers et al. (1997)

companies, the results illustrated in such reports must be analysed with caution, because of the professional interest of the authors themselves and the resulting biases they may show. For instance, in the case of the ISO 9001 standard, many of these non-academic studies, sometimes much publicised, have highlighted the positive correlation between the application of these standards and economic efficiency.² However, the academic literature contains rigorous studies that both corroborate (see Álvarez et al., 2002) and refute this positive relation (for instance, Wayhan et al., 2002). Nevertheless, one of the main difficulties with these studies lies in the problem of getting around the ‘false cause’ fallacy or the *post-hoc ergo propter hoc* problem (‘after this, therefore because of this’), as several authors have highlighted (see Dick et al., 2006). Namely, it cannot be stated with certainty if it is the implementation of the standard that causes better financial performance or if such improved performance of the registered companies versus the non-registered ones is due to the former group already being more successful before the implementation.

Overall, the vast majority of studies confirm the standard’s positive impact. In fact, Leung et al. (1999) claimed: ‘Very few companies belong to groups that believe ISO

certification is expensive and not worthwhile.’ p. 689. In an earlier study published in this journal (Casadesús & Karapetrovic, 2005a), we considered the impact of ISO 9000 over time. This study was aimed at answering the question of whether the benefits of ISO 9001 implementation erode with time as more companies obtain certification and the initial ‘lustre’ of the standard fades away, and as the implemented quality management systems naturally age. In this work, it would have been logical to compare the results of the many studies conducted beforehand. Strange as it may seem, the various methodologies used in the studies made any meaningful comparison basically impossible. For instance, in terms of the content, while some studies analysed a set of internal and external benefits, others were based exclusively on the eight principles of quality management originally given in the ISO 9000:2000 standard. Furthermore, with respect to the methodology, if scales were used to evaluate the benefits, they would be different across the different studies, and while some studies assessed the data quantitatively, others would do it qualitatively, and so on. Thus, it was very difficult to even determine in a summary form what the benefits obtained from ISO 9001 certification were. Trying to assess the variation of the benefits proved even more difficult.

As a result, a decision was made to carry out an initial field study in which the variation in the benefits and costs of implementing the ISO 9000 standards were analysed (Casadesús & Karapetrovic, 2005a, 2005b). The data were obtained from two empirical surveys in the same geographic region of Spain, namely Catalonia, with 283 companies participating in 1998 (Casadesús & Giménez, 2000) and with 399 respondents in 2002 (Casadesús & Alberti, 2003). Since this initial fieldwork provides the background for the research presented here, a brief description of the problem studied and the results obtained follows.

Background

Figure 1, from Casadesús and Karapetrovic (2005b), compares the initial field study carried out in Catalonia with the work of Brecka (1994), Jones et al. (1997) and Leung et al. (1999), the only other studies that tried to assess the temporal variation of ISO 9000 benefits.

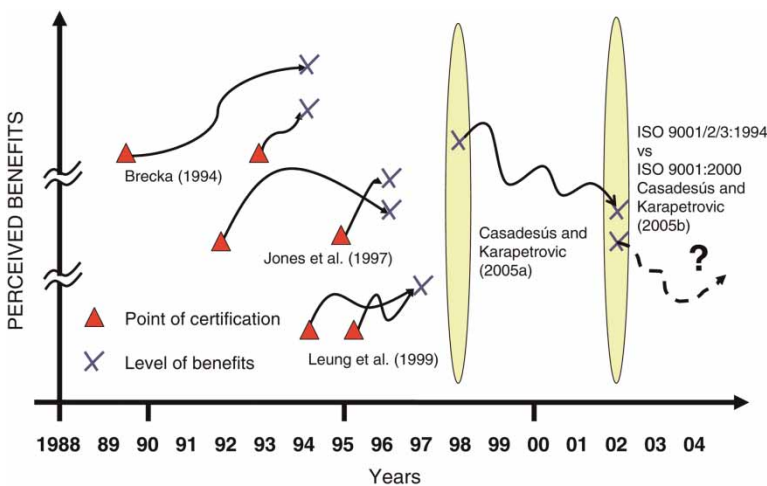


Figure 1. Comparison of the studies related to the impact of ISO 9000 over time (adapted from Casadesús & Karapetrovic, 2005b).

The most noteworthy aspect of these three studies is that each one illustrates completely different overall results from the other two. While the study done by Brecka (1994) and the certifying company Lloyd's Quality Assurance Register with the participation of 400 organisations states that the benefits of implementation increase over time, Jones et al. (1997) hold the exact opposite opinion in their study carried out in Australia, and Leung et al. (1999) find no scientific evidence in either direction. Such contrasting results may have been partly due to the fact that the studies were undertaken in different countries, with the participation of a different number of companies over different periods of time and using different methodologies. Nevertheless, all three studies consider time as a determining factor in the effects of registration, although the different methodologies used do not enable a coherent comparison of the results obtained in the studies.

Another aspect of these three studies, as explained in Casadesús and Karapetrovic (2005b), is that they may be classified as 'static', since they all analyse the evolution of registration benefits from the perspective of a single moment in time. For example, Jones et al. (1997) compare the perceptions of newly registered companies with the ones that had been registered for at least three years, but do so with a single survey conducted at a specific moment in time, namely in 1995. In contrast, 'dynamic'-type research analyses the evolution of perceptions over a period of time with two or more consecutive studies (Casadesús & Karapetrovic, 2005b). The idea is, therefore, to conduct studies with the same frequency, for example every four years, using exactly the same methodology and in the same geographic region. Specifically, Casadesús and Karapetrovic (2005a) discuss the first two empirical studies, conducted in Catalonia in 1998 and 2002, respectively. The third study, conducted in 2006, is illustrated in this paper. This 'dynamic' approach enables a more precise analysis of the situation as it existed in the various moments in time when the specific studies were conducted, since the companies involved did not have to be and were not the same as in the previous studies. In other words, the companies participating in the first study were representative of the situation in 1998, and those participating in 2002 were representative of that year. *A priori*, the situation had actually changed, for example with many more small companies from different industrial sectors becoming registered as time went by. This meant that the study samples had to be different because of the changes that occurred in the respective populations of ISO 9000-registered companies over each four-year period.

The results of the two previous studies (Casadesús & Karapetrovic, 2005a and 2005b), as outlined in Figure 1, led to exactly as many major conclusions. First, from 1998 to 2002, there had been a clear decrease in the benefits as perceived by the companies registered to the ISO 9001/2/3:1994 standards. Secondly, in 2002, ISO 9001/2/3:1994-registered companies held a significantly more positive view of the benefits compared to the companies that were registered in accordance with the then new and now the only existing model, namely ISO 9001:2000. Several interpretations of these findings were offered in Casadesús and Karapetrovic (2005a and 2005b), including the following:

- In 1998, many companies were registered for the very first time. Therefore, they may have had a more optimistic perception of what the standard would offer them within the first few years of registration. However, by 2002, time had taken its toll on such a positive initial view.
- Over time, the rigidity of a registered management system creates difficulties in adapting the system to the necessary changes in the business. Eventually, this will lead to the erosion of the system itself and a decrease in the perception of the benefits obtained from the system.

- The companies may have changed their relative assessment of the benefits as a result of an increase in ISO 9000 registrations overall. Namely, at the time when only a few companies are registered, the intrinsic differentiating capacity of the certificate may make the perception of benefits seem greater compared to the time when the certificate is within reach of basically any company. Many company managers have stated this in empirical studies done by Heras (2006) and Heras et al. (2006).

In addition, the year 2000 saw a major change in the standards themselves, from the three certifiable models of the 1994 series, namely ISO 9001/2/3, to the single ISO 9001:2000 model with some very different requirements and a new process-based framework. Implementation difficulties, caused by these requirement and framework changes, and paired up with the fact that the standard still provides a minimal quality management system no matter how many times or how deeply it is revised, could have all led to the lowered perceptions of the short-term benefits, as found in the 2002 survey.

Regardless of the interpretation, can it be stated that the perception of ISO 9001 benefits will steadily diminish as years go by? Will these benefits experience a flattening-out period, or even an increase, once the year 2000 version of the standard has been well established? The following sections will address these questions by illustrating the objectives, the methodology, and the results of the first three-time-points study of ISO 9001-registered companies reported in the literature.

Objectives and methodology

With the aim of analysing the evolution of the benefits provided by the ISO 9000 family of standards over time and in particular of confirming the trend detected by Casadesús and Karapetrovic (2005a), a third empirical work that links up with the two previous studies (Casadesús & Alberti, 2003; Casadesús & Giménez, 2000) is presented. For enhanced consistency, this work was carried out in the same region of Spain as the earlier research, using an identical methodology, and after the same period of time that separated the first two studies, namely four years.

A postal survey was sent to the quality managers from a sample of companies from Catalonia, one of the regions of Spain with the highest rate of ISO 9001 registrations in the country and experiencing a growth in the number of certificates which is very similar to the average rate of growth in Spain (see Heras & Casadesús, 2006). In the survey, the same questions were asked as in the previous two studies. The questionnaire comprised a combination of open and Likert-type questions with a 1 to 5 scale. From the total population of 8746 companies, 2276 were selected, and from them, with a subsequent follow-up by telephone, 529 valid answers were obtained. This is, without doubt, a high number compared, for instance, to the data obtained from empirical studies shown in Table 1. The survey therefore had a 23% response rate and 96% reliability with 95% confidence. Table 2 compares the features of this empirical work to those of the previous two studies. A descriptive analysis of all the data obtained in the latest study can be found in Karapetrovic et al. (2006).

It is important to emphasise again that the companies participating in the third survey are mostly different from those that responded to the first two studies. This is because each sample of companies must be representative of the moment in time in which it is analysed, and we do not consider a continued analysis of the same group of companies to be such a case. The features of the organisations that participated in the 1998 study, for instance the company size and the industry sector, meant that they were representative of

Table 2. Profile of the 1998, 2002 and 2006 surveys.

	Year 1998	Year 2002	Year 2006
Catalonian registered companies	835	4500	8746
Surveyed companies	835	1300	2276
Received responses	283	399	529
Response rate	34%	31%	23%
Average number of employees	292	160	145
Average time of implementation	2 years 6 months	1 year 8 months	1 year 6 months

the population of registered companies existing in that year, but are definitely not representative of the year 2006. This can be easily confirmed as a great number of small companies and service organisations were registered in recent years, while it was mostly the medium-sized and large manufacturing companies that comprised this population initially.

Benefits of the ISO 9001:2000 implementation: a static view (2006)

The aim of this article is not to analyse the benefits obtained from ISO 9001:2000 registration per se, but rather to analyse the evolution of their perception. As mentioned in the introduction, these benefits have been widely studied in the literature, with the most widely quoted benefits being:

- improved efficiency, improved awareness of procedural problems, better management control (Buttle, 1997);
- improved product quality, creation of complete and well-organised files of the control procedures and the improvement of communication between the various departments of the enterprise (Lipovatz et al., 1999);
- product quality and customer complaint reduction, business performance and market position and competitiveness (Sun, 1999);
- increasing foreign buyers' approval of the firm's product quality, improving product reliability and increasing foreign buyers' confidence in the firm's management ability (Huarng et al., 1999);
- better documentation, greater quality awareness and improved measurement system (Yahya & Goh, 2001);
- improved efficiency of the quality system, better documentation procedures and increased awareness in the firms (Magd, 2006);
- continuous improvement, management control and quality focus (van der Wiele et al., 2005).

The results obtained from our study are illustrated in Figure 2, which shows not only the most important benefits of ISO 9001:2000 implementation, but also the percentages of companies perceiving a positive, negative or no influence of this standard against each of the benefits studied. In accordance with the classification given in Vloeberghs and Bellens (1996), and in the same manner as in the previous two studies (Casadesús & Alberti, 2003; Casadesús & Giménez, 2000), the benefits are categorised into four groups, namely operational results, financial results, benefits for the customers and benefits for the employees.

Broadly speaking, ISO 9001:2000 registration had a positive effect on most of the effects analysed. The percentage of companies that consider the standard's impact to

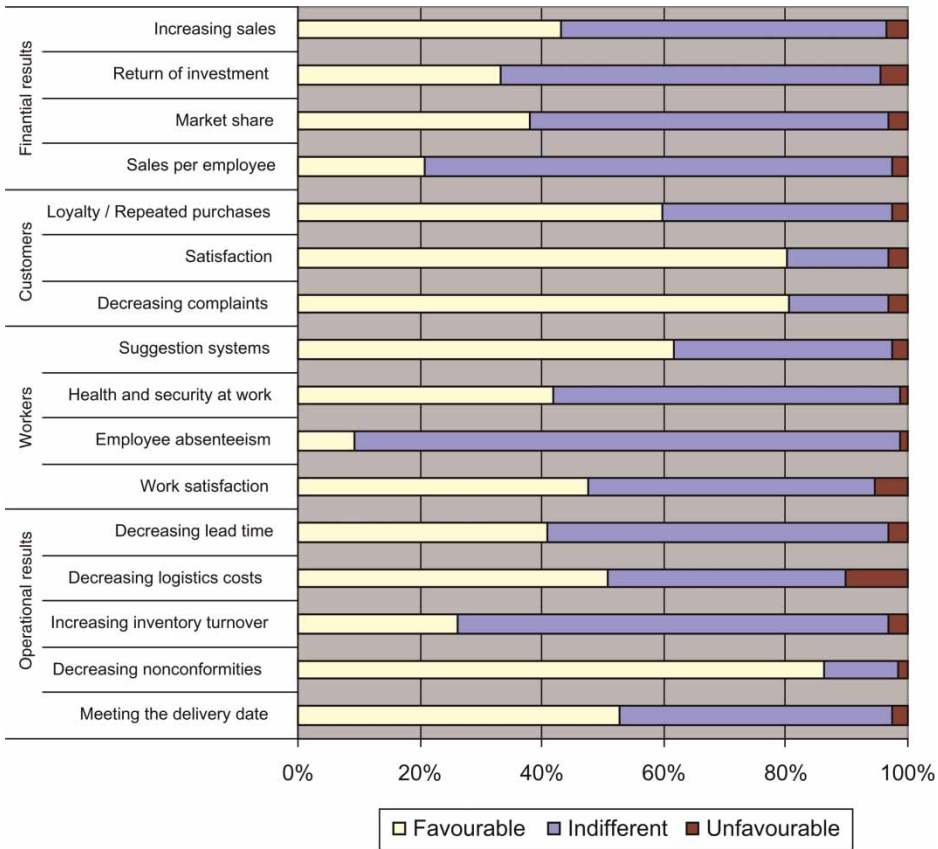


Figure 2. Benefits of ISO 9001:2000 (2006 survey).

have been negative is less than 10% in 15 of the 16 effects analysed. The one impact that was perceived as more negative than the others was the logistics costs, for which 10% of the respondents reported an unfavourable outcome of the standard.

The following is a list of some specific findings of the study:

- The most important benefits found were a decrease in nonconformities, a decrease in complaints and an increase in customer satisfaction.
- With the implementation of the standard, there is clearly an improvement in customer relationships, exemplified by increased customer satisfaction, a decrease in customer complaints, and an improvement in customer loyalty.
- The most improved operational issues are a lower number of nonconformities, meeting the delivery date and decreasing the logistics costs.
- With respect to the employee-related results, 62% of the respondents indicated that the implementation of ISO 9001:2000 improved their suggestion systems, and about half of the respondents think that work satisfaction has improved as a result, as well.
- Financial results are least affected by ISO 9001:2000 registration, although when they are, they are perceived as generally positive, with roughly 20–45% of responses, depending on the individual effect analysed.
- Implementation of the ISO 9001:2000 standard does not generally affect absenteeism at work, sales per employee or stock rotation.

- Three per cent of the respondents, on average, think that the implementation of the standard has acted against their interests in all 16 analysed effects.

Another noteworthy finding is obtained when the empirical results are contrasted with the actual objectives of the ISO 9001:2000 standard, as defined in its Section 1.1:

This International Standard specifies requirements for a quality management system where an organization

- a) needs to demonstrate its ability to consistently provide product that meets customer and applicable regulatory requirements, and
- b) aims to enhance customer satisfaction through the effective application of the system, including processes for continual improvement of the system and the assurance of conformity to customer and applicable regulatory requirements. (ISO 9001:2000).

These objectives are completely in line with the results obtained during the fieldwork. Namely, by a wide margin over the rest, the three main benefits refer exactly to product quality (fewer complaints and nonconformities) and customer satisfaction. Put another way, given that the objectives of this issue of the standard are substantially different from those of the two previous versions, ISO 9001:2000 seems to serve the purpose for which it was designed.

Benefits of the ISO 9000 implementation: a dynamic view (1998–2002–2006)

As in the IJOPM article (Casadesús & Karapetrovic, 2005a), changes in the perception of the benefits that ISO 9000 standards provide are analysed. In the current analysis, however, a third time point is added, namely the perceptions from the year 2006. It should be noted that, owing to the changes in the models available for registration, the companies responding to the surveys were registered to the different version of the standards, depending on the time of the survey. Namely, all organisations that participated in the first study (1998) were registered in accordance with one of the three models of the 1994 version of the standards (ISO 9001/2/3:1994). In the work carried out in 2002, although some responding companies were registered to the new version of the standard (ISO 9001:2000), the majority of the sample and the corresponding population contained ISO 9001/2/3:1994 registrants, as the new version had been published a little more than a year before, and a three-year 'transition' period was allowed. The 2006 study, however, is exclusively composed of ISO 9001:2000-registered companies. A graphical representation of the results obtained in 1998, 2002 and 2006 is shown in Figure 3.

The first conclusion that can be drawn from Figure 3 is that the three sets of results follow a very similar pattern. For instance, the most important benefits were basically the same in 2006 as they had been in 2002 and in 1998, namely a decrease in nonconformities, an increase in customer satisfaction and a decrease in complaints. The decrease in employee absenteeism continues to be the least relevant effect of an ISO 9000-based quality management system, which stands to reason considering that neither the context nor the content of the standard were designed to specifically influence this or other similar organisation aspects. Another finding is a general decrease in the perceived benefits when the earliest study (1998) is compared with the latter two (2002 and 2006). Namely, in the 1998 survey, the number of companies indicating a positive effect of ISO 9000 registration is higher across the board compared to both the 2002 and 2006 surveys for all but two of the reported benefits. These two benefits, which

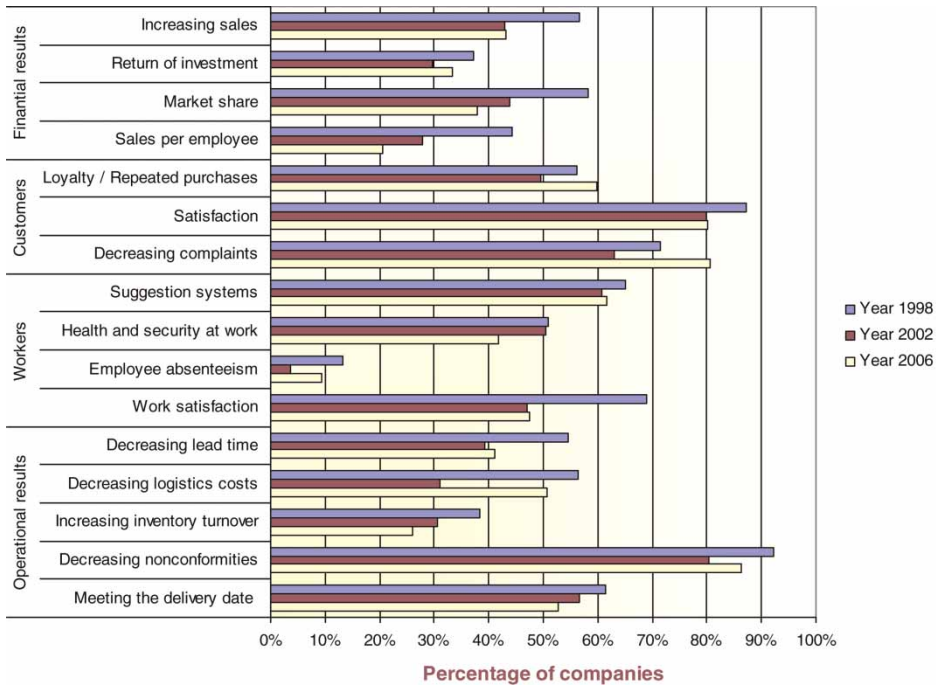


Figure 3. Benefits of ISO 9000 implementation (1998–2002–2006).

were actually reported as higher only in 2006, both related to customer satisfaction (less customer complaints and higher customer loyalty). As mentioned previously, ‘enhanced customer satisfaction’ is one of the two main objectives of the ISO 9001:2000 standard, and did not exist as such in the 1994 version.

When the results of the first two surveys were compared in Casadesús and Karapetrovic (2005b), the degree of difference between the samples was analysed using a binomial parameter test on the proportions of companies that perceived a positive impact of ISO 9000. This test was performed on all 16 factors found in both surveys, and with 95% confidence, only four factors showed no statistically significant differences, namely meeting the delivery date, repeated purchases, suggestion systems and work satisfaction. The other 12 factors indicated a statistically higher level of perceived benefits in 1998 compared to 2002. The same results were obtained when the factors were aggregated into the four overall categories of operations, finances, workers and customers, with all categories showing a significant decrease in benefits.

Table 3 shows the results of the same type of analysis, comparing the results obtained in 1998, on one hand, and in 2006, on the other. In the table, statistically significant factors with a decrease or an increase from 1998 to 2006 are indicated with a minus (‘-’) or a plus (‘+’) sign, respectively. With 95% confidence, 10 out of 16 factors show a significantly lower proportion of respondents indicating a favourable impact of the standard in 2006. Only in one case, namely a decrease in the number of complaints, a higher level was found in 2006 than in 1998. This was probably due to the increased importance of customer satisfaction in the 2000 version of the standard. Among the most noteworthy decreasing factors, special mention should be made of financial aspects, such as sales per employee, with a decrease in over half of the companies

Table 3. Comparison of ISO 9000 implementation benefits (1998–2006).

		1998		2006		Binomial-test Z	Statistically significant*
		Number of responding companies	Percentage of positive responses	Number of responding companies	Percentage of positive responses		
Operational results	Meeting the delivery date	239	61%	522	54%	2.42	–
	Decreasing nonconformities	244	93%	525	87%	2.39	–
	Increasing inventory turnover	237	38%	503	27%	3.71	–
	Decreasing logistics costs	230	57%	517	52%	1.53	
	Decreasing lead time	237	55%	515	43%	3.70	–
Workers	Work satisfaction	247	69%	524	49%	5.86	–
	Employee absenteeism	240	13%	523	9%	1.69	
	Health and security at work	241	51%	523	44%	2.51	–
Customers	Suggestion systems	242	66%	524	63%	0.98	
	Decreasing complaints	239	72%	523	81%	–2.99	+
	Satisfaction	247	87%	527	81%	2.50	–
Financial results	Loyalty/Repeated purchases	231	56%	524	61%	–1.02	
	Sales per employee	225	44%	499	22%	7.11	–
	Market share	232	59%	504	39%	5.51	–
	Return of investment	221	38%	507	34%	1.08	
	Increasing sales	232	57%	504	44%	3.65	–

Note: * 'Statistically significant' indicates that *binomial* test for '1998 ISO 9001 benefits' compared to '2006 ISO 9001 benefits' is significant at level of significance set at $\alpha = 0.05$.

responding, and employee satisfaction, with a decrease of over 20%. Grouping the factors analysed according to the categories used by Vloeberghs and Bellens (1996) particularly highlights the financial and operational results, in which three out of four of the items in the former group and four out of five in the latter were significantly reduced. In contrast, even if a continued decrease in the perception of worker-related results can be generally noted, in only two out of four of these items do these differences prove to be statistically significant. Such an outcome makes sense if one considers that the effects from this group are also the lowest-rated ones in general. Hence, their reduced perception could be more complex to detect statistically. Another possibility is that these effects have reached and are now staying at some fairly constant 'saturation' level.

In addition to comparing the results from the end-points of the eight-year period under study, namely from 1998 and 2006, a 'step by step' analysis including the intermediate survey from 2002 can be conducted as well. While the results of the 2002 to 1998 comparison were provided in Casadesús and Karapetrovic (2005a, 2005b), and were summarised in an earlier paragraph here, Table 4 illustrates the findings when the latest survey results are contrasted against the ones obtained in 2002. Evidently, most of the factors studied show no statistically significant differences between the 2002 and 2006 perceptions. In fact, only six of the 16 factors exhibit statistical differences, with five actually showing a higher perception of the benefits in 2006 compared to 2002, and one just the opposite. The majority of the benefits with an increased perception level are related to customer satisfaction (decreasing complaints, repeated purchases and decreasing nonconformities), which could be due to the fact that the ISO 9001:2000 standard focuses on customer satisfaction more than ISO 9001/2/3:1994 (see, for example, Casadesús and Karapetrovic (2005b) and Figure 1).

In summary, this empirical research confirms that a standardised quality management system is bringing the benefits it is supposed to provide over time. This is, for example, demonstrated by the high proportion of the respondents who reported increases in customer satisfaction and loyalty, and decreases in complaints and defects. However, most other indirect effects have either gone down or are asymptotically approaching a steady-state level. For instance, financial and operational benefits have experienced a particularly significant reduction. Overall, during the 1998–2002 period, the decrease in the perception of all the 16 studied factors averaged around 11% (Casadesús & Karapetrovic, 2005a), while during the eight-year period from 1998 to 2006, this perception, measured as the average of the percentages of 'favourable' responses for all 16 indicators, has decreased by up to 12%. This would indicate a certain level of the 'saturation' of the benefits obtained by the companies, and it may be that such perceptions will remain at the detected levels for some time to come. Undoubtedly, any affirmation in this sense is at least open to discussion, since in some factors, an improvement over the last four years was indicated in the perceptions. As a whole, though, the aspects analysed may point to a valid trend.

Although some of the possible causes for the decreasing and levelling benefit perceptions were already discussed in Casadesús and Karapetrovic (2005a) and Karapetrovic et al. (2006), they can be grouped into two categories of causes, namely the ones causing a genuine decrease in the benefits provided by the standard, and the ones causing a decrease in the perception of such benefits.

There are many factors that could have contributed to a real drop in the level of the implementation benefits. For example, as the ISO 9000 standards have been around for already two decades now, the implementation process would have become more

Table 4. Comparison of ISO 9000 implementation benefits (2002–2006).

		2002		2006		Binomial-test Z	Statistically significant*
		Number of responding companies	Percentage of positive responses	Number of responding companies	Percentage of positive responses		
Operational results	Meeting the delivery date	387	57%	522	54%	-0.21	
	Decreasing nonconformities	388	80%	525	87%	1.63	+
	Increasing inventory turnover	379	31%	503	27%	-2.16	
	Decreasing logistics costs	379	31%	517	52%	1.66	+
Workers	Decreasing lead time	388	39%	515	43%	-6.02	
	Work satisfaction	392	48%	524	49%	0.15	
	Employee absenteeism	391	4%	523	9%	-3.59	+
	Health and security at work	392	51%	523	44%	2.40	-
Customers	Suggestion systems	387	61%	524	63%	0.11	
	Decreasing complaints	393	63%	523	81%	-5.65	+
	Satisfaction	393	80%	527	81%	0.46	
	Loyalty/Repeated purchases	394	49%	524	61%	-2.93	+
Financial results	Sales per employee	368	28%	499	22%	2.95	
	Market share	368	44%	504	39%	2.13	
	Return of investment	367	30%	507	34%	-1.32	
	Increasing sales	371	43%	504	44%	0.30	

Note: * 'Statistically significant' indicates that *binomial* test for '2002 ISO 9001 benefits' compared to '2006 ISO 9001 benefits' is significant at level of significance set at $\alpha = 0.05$.

routine, facilitated by more knowledgeable internal staff of the company, and still in many cases the consultants and the registration bodies, paired with a possible relaxation of the threshold for registration. Such changes in the implementation and auditing processes could have brought about a decrease in the benefits obtained from the implemented system. The changes in company profiles and in the motivation to pursue ISO 9000 registration over the last eight years could have affected this outcome. For example, more and more small businesses are getting registered and although some of them may have pursued ISO 9000 because they expected operational and internal benefits, most of them were probably required by their customers to obtain registration, or decided that the registration may have provided marketing and other external benefits. If this is indeed the case, such businesses would not have seen much short-term effect on the financial, operational or employee side, which are precisely the aspects in which a decrease in benefits has been clearly detected. In addition, ISO 9001:2000 registration no longer provides a competitive advantage, as the number of companies registered to the standard has grown tremendously across all business sectors. Thus, if a registered company could have claimed some advantage over a non-registered one in the past, this is no longer the case as it will now find that most of its competitors are also registered. Because the standard only provides a set of minimal requirements for a quality management system, all registered companies should at least meet such requirements, and no competitive advantage can be had. Therefore, even the customer-related benefits such as market share or customer satisfaction may not be realised solely as a result of ISO 9001:2000 registration.

With respect to the second group of causes, namely the decrease in the perception of benefits plus their actual decrease, it stands to reason that just after registration, companies could have been so satisfied with their achievement that they would have perceived the resulting benefits as higher than in reality. Consequently, after some time passed, these companies could have adjusted their perceptions to better reflect reality. Such adjustments could take many of the effects to a certain steady-state level as detected in the study above.

It can therefore be stated that ISO 9001 is meeting its objectives, which are justifiably limited to quality management and customer satisfaction, but has also become less useful overall. This conclusion is indicated by a constant decrease across the perceived benefits from 1998 to 2006. Another point is that this result actually validates the three surveys, as each factor found to be important in 1998 was also found to be significant in 2002 and later in 2006.

Costs of ISO 9000 implementation: a dynamic view (1998–2002–2006)

It is not possible to fully study the benefits provided by the establishment of a quality management system without a parallel analysis of the required investment in terms of the costs of implementation and registration. Therefore, a good number of studies can be found in the literature about the costs of implementing ISO 9000 standards (see, for instance, Gunnlaugsdottir, 2002; Gupta & Pongetti, 1998; Gustafsson et al., 2001; Liebesman & Mroz, 2002). Nevertheless, all of these studies analyse the issue at a certain moment in time, and none of them shows or predicts how the costs actually evolved or would change over time. The only existing study of a 'dynamic' nature can be found in Casadesús and Karapetrovic (2005a), demonstrating that both ISO 9000 implementation and maintenance costs experienced a decrease over a four-year period analysed in the research (1998–2002). With the purpose of answering the question of whether this decreasing trend would continue, or the costs would flatten at some minimal level after which a further decrease would not be possible, the third empirical study asked ISO

9001-registered companies for their implementation and maintenance costs, using the same questionnaire as in the previous two studies.

Figures 4 and 5 compare the costs of implementing (Figure 4) and maintaining (Figure 5) the standard, as reported by the respondents in 1998, 2002 and 2006, respectively.

The figures reveal that the decreasing trend found in the first four-year period analysed (1998–2002) is fully confirmed over the second such period (2002–2006). The costs of the quality management system implementation have decreased considerably, to the point where they are below €6000 in over 50% of the companies participating in the last survey. Regarding the cost of system maintenance, this number exceeds 80%, when just eight years ago it did not even reach half of the sample (at 45%).

Following the analysis of Casadesús and Karapetrovic (2005a), these results should be looked at in more detail, because they will depend on a number of factors, most

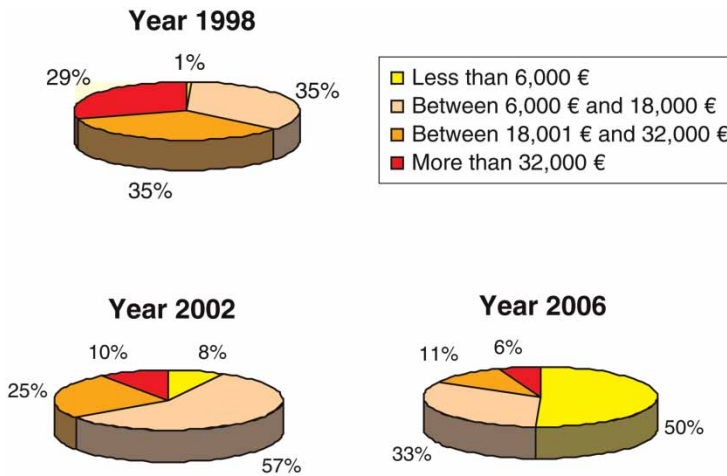


Figure 4. Costs of ISO 9000 implementation (1998–2002–2006).

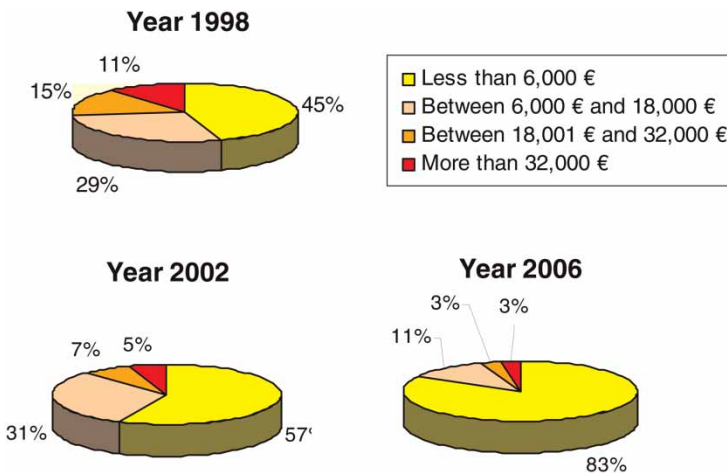


Figure 5. Annual cost of the ISO 9000 system maintenance (1998–2002–2006).

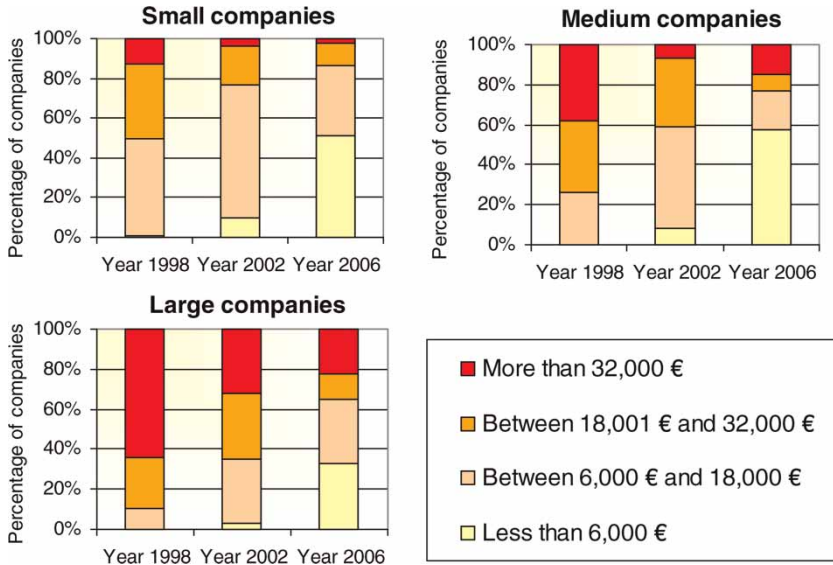


Figure 6. Cost of ISO 9000 implementation by company size (1998–2002–2006).

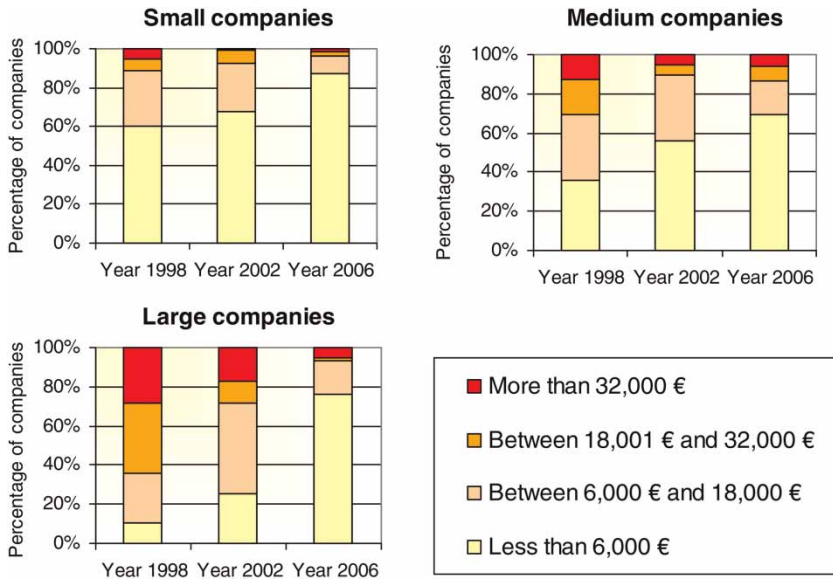


Figure 7. Annual ISO 9000 maintenance cost by company size (1998–2002–2006).

importantly the size of the organisation. Figures 6 and 7 are shown with this notion in mind, in which the evolution of the costs is observed according to the number of employees of the responding companies. A major decrease of both types of costs is apparent. In fact, this decrease is much more pronounced than the one detected in the 1998–2002 period, especially in the case of large companies.

Carrying out a further costs analysis, parallel to that conducted in Casadesús and Karapetrovic (2005a), the costs of implementation and maintenance of the system per employee are shown in Figures 8 and 9. Although the costs per employee had decreased considerably over the first four-year period analysed (1998–2002), this was not the case during the second period (2002–2006) for smaller and medium-sized companies. However, these results continue to back up McAdam’s and McKeown’s (1999) analysis, according to which the costs of achieving registration in a smaller business will be higher per employee than in a larger one, because of the various fixed costs. However, the latest survey results also show that the costs per employee have continued to decrease for large businesses (Figures 8 and 9).

To sum up, the decrease in costs seems to have continued over the second four-year period studied. Although this may be at least partly due to the changes in the overall characteristics of the ISO 9001-registered companies, such as the increasing number of smaller service organisations obtaining the certificate, it is most likely even more influenced by a number of factors that are external to these companies. Aspects such as the entry of newly registered companies in the market, the ‘saturation’ of certifications (see Marimon et al., 2006), the greater availability of the implementation training materials, the increased overall knowledge of the standards by the employees in charge of the implementation, the broader experience of consultants and registrars, as well as the possible existence of a quality management system prior to implementation of the ISO 9001:2000 standard, are some of the factors that could have contributed to the decrease in the system implementation and maintenance costs.

Another aspect that is related to the resources used to implement the standard is the actual time of the implementation. Namely, it is interesting to find out whether, similarly to the decreasing trends in the implementation costs, the time required to establish a quality management system according to the ISO 9001 standard would continue to decrease, as reported in Casadesús and Karapetrovic (2005a). These changes over the

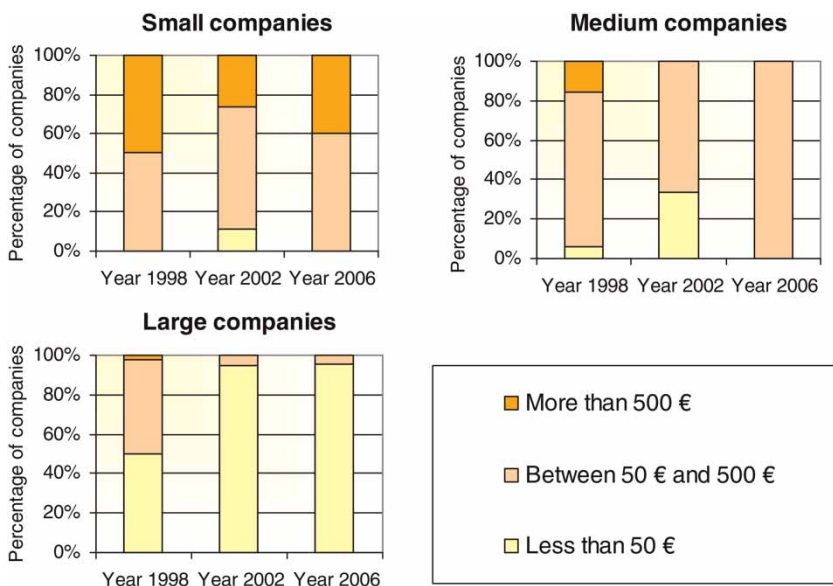


Figure 8. Cost of ISO 9000 implementation per employee (1998–2002–2006).

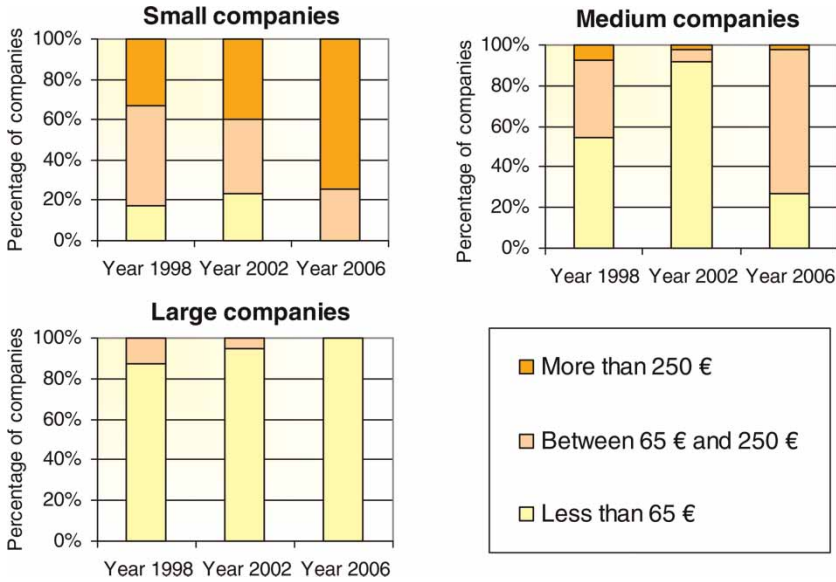


Figure 9. Annual ISO 9000 maintenance cost per employee (1998–2002–2006).

1998–2002–2006 period are represented in Figure 10, and are stratified according to the size of the companies analysed.

Figure 10 shows that the decreasing trend in the implementation time continues, but seems to stabilise at an average of around 18 months. Such a trend would seem to be completely logical if one takes into account the above-mentioned factors that contributed to the lowered costs over time. Furthermore, in the last several years, many generic and industry sector-specific standards and back-up guidance documents have been created to assist in the implementation of ISO 9001 quality management systems, with examples including ISO 10017:2003 (Guidance on statistical techniques for ISO 9001:2000) and ISO 15161:2001 (Guidelines on the application of ISO 9001:2000 for the food and drink industry). Likewise, it is reasonable that the period of implementation actually stabilises at some, perhaps minimal value, which in this study turned out to be approximately 18

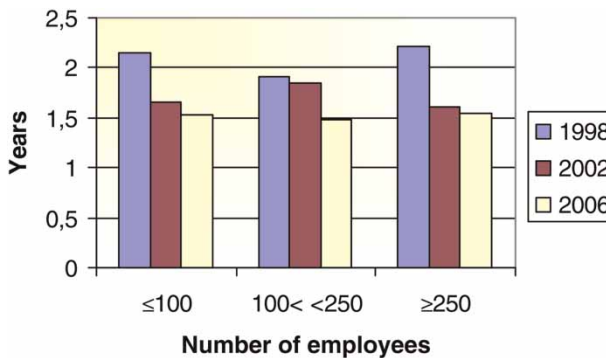


Figure 10. Average time of ISO 9000 implementation (1998–2002–2006).

months, and that this threshold does not depend on the size of the company, as indicated in Figure 10.

Conclusions

The main objective of this article was to study the changes in the perceptions of the benefits and costs of the implementation of the ISO 9001 standard over time. To do so, the existing literature has been reviewed to find over 100 empirical studies that analyse the benefits provided by this standard. Unfortunately, the very different methodologies used by these studies make it difficult to compare them and consequently conduct a desk study of the changes in the ISO 9001 benefits and costs. However, a methodology based on the periodic repetition of the same fieldwork in the same region was applied to fulfil the objective that was put forward. Therefore, this article draws conclusions from an empirical study carried out in Catalonia (Spain) in 2006, with the participation of 529 companies, and an analysis of the two previously conducted fieldworks from 1998, with 273 respondents (Casadesús & Giménez, 2000), and 2002, with 399 respondents (Casadesús & Alberti, 2003), respectively. By using the data from these three large studies, the research presented in this paper was able to draw two noteworthy and innovative conclusions that should be of great interest to both the academics and the practitioners in the fields of quality and operations management.

First, it has been confirmed, for the third time in eight years, that the three main benefits of ISO 9000 implementation relate to customer satisfaction, namely an increase in customer satisfaction, a decrease in the number of complaints, as well as a decrease in the number of product nonconformities. These three benefits exactly coincide with the objectives of an ISO 9001-based quality management system, as stated in the ISO 9001:2000 standard itself. Secondly and with reference to the evolution of the benefits of implementation, the results show that these benefits decreased overall in the full eight-year period of the research, and continued to decrease in the immediate four-year period since the last 'dynamic' analysis carried out in 2002 (Casadesús & Karapetrovic, 2005a). The decrease in benefits parallels a significant decrease in the costs of implementation and maintenance of the quality management system, while the time required for the implementation remained 'stagnant' at an average of 18 months, irrespective of the size of the companies concerned. These results are without doubt one of the first contributions to this type of temporal analysis and the first in which the results from three different moments in time have been compared.

Such an evolution of the benefits, costs and time of ISO 9000 implementation is logical if one takes into account the saturation of the market for ISO 9001 registration in many countries (see Marimon *et al.*, 2006) and in particular in Spain, where this work has been carried out. This saturation reduces the differentiation among the registered companies, since the implementation of the standard becomes more a matter of survival than simply one of improving competitiveness. It is also true that the perception of the benefits of this standard decreases over time, owing to the difficulty in differentiating between the registered organisations and to the temporal 'erosion' of the benefits experienced by any management system. From a more positive point of view, it would seem obvious that the certificate saturation phenomenon gives rise to a reduction in the costs of implementation and maintenance of the management system, as was empirically confirmed in the study.

Therefore, ISO 9000 benefits decrease over time, but remain important. Indeed, those that remain important are the ones for which the ISO 9001:2000 standard was designed in the first place: customer satisfaction.

Notes

1. For instance, public institutions in the USA, such as the Department of Defense and the Food and Drug Administration, as well as other bodies of a private nature, such as the American Chemistry Council and the Automobile Manufacturers' Association, adopted the ISO 9000 standards (Crowe et al., 1998).
2. Especially noteworthy is the publicised study carried out over a decade ago by a well-known international certifying body in the United Kingdom, which pointed out that registered companies had increased their sales, profit margins and financial profitability to a much greater extent than the non-registered ones.

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