

## **Quality management and improvement in the Spanish SME Food Industry: The adoption of ISO 9000**

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# QUALITY MANAGEMENT AND IMPROVEMENT IN THE SPANISH SME FOOD INDUSTRY: THE ADOPTION OF ISO 9000

## Abstract

This paper presents the results of a large-scale study in the Spanish F&DI aimed to identify the motivators, perceived costs, and benefits of implementing ISO 9000 standards. Results indicate the increasing importance of ISO 9000 standards as a strategic tool in the Spanish F&DI with an increasing number of F&D companies seeking ISO 9000 certification. Despite being a recent strategic option among Spanish F&D companies latest figures show a total of 1,754 firms being ISO 9000 certified (a significant increase from a total of 4 firms in 1993)

**Keywords:** ISO 9000 certification, food industry, Spain, performance

## 1. Introduction

Small and medium enterprises (SMEs) dominate the Spanish food and drink industry and the adoption of quality control system is one of the ways to increase efficiency.

On the other hand increasing competition and the need to adapt their performance to the food safety regulation and traceability systems, are driving the entrepreneurs to incorporate quality control. However action have some risk and they also face a high cost of adoption (Yiridoe 2004)

ISO 9000 is a series of standards and guidelines developed by the International Organisation for Standardisation (ISO), which requires companies to document their quality assurance operations and procedures. This family of standards were first published in 1987 and subsequently updated in 1994 and 2000. To date, 161 countries have adopted ISO 9000 series as their national quality standard, and over 500, 000 certificates have been issued world-wide (ISO, 2002).

The ISO 9000 comprises a set of standards, which were simplified in December 2000 (**Table 1**). Under the revised version, ISO 9000:2000 is the general standard that serves as an overall guide to the other standards. Its purpose is to provide definitions of terms and a basic explanation of the ISO 9000:2000 standards. ISO 9001:2000 consolidates the former ISO 9000/9002/9003 standards into a single document and is the only standard to which certification is currently assessed. ISO 9004:2000 provides further guidelines for continuous improvement of internal quality management systems.

Table 1. The ISO 9000 Series

<b>Standard</b>	<b>Focus</b>
<i>Original Standard (ISO 9000)</i>	
ISO 9000	Quality management and assurance standards for selection and use
ISO 9001	the most comprehensive, encompasses design, development, production, installation and servicing
ISO 9002	guides the development of a quality management system when design control is not a requirement
ISO 9003	the least comprehensive, addresses only final inspection and testing
<i>Revised Standards (ISO 9000:2000)</i>	

ISO 9000:2000	Quality management systems fundamentals and vocabulary – defines terminology and standard
ISO 9001:2000	Quality management systems requirements –used to assess compliance with requirements (consolidates the former ISO 9001/9002/9003 into a single document)
ISO 9004:2000	Quality management systems guidelines for performance improvement – offers guidelines for continual management system improvements

When working procedures and practices reach required ISO standards, the company receives a certificate (through an audit performed by an independent, third-party registrar). This involves the development of three documents: (i) a quality handbook, which describes the company structures and its quality policy; (ii) a procedure handbook, which describes procedures according to required processes; and (iii) a written document containing work instructions for specific tasks.

Studies have pointed out improved operational efficiency as one of the main benefits of ISO 9000 certification (Seddon *et al.*, 1993) as it would give the system structure and formality in place of chaos, which currently represents the approach of most companies to quality management. However, despite the increasing number of ISO 9000 certified companies world-wide and the availability of numerous well developed materials to help companies through the certification process, achieving certification is complex, and this complexity is costly both in term of financial and human resources. Moreover, companies seem to be interested in obtaining the actual quality certificate than improving quality (Stevenson and Barnes, 2002).

ISO 9000 standards started being a QMS in Europe and nowadays are an internationally recognised quality assurance standard, and in some market an indispensable condition for contracting suppliers. Over the last decade, ISO 9000 certifications have been growing world-wide, and according to the latest statistics (ISO, 2002) up to the end of December 2001, at least 510, 616 ISO 9000 certificates had been awarded in 161 countries which represents an increase of 24.96% over the end of December 2000. Of the ISO 9000 total, 44,388 were certificates of conformity to ISO 9000:2000 (8.7% of the overall total).

Europe accounts for over half of total ISO 9000 certifications (53% in 2001); though significant increases are seen in other geographical areas like the Far East with 126,779 certificates in 2001, which represents an increase of 55% from the previous year, and Central and South America with a 33.5% increase from December 2000 to December 2001.

The aim of this paper is to explore the process of ISO 9000 implementation in the Spanish F&DI. The paper presents the results of a large-scale questionnaire administrated in January 2002 aimed to determine the major costs of implementing and operating ISO 9000 standards, the major problems encountered by firms by implementing the system as well as the major perceived benefits.

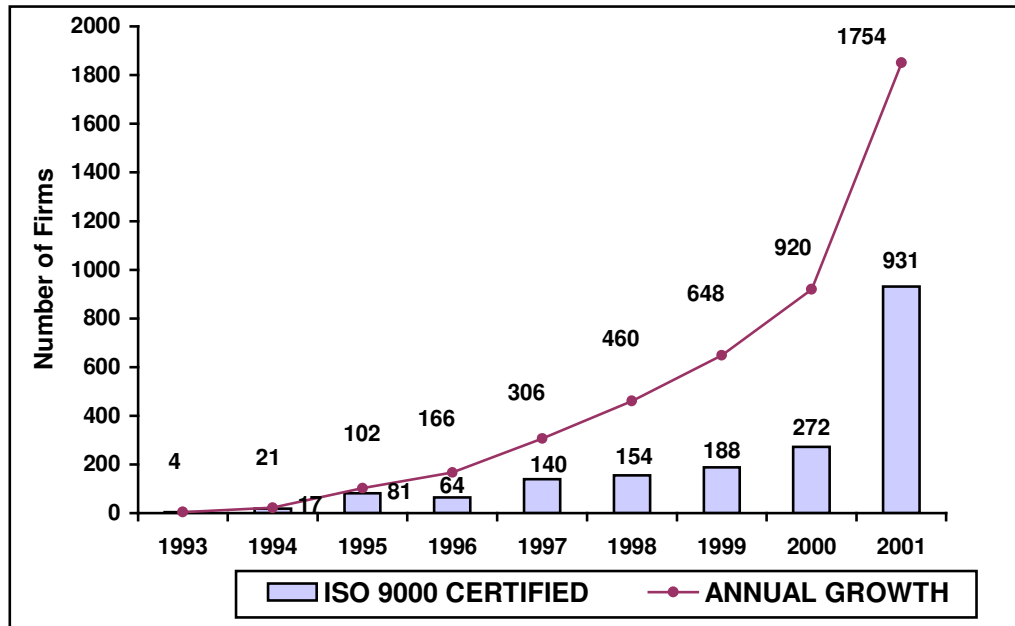
The paper is structured in three parts. After this introduction, in section two, the paper examines briefly the development of ISO 9000 in the Spanish F&DI. Then section three is an account of the methodology used in this research followed by the results. Finally, in section four the paper provides some conclusions and recommendations.

## 2. ISO 9000 In the Spanish Food and Drink Industry

According to the latest statistics published by the Spanish Ministry of Agriculture, Fisheries and Food (MAPA), at December 2001 there were 1,754 Spanish F&D companies with ISO 9000, which represents a significant increase from previous years where, for instance, in 1995 there were only 102 ISO certified F&D firms far from the initial 4 in 1993. Hence, ISO 9000 is a quite recent movement in the Spanish F&DI with 74% of the firms being ISO certified between 1998 and 2000 (**Figure 1**). The

different programmes developed by the Spanish government to provide financial aid to implement QMS in the Spanish industrial sector are likely to increase the number of ISO 9000 certified firms in the near future.

Figure 1. Number of ISO 9000 certifications in the Spanish F&DI, 1993-2001



Source: MAPA

The sectoral distribution of ISO 9000 certifications shows the processing and preserving of fruit and vegetables as the leading sector in terms of the total number of certifications in the Spanish F&DI (18%) (Table 2). The international orientation of this sector appears as the main driver behind the management decision to seek certification. In second place, we find the meat sector with 136 ISO certified firms (17%). This sector has always maintained a leading position regarding the number of certifications given its economic relevance and position in the Spanish F&DI, and in response to market demands (customer-driven). It is worth noting the high number of certified firms in the wine sector (10%). These three sectors plus miscellaneous food products account for more than half of the total number of ISO certifications in the Spanish F&DI.

The increasing importance of ISO 9000 as a strategic tool in the Spanish F&DI is reflected in the decision of leading F&D firms in each sector to seek this certification, and in some sectors appears to be a standard business practice (i.e., in the sugar and beer sector the entire production is ISO certified).

Table 2. Sectoral distribution of ISO 9000 certificates in the Spanish F&DI, 2000

<b>SECTOR</b>	<b>No of Certified Firms</b>	<b>% total ISO certificates</b>
Meat products	136	16,7
Fish processing	44	5,4
Processing of fruits and vegetables	145	17,8
Organic oils and animal fats	45	5,5
Dairy products	44	5,4
Grain milling	30	3,7
Animal feeds stuffs	29	3,6
Miscellaneous food products	106	13,0
Industrial baking	44	5,4
Sugar processing	14	1,7
Cocoa, chocolate & sugar confectionery	12	1,5
Coffee, Tea and Infusions	13	1,6
Species, souces and condiments	17	2,1
Baby food and diet products	6	0,7
Spirits distilling	15	1,8
Wine	78	9,6
Brewing and malting	12	1,5
Water and soft drinks	24	2,9
<b>Total Spanish F&amp;DI</b>	<b>814</b>	<b>100%</b>

Source: MAPA

### 3. The Strategic Use of ISO 9000 in the Spanish F&D Industry

#### 3.1. Sampling Frames and Data Collection

The target population for this study consisted of ISO 9000 certified F&D companies in Spain. The database was obtained from MAPA and included all ISO 9000 certified F&D companies until 30 December 1999 (MAPA, 2000). The list included a total of 534 F&D firms. The database was extended by including additional F&D companies certified by AENOR (the leading ISO 9000 registration company in Spain) during 2000. The final database contained 654 ISO 9000 certified F&D firms. Contact details of the companies (i.e., address, phone number, fax, etc.) were obtained from the annual business directory Alimarket 2001. The annual Food and Drink published by Alimarket provides firm level data on sales volume by product type for a group of firms accounting for around 90% of total Spanish Food production.

Each firm was contacted by telephoned and the objectives of the research explained to the responsible of the quality control department. If the firm was willing to participate, the questionnaire

was, depending on their preference, sent my mail, fax or email. A total of 557 food companies received the questionnaire.

The questionnaire (a copy of which is available on request) was pre-tested among a sample of senior quality control managers who completed the draft questionnaire and provided feedback on the comprehensiveness and phrasing. The survey was administered in January 2002. A reminder letter or phone call with an additional copy of the questionnaire was posted five weeks after the mail-out, and a second reminder six weeks later, which noticeably improved response rates. Completed questionnaires were received from 199 firms, giving a response rate of 36%, which is regarded as significant considering the difficulties and problems involved in large-scale postal questionnaires (Similar response rates have been achieved in recent ISO and HACCP studies in the food industry: Henson *et al.*, (1999); Turner *et al.*, (2000)). **Table 3** shows the responses by manufacturing sector. 56% of respondents were SMEs (fewer than 100 employees), which emphasises the importance that these companies attribute to the certification; and 59% indicated that export activities accounted for less than 15% of their sales.

### 3.2. Results

#### Certification Status

Most F&D firms were certified to ISO 9002 (89%) and 25 to ISO 9001. None had ISO 9003 certification (**Table 4**). Only 2 companies have been certified under the new version- ISO 9000:2000 (Companies already holding ISO 9000 certification will have 3 years to transition to the new version ISO 9000:2000. As with ISO 9000, however, companies seeking initial ISO 9000:2000 certification must be audited by an independent third party certified and the implementation process will be similar to that of the previous standard). With regard to the newly developed environmental standards -ISO 14000- 14% of respondents have obtained this certification.

Most ISO 9001 and 9002 certifications were obtained in 1997 and 1999, respectively, which support previous arguments on the relatively newness of these quality management systems (QMS) in the Spanish F&DI. However, data shows a significant increase in the number of certifications since 1996 highlighting the increasing relevance of ISO 9000 as a strategic tool for the Spanish F&DI. The first and most obvious benefit in today's ever-increasingly competitive environment is marketing advantage, and being ISO 9000 certified tends to indicate that a firm is more likely to meet the demands of its customers than a rival without certification.

Table 3. Responses by manufacturing sector

SIC Code	Sector	Total Sample	Response Rate	
		No of Firms	No of Firms	%
15.11	Animal slaughtering, by-product processing and fellmongery	12	6	1,08
15.12/13	Meat Processing and Preserving	60	24	4,31
15.20	Fish Processing and Preserving	28	6	1,08
15.32	Manufacture of fruit and vegetable juice	34	17	3,05
15.33	Fruit and Vegetables Processing	42	10	1,79
15.42	Manufacture of Refined Oils and Fats	36	12	2,15
15.51	Milk and Milk Products	22	14	2,51
15.61	Grain Milling and Manufacture of Cereal products	18	12	2,15
15.71	Manufacture of Prepared Feeds for Farm Animals	19	9	1,62
15.81	Manufacture of Bread, Fresh Pastry Goods and Cakes	13	3	0,54
15.82	Manufacture of Rusks, Biscuits and Preserved Pastry Goods	24	8	1,44
15.83	Manufacture of Sugar	9	1	0,18
15.84	Manufacture of Cocoa, Chocolate or Sugar Confectionery	13	8	1,44
15.86	Tea or Coffee Production	15	6	1,08
15.87	Manufacture of Condiments and Seasoning	12	4	0,72
15.88	Manufacture of Homogenised Preparations and Dietetic Foods	5	1	0,18
15.89	Manufacture of Soups and Other Food Products not elsewhere classified	101	19	3,41
15.91	Manufacture of Distilled Potable Alcoholic Beverages	5	3	0,54
15.93	Manufacture of Wine	23	14	2,51
15.94	Manufacture of Cider, Perry and Other Fermented Fruit Beverage	18	8	1,44
15.96	Manufacture of Beer	8	4	0,72
15.98	Production of Mineral Water and Soft Drinks	10	10	1,79
<b>Total</b>		<b>557</b>	<b>199</b>	<b>35,73</b>

The average time for certified firms to reach certification was slightly longer for ISO 9002 (16.6 months on average) than for ISO 9001 (15.5 months). This time, however, is reduced by half in the case of the revised ISO 9000:2000 standards. The average implementation time, however, do not seem to suggest significant differences across sectors (first vs. second transformation) or firm size (small vs. large) as suggested by previous studies in the Spanish F&DI (MAPA, 1999). However, the time required to achieve certification would depend on the firm's in-house capabilities in quality management (i.e., current level of work quality, extent of current documentation, etc.); and thereby firms without prior knowledge in this area would have to rely more heavily on external consultants to achieve certification. It is in this area where there seem to be firm size differences with small firm

hiring more often external consults (81% of small F&D firms) to achieve certification while large firms tend to internalise the QMS. Hence, while differences in-house knowledge may not be reflected on the time needed to achieve certifications, since deficiencies could be overcome by using external aid, they result on higher certification cost for smaller firms as shown in **Table 6**.

Table 4. ISO 9000: Certification Status

	<b>Number of Firms</b>	<b>Year in which certification was achieved (average)</b>	<b>Time needed to achieve certification (months)</b>
ISO 9001	25 (12 %)	1997 (32%)	15.5
ISO 9002	178 (86.5%)	1999 (24%)	16.6
ISO 9003	0	-	-
ISO 9000:2000	3 (1.5%)	2001	7.0
ISO 14000	20 (14.6%)	2000	12.9

### Reasons for Seeking Certification

To determine the main reasons for seeking ISO certification, respondents were asked to indicate the importance of a number of firm-driven factors (i.e., operational efficiency, reduction in error rates and costs, etc.) and customer-driven variables (i.e., legal requirements, customer demands, gain market share, etc.) using a five-point scale ranging from 1 (*Not at all important*) to 5 (*Extremely important*). As **Table 5** shows, internal factors like the reduction of error rates and improve operational efficiency in order to obtain a competitive advantage were regarded by surveyed firms as the key determinants for adopting ISO 9000 quality assurance standards. The importance of internal (firm-driven) factors compared to external (customer-driven) motives have also been highlighted by similar studies in the agrifood sector (Holleran and Bredahl, 1997; Turner *et al.*, 2000; Lloyds, 1995); however, the importance of ‘staying in business’ by responding to customer demands is and will be increasingly important in a ever-increasing competitive environment (internal and external factors are not mutually exclusive). It is worth noting, however, that the need to response to private demands (i.e., food retailers) appears to be significantly more important for F&D firms than meeting legal requirements. The F&DI is an example where the private sector has been more proactive in developing QMS given the failure of public controls. These private quality initiatives are supported by more frequent and rigorous inspections than public enforcement bodies are able to attain (Northen, 2001). Moreover, food retailers’ increasing bargaining power enables them to impose their product specifications on the supply chain more effectively.

While adoption motivation has been found size dependant by previous studies (Seddon *et al.*, 1993; Holleran *et al.*, 1999): internal reasons in the case of larger firms and external motives for small firms, results from this study did not find statistically significant differences in the reasons for seeking ISO 9000 certification in terms of firm size (Firm size was defined in terms of the number of employees and treated as a two-category variable, being firms regarded as ‘small’ if employing fewer than 100 employees or ‘large’ otherwise). However, some customer-driven variables like access to new markets and meeting customer demands seems to be dependant on the export orientation of the firm.

Factor analysis was conducted to measure the underlying structure of the reasons for seeking certification. A varimax rotation was conducted and the standard criterion of an eigenvalue >1 was applied to determine the appropriate factor structure. Three factors were extracted and collectively accounted for 66% of the total variance (**Table 5**). Previously, Cronbach’s Alphas were computed to measure the reliability of the initial constructs.



The cut-off for interpretation purposes was factor loadings greater or equal to  $\pm 0.5$  on at least one factor. These loadings may be considered to be a conservative criterion. Kim and Muller (1978) suggest factor loadings of 0.30 as a cut-off for significance. Likewise, Nunnally (1978) indicates, “it is doubtful that loadings of a smaller size be taken seriously, because they represent less than ten percent of the variance of the factor” (p. 423).

As **Table 5** shows, a highly interpretable simple structure factor solution was obtained (i.e., only one loading on any factor for each variable). These factors are summarised below:

- Factor 1 - ‘*Competitive advantage*’: firms seek ISO 9000 certification to enhance their competitive position in the market by meeting customer demands and/or as a means to enter new markets.
- Factor 2 – ‘*Operational efficiency*’: associated with internal motive (i.e., productivity, costs, error rates).
- Factor 3 – ‘*Regulation driven*’: associated with the need to meet legal requirements and reduce business risks.

Table 5. Factor analysis of reasons for seeking ISO 9000 certification

Reasons	Mean*	F1	F2	F3
		<i>Competitive Advantage</i>	<i>Operational Efficiency</i>	<i>Legal Requirements</i>
Increase market share	3.34	<b>0.862</b>	0.091	0.167
Access to new markets	3.46	<b>0.855</b>	0.032	0.103
Obtain a competitive advantage	4.01	<b>0.739</b>	0.247	0.024
Meet customer requirements	3.78	<b>0.700</b>	0.023	0.279
Become the leading firm in the sector	3.57	<b>0.540</b>	0.297	0.058
Improve operational efficiency	4.08	0.057	<b>0.842</b>	0.086
Reduce error rates	4.24	0.067	<b>0.818</b>	0.120
Reduce costs	3.11	0.228	<b>0.665</b>	0.243
Improve the profitability of the firm	3.21	0.546	<b>0.606</b>	0.037
Meet legal requirements	2.56	0.106	0.074	<b>0.903</b>
Reduce business risks	2.82	0.224	0.412	<b>0.714</b>
<b>% of total variance explained</b>		<b>29.3</b>	<b>22.9</b>	<b>13.9</b>

<sup>1</sup> 1 = Not at all important; 5= Extremely important

### ISO 9000 Costs and Benefits

The majority of Spanish F&D firms indicated to be satisfied with the implementation of ISO 9000 (91.4% of respondents were satisfied/highly satisfied with the QMS). Moreover, when ask to compare the costs versus the benefits, over third quarters of the surveyed firms regarded the costs of becoming certified as low or moderate. Only a small minority of F&D firms (11.6%) considered the cost of certification high or excessive. Similar levels of satisfaction have been reported in other studies (Capmany *et al.*, 2000).

The average cost (per plant) of becoming certified was 23,368.86€ with the maintenance of the certification status costing 6,037.06€ per year (**Table 6**). The analysis of the costs per employee,

however, clearly indicates the importance of economies of scale in the implementation and maintenance of QMS. One-way ANOVA test indicated a statistically significant difference between size clusters for certification and maintenance costs ( $p < 0.01$ ). While previous studies suggest that certification costs should not represent a barrier towards achieving certification (Zaibet and Bredahl, 1997), evidence from this paper, however, contradicts this hypothesis showing how cost per employee estimates may be prohibited for SMEs. Similar diseconomies for small firms were obtained by Turner *et al.* (2000) study.

Table 6. Cost of ISO 9000 certification

<b><u>Certification Cost</u></b>		
<b>N.</b>	<b>Average</b>	<b>Cost per Employee*</b>
<b>Employees</b>	<b>(Euros)</b>	<b>(Euros)</b>
1-49	15,108	703
50-499	24,286	214
>500	39,066	61
<b>Total</b>	<b>23,404</b>	<b>342</b>

<b><u>Maintenance Cost</u></b>		
<b>N.</b>	<b>Average</b>	<b>Cost per Employee*</b>
<b>Employees</b>	<b>(Euros)</b>	<b>(Euros)</b>
1-49	4,542	206
50-499	7,104	61
>500	5,052	7
<b>Total</b>	<b>6,053</b>	<b>95</b>

\* ( $p < 0.01$ )

ISO 9000 implementation costs include items like staff training, record keeping, hiring of external consultants, purchasing of new equipment and structural changes to infrastructure and buildings. To measure of relative importance of these cost items in the overall certification cost, participants were asked to rank them. If a cost had not been incurred, firms were asked to allocate a rank of zero. Overall, record keeping ranked as the most important cost for ISO 9000 certified firms (only 0.7% of respondents did not incur this cost), followed by the cost of hiring external consultants (**Table 7**). Most surveyed firms had to rely on external consultants from start to finish to ensure passage of the ISO audit while only 14% of respondents used external expertise for specific parts of the procedure, mainly at the beginning and with the elaboration and preparation of documentation. The main reasons behind the use of external consultants to achieve ISO 9000 certification were consultants' more independence of judgement and the lack of knowledge of requirements by companies. Conversely, costs related to the purchasing of new equipment or due to structural changes in infrastructure and buildings ranked lower.

The burden of keeping records is equally high for larger and small firms; however, small firms seem to rely more on external help throughout the implementation process. The larger firms seem to internalise the QMS, and therefore devote more resources to staff training and changes in management practices with highly in-house trained professionals being responsible for managing the ISO 9000 process.

Variations between individual respondents regarding the cost of hiring external consultants have been also reported by Henson et al. (1999); however they related these differences to the starting position of the firms, that is, whether firms previously operated to standards of good manufacturing practices and/or had a highly trained work force. However, it could be argued that larger firms are more likely to operate some kind of QMS and therefore have the required in-house expertise to implement ISO 9000 while smaller firms would have to buy-in this expertise.

Table 7. Rank scores for costs of implementing ISO 9000

<b>Costs</b>	<b>% of respondents giving 0 rank (cost not incurred)</b>	<b>% of respondents giving rank of 1 (most important cost)</b>
Record keeping	0.7	43.8
Using external consultants	4.4	33.6
Staff training	1.5	7.3
Managerial changes	13.3	5.2
Structural changes to infrastructure/buildings	19.0	4.4
Purchasing of new equipment	10.4	3.7

In addition, respondents were presented with a list of issues, which previous studies have suggested can be problems in the implementation of QMS. They were asked to indicate how much of a problem each of these issues had been when implementing and maintaining ISO 9000 in their firms using a five-point scale ranging from 1 (*Not a problem at all*) to 5 (*Major problem*). As **Table 8** shows, mean scores were relatively low for all the issues presented to surveyed firms, suggesting that no major difficulties were encountered by ISO certified firms when implementing ISO 9000 standards. Only two issues were above the 3 point on the scale and both related to the motivation of staff, both production and supervisory level; these results suggest again the difficulties to implement a culture of quality in the firms. Similar results were reported by Henson *et al.* (1999).

Factor analysis was conducted to measure the underlying structure of the problem variables. A varimax rotation was conducted and the standard criterion of an eigenvalue >1 was applied to determine the appropriate factor structure. Two factors were extracted and collectively accounted for 59% of the total variance (**Table 8**). Previously, Cronbach's Alphas were computed to measure the reliability of the initial constructs.

As **Table 8** shows, a highly interpretable simple structure factor solution was obtained (i.e. only one loading on any factor for each variable). These factors are summarised below:

- Factor 1 – *Operational flexibility*: related with the flexibility of internal operational processes.
- Factor 2 – *Business culture*: associated with the attitude/motivation and need to retrain staff.

Table 8. Factor analysis of the difficulties to implement ISO 9000

	Mean*	F1	F2
		Operatio nal Flexibility	Business Culture
Reduced flexibility of production staff	2.29	<b>0.891</b>	0.115
Reduced flexibility of the production process	2.34	<b>0.874</b>	0.035
Reduced flexibility of the NPD process	2.18	<b>0.866</b>	0.051
Recouping costs of implementing ISO 9000	2.67	<b>0.477</b>	0.159
Reduced time available for other tasks	2.96	<b>0.458</b>	0.313
Need to retrain production staff	2.89	0.045	<b>0.795</b>
Attitude/motivation of production staff	3.26	0.227	<b>0.767</b>
Need to retrain supervisory/managerial staff	2.61	0.090	<b>0.760</b>
Attitude/motivation of supervisory/managerial staff	3.06	0.134	<b>0.743</b>
<b>% of total variance explained</b>		<b>31.4</b>	<b>27.7</b>

<sup>1</sup> 1 = Not at all important; 5= Extremely important

As pointed out Spanish F&D ISO 9000 certified firms consider that the benefits of ISO 9000 certification outweigh the cost incurred. A number of studies have looked at the benefits obtained with the ISO 9000 certifications and highlighted factors like: increase in company quality awareness, increase in product quality awareness, improvement in company management, increase in customer relations, improvement of the products and services offered, improvement of the relationship within the organisation, and increase in customer satisfaction (Brown and Van der Wiele, 1995; Henson *et al.*, 1999; Augustyn and Pheby, 2000).

In order to determine the type of benefits derived from ISO 9000 certification, respondents were presented with a list of 16 factors and asked to indicate the importance of each benefit using a five-point scale ranging from 1 ('*Not at all important*') to 5 ('*Extremely important*'). The possibility of obtaining a competitive advantage over their competitors appears as the main benefit for the Spanish F&D firms from ISO 9000 certification. This advantage is derived from the possibility of improving product traceability, which is considered a key requirement in the current supplier-buyer relationships. Evidence suggest that the implementation of private QMS helps to improve suppliers' relationships with their customers, particularly if the customer has significant market power, and therefore it improves the image of the firm in an ever-increasingly competitive environment. As Holleran *et al.* (1999) point out the single fact of satisfying customer demands may be of such importance that the certification costs and other benefits of the QMS are irrelevant.

Additional benefits related to the internal functioning of food companies as the '*improved management and control of the firm*', '*improved definition of responsibilities and duties of production staff*', and '*improved quality of products and services*'. It is worth noting the positive impact of QMS on the business culture of surveyed firms where the quality concept appears to play a key role in the business strategy of the firms as in the productive process.

Previous studies have fund that large companies derived more benefits from ISO 9000 certification, especially in terms of positive cultural change, corporate image, quality awareness, better

documentation procedures, better working environment and continual improvement (Seddon *et al.*, 1993; Holleran and Bredahl, 1997). However, as for the motives behind seeking ISO 9000 certifications, evidence from this study did not support the hypothesis that benefits from the ISO 9000 adoption are firm size dependant nor related to export propensity.

Factor analysis was conducted to measure the underlying structure of the benefit variables. A varimax rotation was conducted and the standard criterion of an eigenvalue >1 was applied to determine the appropriate factor structure. Four factors were extracted and collectively accounted for 67% of the total variance. Previously, Cronbach's Alphas were computed to measure the reliability of the initial constructs.

#### **4. Conclusions and Recommendations**

This paper has reported the results of one of the first comprehensive study on the implementation of ISO 9000 in the Spanish F&DI, in particular its use as a marketing tool and impact on business performance.

Evidence from this study suggest that the majority of ISO 9000 F&D firms consider that the net benefits of ISO 9000 certified quality systems outweigh the cost incurred. However, cost estimates for the sector clearly indicate economies of scale in the implementation and maintenance of QMS. Strategies, therefore, need to be formulated to address those issues commonly identified as a negative outcome such as record keeping, but more critically those barriers particularly faced by SMEs. Results indicate that policy-makers should consider the important reliance of SMEs on external support throughout the implementation process when formulating advice and/or support mechanisms.

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