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The impact of ISO 9001 effectiveness on the performance of service companies

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The impact of ISO 9001 effectiveness on the performance of service companies

The impact of
ISO 9001
effectiveness

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Abstract

Purpose – The purpose of this paper is to define and subjectively measure ISO 9001 effectiveness as the achievement of the standard's objectives and determine its impact on the performance dimensions of service companies related to product/service quality, operational and financial performance.

Design/methodology/approach – An empirical study was carried out using a sample of 100 ISO 9001:2008 certified service companies. Data were obtained from the quality managers of the companies through a structured questionnaire. Exploratory factor analyses are applied to extract the latent factors of the indicators of ISO 9001 objectives and performance dimensions. Multiple linear regression analyses are also applied in order to determine the impact of ISO 9001 effectiveness on the performance dimensions of service companies.

Findings – The findings of the present study confirm the dimensionality of the ISO 9001 effectiveness (evaluated by the degree of achievement of the standard's objectives, namely prevention of nonconformities, continuous improvement and customer satisfaction focus) and reveal its significant contribution to the performance of the service companies. The product/service quality and operational performance of the service companies are directly and significantly influenced by ISO 9001 effectiveness. However, the financial performance is directly influenced only by operational performance, while the impact of ISO 9001 effectiveness is indirect through its significant correlation with operational performance.

Research limitations/implications – The sample of the responding ISO 9001 certified service companies is limited to small and medium-sized enterprises (SMEs) from one country (Greece). Moreover, the introduced instrument is of subjective nature as the data collected through quality managers may be biased regarding ISO 9001 effectiveness and company performance. Furthermore, the influence of ISO 9001 effectiveness on service company performance with regard to market share and customer satisfaction has not been determined. The above limitations suggest future research recommendations.

Practical implications – By defining ISO 9001 effectiveness based on its objectives, managers may be aware of what to improve to increase the standard's effectiveness and therefore directly improve service company performance in terms of quality and operative results and indirectly in terms of financial results.

Originality/value – Based on the core issues of ISO 9001 effectiveness this empirical study confirms its multi-dimensional structure and determines the contribution of ISO 9001 effectiveness to specific performance dimensions of service companies.

Keywords Greece, Small to medium-sized enterprises, ISO 9000 series, ISO 9001 effectiveness, Objectives, Company performance, Service companies

Paper type Research paper



1. Introduction

Service sectors are of great importance to the world economy (Lee *et al.*, 2009; To *et al.*, 2011). Competing in the global economy and the current markets demands that the service companies establish well-designed and implemented internal management systems according to internationally accepted management standards such as ISO 9001 (Karapetrovic and Willborn, 1998). The ISO 9001:2008 standard is a generic management system that is applicable to large and small; private and public; industrial, commercial and service organizations (Walker and Johnson, 2009; To *et al.*, 2011). While manufacturing organizations were early adopters of ISO 9001, lately, many service sector organizations have also pursued its adoption (Dick *et al.*, 2002; Singh *et al.*, 2006; Calisir, 2007) at a much slower pace though than industrial organizations (Heras *et al.*, 2008). Current research postulates that this difference between the manufacturing and the service sector in adopting quality management practices and standards is decreasing, and that service organizations are now making more progress towards quality management than manufacturing organizations (Ronnback and Witell, 2008).

Despite the level of ISO 9001 penetration in services or manufacturing, it is supported that just adopting and maintaining the ISO 9001 certificate is not enough (To *et al.*, 2011) and fulfilling and conforming to a quality standard's minimal requirements by itself is insufficient (Psomas *et al.*, 2010). Opposing results have been reported in the literature (for an analysis refer to Marin and Ruiz-Olalla, 2011 or Lin and Jang, 2008) arguing in favour or against the importance of ISO 9001 certification to achieve quality, better financial results (Sampaio *et al.*, 2011) or company performance (Yeung *et al.*, 2003; Psomas *et al.*, 2010; Kim *et al.*, 2011). Ronnback and Witell (2008) state that concerning the overall question about the financial benefits of quality management, the various research studies show conflicting results. In practice, this may be attributed to the ineffective implementation of the ISO 9001 standard (Zeng *et al.*, 2007; Heras *et al.*, 2008; Singh, 2008; Caro and Garcia, 2009; Psomas *et al.*, 2010). Moreover, it is worth noting that quality initiatives focusing exclusively on service organizations is scarce (Ronnback and Witell, 2008) and the lack of a road map that can be used by service managers to achieve their quality-related goals is apparent (Calisir, 2007).

The main competitive edge nowadays shifts from simply applying the ISO 9001 standard to successfully implementing an effective quality management system (QMS) after obtaining the certification (Lee *et al.*, 2009; Wahid and Corner, 2009; Psomas *et al.*, 2013). Obviously, if service companies want to achieve business benefits and superior results, the attainment of a quality certificate to ISO 9001 should not be the end, but the starting point for deploying an effective QMS in the quest for quality improvement (Dick *et al.*, 2001).

Thus, and given the contradictory nature of the research findings regarding the successful implementation and contribution of ISO 9001 to company and financial performance, more fact-based and statistically oriented studies in the area of the ISO 9001 QMS are required, according to Lin and Jang (2008) and Sampaio *et al.* (2009, 2011). Additionally, Jang and Lin (2008) and Sampaio *et al.* (2009) suggest examining how the depth of ISO 9001 implementation influences company performance in the long run. Augustyn and Pheby (2000), Yaya *et al.* (2011) and To *et al.* (2011) specifically highlight the need for further contextual research for the impact of ISO 9001 on operational and business performance in several service sub-sectors (e.g. e-service providers, public and tourism firms).

Defining for the first time in the service sector ISO 9001 effectiveness as the achievement of ISO 9001 objectives, the purpose of the present study is twofold: first is to confirm, by providing empirical evidence from the service sector, the multidimensional structure of ISO 9001 effectiveness. Second to that is to highlight the impact of ISO 9001 effectiveness on the service companies' performance (defined as product/service quality, operational and financial performance). By exploring ISO 9001 effectiveness patterns and performance outcomes in service organizations, this study provides new and practically relevant insights into the literature. Data from small and medium size companies from the service sector with the use of exploratory factor analysis (EFA) and multiple linear regression identify and support the introduced hypotheses.

The rest of the paper is structured as follows: in the first part, the literature is reviewed in order to precisely define ISO 9001 effectiveness and specific company performance dimensions. Then, the research hypotheses of the present study are formulated. In the next part, the methodology of the research study is described which is followed by the data analysis and the respective results. In the next part, the results are discussed and the final conclusions and the managerial implications are presented. Finally, the limitations of the study and future research proposals are presented.

2. Literature review and research hypotheses

2.1 ISO 9001 effectiveness

The International Organization for Standardization (ISO) serves not only to establish performance standards but, also, to specify the processes by which the quality management standards may be met, and by which the effectiveness and efficiency of the QMS may be improved (Walker and Johnson, 2009). According to the ISO 9001 standard, "effectiveness" is defined as the extent to which the anticipated objectives are achieved (ISO 9001:2000, 2000). van der Spiegel *et al.* (2007) suggest that evaluating the degree to which the standard's pre-established objectives are met should test ISO 9001 effectiveness. According to ISO (2008) and the ISO 9001 standard (ISO 9001:2008, 2008), the aims of the standard are the following: prevention of nonconformities, continuous improvement and customer satisfaction focus. These objectives are specifically determined not only by the standard itself but also by many academics and experts worldwide (van der Spiegel *et al.*, 2004; Heras *et al.*, 2006; Gotzamani *et al.*, 2007). Psomas *et al.* (2013) provide empirical evidence to support this consensus regarding the underlying structure of ISO 9001 effectiveness. More specifically, using a sample of small and medium-sized food manufacturing enterprises (SMEs), they confirm the three ISO 9001 objectives identified in the literature (prevention of nonconformities, continuous improvement and customer satisfaction focus) that define ISO 9001 effectiveness. The indicators for the assessment of these objectives are drawn from the study of Psomas *et al.* (2013) (Table I).

2.2 Company performance

A restrictive set of financial performance measures may adversely impact on an organization's long-term viability, so organizations should develop a broad range of performance measures (O'Mara *et al.*, 1998). Lee *et al.* (2009) investigate the overall performance of ISO 9001 certified service organizations through elements such as customer satisfaction from service quality, internal administration efficiency, cost of poor quality and employee turnover rate. McAdam and Canning (2001) study the ISO 9001 benefits gained from small professional service firms related to the internal

Kaiser-Meyer-Olkin = 0.921

Measured variables	Continuous improvement	Factors Customer satisfaction focus	Prevention of nonconformities
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Factor loadings

Drawing an effective plan for continuous quality improvement	0.824		
Achieving measured-explicit quality goals	0.804		
Company collection of information for processes and service improvement	0.769		
Continuous monitoring and improvement of processes, procedures and products	0.761		
Developing an organizational structure supporting continuous improvement	0.685		
Continuous improvement of employee work	0.684		
Company activities increasing the level of customer satisfaction		0.758	
Company assurance of meeting customer requirements with regard to products		0.753	
Company focus on customer requirements		0.748	
Personal contact between employees and customers		0.732	
Customer complaints, a major priority		0.623	
Product conformance to specifications			0.804
Reduced nonconformity problems through quality processing			0.742
Efficient product, process and quality design			0.652
Eigenvalue	8.776	1.375	1.103
Cumulative variance (%)	58.50	67.67	73.75

Table I.
Exploratory factor analysis of the indicators of ISO 9001 objectives

management system and communication, service quality and profit ratio. Singh and Mansour-Nahra (2006) also study the operational efficiency and financial improvement of public sector organizations as a result of ISO 9001 implementation. Singh *et al.* (2006) examine whether the quality of customer service, the documentation process, the number of mistakes and defects and the service company value are benefits derived from implementing ISO 9001. Augustyn and Pheby (2000) assess the potential impact of ISO 9001 implementation upon the performance of small tourism enterprises with regard to customer complaints from service quality, re-working, efficiency, error rate, productivity, cost of lost orders and sales. Tang and Kam (1999) conducting a survey on consulting firms, explore the benefits from implementing ISO 9001 such as those related to internal business operations, the company's quality image and cost savings. Prajogo and Brown (2006) study organizational practices and performance outcomes (in terms of quality) of ISO 9001 certified nonmanufacturing companies.

Bearing the above-mentioned studies in mind, three performance-related dimensions have been chosen for the purpose of the present study: product/service quality, operational performance and financial performance. The indicators/variables for the evaluation of product/service quality (Table III) are drawn from the studies of Karapetrovic and Willborn (1998), McAdam and Canning (2001), Dick *et al.* (2002), Prajogo and Brown (2006), Singh *et al.* (2006), Zaramdini (2007), Su *et al.* (2008), Avella and Vazquez-Bustelo (2010) and Lam *et al.* (2012). The indicators/variables of

operational performance (Table III) are drawn from the studies of Karapetrovic and Willborn (1998), Augustyn and Pheby (2000), McAdam and Canning (2001), Singh *et al.* (2006), Zaramdini (2007), Lee *et al.* (2009) and Salaheldin (2009). Finally, the indicators/variables of financial performance (Table III) are drawn from the studies of Augustyn and Pheby (2000), McAdam and Canning (2001), Zaramdini (2007), Ho *et al.* (2010), Avella and Vazquez-Bustelo (2010) and Moneva and Ortas (2010).

2.3 Hypotheses formation

Based on the contradictions presented earlier at the introduction section regarding the significance of ISO 9001 certification on performance and the above review of the literature, the purpose of the present study in line with many scholars' suggestions for further research is to question and examine the impact of ISO 9001 effectiveness on company performance.

The following research hypotheses are therefore formulated:

RH1. ISO 9001 effectiveness may well be described for the service companies by its objectives (prevention of nonconformities, continuous improvement and customer satisfaction focus) in a way similar to this of manufacturing companies.

RH2. ISO 9001 effectiveness as described by its objectives predicts and defines service company performance (related to product/service quality, operational and financial performance) in a cause and effect relationship.

3. Methodology

3.1 Questionnaire

A research study was carried out on ISO 9001 certified Greek service companies through which the above formulated research hypotheses are tested. Data were collected through a structured questionnaire. The present study essentially adopts the measurement instrument used by Psoomas *et al.* (2013) to assess ISO 9001 effectiveness in food manufacturing companies. This instrument is based on the ISO 9001 defined objectives (prevention of nonconformities, continuous improvement and customer satisfaction focus) and their respective indicators as they have been identified in the literature. However, the questionnaire items were modified in accordance with the characteristics of a service company. Items concerning the performance dimensions of service companies related to product/service quality, operational and financial performance are also included in the questionnaire. Academics and professionals in the field of quality management reviewed the initial version of the questionnaire to ascertain successful adaptation. Based on their recommendations, the wording of the questions was improved in order to make it more comprehensive. Moreover, a pilot study was carried out using a sample of five quality managers of service companies. The pilot study confirmed the suitability of the questionnaire items for a service company. The final version of the questionnaire consists of three parts. The first part includes questions on the demographic profile of the companies. The second part concerns ISO 9001 effectiveness and contains statements with regard to the indicators of the ISO 9001 objectives. Finally, the last part of the questionnaire contains statements regarding the performance dimensions related to product/service quality, operational and financial performance. Respondents were asked to indicate the degree

of agreement or disagreement with these statements, using a seven-point Likert scale, where 1 represented “strongly disagree” and 7 represented “strongly agree”.

3.2 Sample

A total of 600 quality managers belonging to Greek service companies, selected randomly from a pool of 1,000 service organizations all certified with ISO 9001:2008 standard and listed at ICAP's (a Greek business information firm) database, were approached through e-mails at the beginning of 2012. Totally, 100 completed questionnaires were received back – a response rate of 16.6 per cent. The early and late responding companies were compared in terms of the number of their employees (χ^2 -test) and the questionnaire items (one-way ANOVA) and no statistically significant differences were found. Furthermore, several nonresponding companies stated, when contacted, that the major reason for not participating in the research study was lack of time. So, it is apparent that nonresponse bias is not likely to be an issue in the final sample.

3.3 Data analysis

EFA are applied to extract the latent factors of the indicators of ISO 9001 objectives and performance dimensions. The impact of ISO 9001 effectiveness on the performance dimensions is determined through multiple linear regression analyses. The statistical package SPSS 19 is used for data processing.

4. Results

4.1 The company profiles

Having as a criterion the number of employees, the responding service companies can be categorized as micro (<10 employees, 33 per cent), small (10-50 employees, 38 per cent), medium (50-250 employees, 22 per cent) and large sized (> 250 employees, 7 per cent). Thus, the vast majority of the sample companies are SMEs. A rate of 63 per cent of the responding companies have held the ISO 9001 certificate for more than three years, meaning that these companies had also been certified according to the previous version of ISO 9001:2000. The sample of the responding companies includes private service companies from a variety of sectors (e.g. wholesale/distribution, retail, banking/finance, repair/maintenance, communications, construction, insurance, food and beverage catering). As far as the profile of the quality manager of the companies is concerned, 85 per cent are at least university graduates, while 80 per cent have more than five years' experience in the service sector.

4.2 EFA of the indicators of ISO 9001 objectives

In order to confirm whether the factorial structure of the indicators of ISO 9001 objectives revealed in the manufacturing sector (through the study of Psomas *et al.*, 2013) is also valid in the service sector, an EFA (varimax rotation method) is performed. The result is the establishment of three latent factors. These factors are explained based on the measured variable loadings and can be labelled in accordance with the three ISO 9001 objectives identified in the literature and determined in the manufacturing sector (Psomas *et al.*, 2013), namely continuous improvement, customer satisfaction focus and prevention of nonconformities (Table I).

Table I shows that all the factor loadings are >0.62. Thus, the squared factor loadings indicate that a satisfactory proportion of measured variance is explained by the respective latent factor. Factor loadings > ± 0.50 are generally considered

necessary for practical significance (Hair *et al.*, 2005). Moreover, loadings of ± 0.55 are considered statistically significant for sample sizes of around 100 (Hair *et al.*, 2005). Hence, it is apparent that the factor loadings of the measured variables of the present study are practically and statistically significant.

The reliability of the latent factors is confirmed, according to Hair *et al.* (2005), through Cronbach's α coefficients (Table II). All these coefficients indicate acceptable to good reliability, given that the lowest acceptable limit of Cronbach's α coefficient ranges between 0.6 and 0.7 (Hair *et al.*, 2005). Cronbach's α is the most commonly used measure of scale reliability, as revealed by Ladhari (2008) reviewing a large number of service-quality measurement models. Most scales used in the reviewed studies exhibit good reliability that is, Cronbach's $\alpha > 0.60$ (Ladhari, 2008).

The construct validity of the latent factors is confirmed, according to Hair *et al.* (2005), by evaluating the convergent validity (factor loadings of respective measured items > 0.62 , average variance extracted > 0.5), the discriminant validity (average variance extracted $> \text{Corr}^2$) (Table II), the face-content validity (the questionnaire was developed based on an extensive literature review, a pilot study and review by academics) and the nomological validity (significant correlations between the latent factors). It is worth noting that in the studies reviewed by Ladhari (2008) concerning the development of service-quality measurement instruments; the convergent, discriminant and nomological validity are also tested using the same methodology and thresholds as in the present study. However, only a few of these studies test and support all three types of validity (convergent, discriminant and nomological) (Ladhari, 2008).

4.3 EFA of the indicators of performance dimensions

The indicators of the performance dimensions of service companies identified in the literature are used as the measured variables of an EFA (varimax rotation method). The result is the establishment of three latent factors. These latent factors are explained using the measured variable loadings and can be labelled as follows: financial performance, operational performance and product/service quality (Table III).

Table III shows that all the factor loadings are > 0.60 . Thus, the squared factor loadings indicate that a satisfactory proportion of measured variance is explained by the respective latent factor. Having in mind the size of the research sample of the present study and the suggestions of Hair *et al.* (2005), it is apparent that the factor loadings are practically and statistically significant.

The reliability of the latent factors is confirmed, according to Hair *et al.* (2005), through Cronbach's α coefficients (Table IV). All these coefficients indicate acceptable to good reliability. The construct validity of the latent factors is confirmed, according to Hair *et al.* (2005), by evaluating the convergent validity (factor loadings of respective

Latent factors	Cronbach's α	Average variance extracted (AVE)*	(Corr ²)**
Continuous improvement	0.936	0.572	0.469
Customer satisfaction focus	0.884	0.525	0.449
Prevention of nonconformities	0.893	0.541	0.469

Notes: *AVE = $\sum \lambda_i^2/n$ (number of items $i = 1 \dots n$; λ_i , factor loading); **Corr², the highest squared correlation between the factor of interest and the remaining factors

Table II.
ISO 9001 objectives –
model reliability
and validity

MSQ
23,2

Kaiser-Meyer-Olkin = 0.825

Measured variables

	Financial performance	Factors Operational performance	Product/service quality
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156

		Factor loadings		
Net profit	0.860			
Company financial results	0.857			
Profitability	0.855			
Cash flow from operations	0.771			
Sales growth	0.603			
Company efficiency		0.881		
Company productivity		0.858		
Process effectiveness		0.849		
Product/service quality				0.863
Consistent and reliable products/services				0.856
Product/service conformance to specifications				0.824
Eigenvalue	4.935	2.096		1.288
Cumulative variance (%)	44.86	63.91		75.63

Table III.
Exploratory factor analysis of the indicators of performance dimensions

Latent factors	Cronbach's α	Average variance extracted (AVE)*	(Corr ²)**
Financial performance	0.874	0.632	0.223
Operational performance	0.912	0.745	0.223
Product/service quality	0.833	0.719	0.192

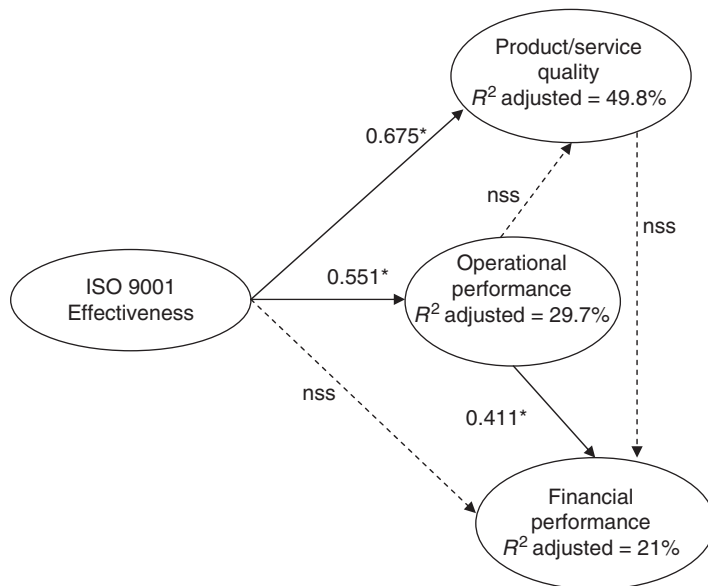
Table IV.
Performance dimensions – model reliability and validity

Notes: *AVE = $\sum \lambda_i^2/n$ (number of items $i = 1 \dots n$; λ_i , factor loading); **Corr², the highest squared correlation between the factor of interest and the remaining factors

measured items > 0.60, average variance extracted > 0.5), the discriminant validity (average variance extracted > Corr²) (Table IV), the face-content validity (the questionnaire was developed based on an extensive literature review, a pilot study and review by academics) and the nomological validity (significant correlations between the latent factors).

4.4 The impact of ISO 9001 effectiveness on service company performance

The impact of ISO 9001 effectiveness on the performance of the service companies is determined through multiple linear regression analyses (Figure 1). The regression analyses are applied based on the summated scales of the independent and dependent variables (Fotopoulos *et al.*, 2009; Psomas and Fotopoulos, 2010). Moreover, based on the summated scales of ISO 9001 objectives, a new summated scale is formulated called "ISO 9001 effectiveness". The first regression analysis examines the impact of the independent variable "ISO 9001 effectiveness" on the dependent variable "operational performance". The second regression analysis examines the impact of "ISO 9001 effectiveness" and "operational performance" (independent variables) on the dependent variable "product/service quality". Finally, the third regression analysis examines the impact of "ISO 9001 effectiveness" as well as "operational performance" and "product/service quality" (independent variables) on the dependent variable



Notes: *Statistically significant regression weight in $p = 0.00$; nss, not statistically significant

Figure 1.
The relationships between
ISO 9001 effectiveness and
company performance

“financial performance”. Using the studentized residuals, the assumptions required for each regression analysis and more specifically the linearity, homoscedasticity, independence and normality were tested. Based on the recommendations of Hair *et al.* (2005), specific tests were carried out for each assumption to check for violations. According to the results, these assumptions are not violated. Furthermore, the multicollinearity among the independent variables of each regression analysis is checked and not confirmed.

According to the results, the first regression is statistically significant (p -value = 0.00 and adjusted $R^2 = 0.297$). Estimating the regression model, the results show that “operational performance” is directly affected by “ISO 9001 effectiveness” ($p = 0.00$, β standardized coefficient = 0.551). The results also show that the second regression is statistically significant (p -value = 0.00 and adjusted $R^2 = 0.498$). Estimating the regression model, the results show that “product/service quality” is directly affected only by “ISO 9001 effectiveness” ($p = 0.00$, β standardized coefficient = 0.675). By contrast, “operational performance” does not directly affect “product/service quality”, but indirectly through its significant correlation with “ISO 9001 effectiveness”. Finally, the results show that the third regression is statistically significant (p -value = 0.00 and adjusted $R^2 = 0.21$). Estimating the regression model, the results show that the dependent variable “financial performance” is directly affected only by “operational performance” ($p = 0.00$, β standardized coefficient = 0.411). By contrast, “ISO 9001 effectiveness” and “product/service quality” do not directly affect “financial performance”, but do so indirectly through their significant correlation with “operational performance”.

5. Discussion

Large and small and medium size enterprises and ISO 9001 certification have been extensively surveyed and examined in the quality literature (McAdam and Canning,

2001; McAdam and Fulton, 2002; Singh *et al.*, 2006; Zaramdini, 2007; Lee *et al.*, 2009; Wahid and Corner, 2009; To *et al.*, 2011), requiring as a prerequisite to any further consideration ample and thorough experience in applying the standard. The sufficient experience of the responding Greek service companies in implementing the ISO 9001 standard is evident (Psomas *et al.*, 2010) as they have long ago applied and implemented the ISO 9001 QMS. Although the length of ISO 9001 certification has no impact on either quality management practices or quality performance (Prajogo and Brown, 2006; Lee *et al.*, 2009), the present study focuses on service SMEs that have long experience (at least three years) in implementing ISO 9001, in order to examine the introduced hypothesis that ISO 9001 effectiveness improve the performance outcomes.

Many authors and experts worldwide support the view that the effectiveness of a system such as ISO 9001 should be evaluated based on the performance of the company in a reverse causality relationship than this that is here introduced: performance defines ISO 9001 effectiveness. However, neither confirmation to the system requirements, nor the depth and the extent of ISO 9001 implementation, nor the achievement of a company's objectives should be taken into consideration when evaluating ISO 9001 effectiveness. A measurement tool applicable to service companies and reflecting the ISO 9001 objectives (continuous improvement, customer satisfaction focus and prevention of nonconformities) should be used, and is here introduced and confirmed, in order to evaluate ISO 9001 effectiveness. The present study findings also confirm the existence of the significant dimensions of service company performance identified in the literature relating to product/service quality, operative and financial results.

Having determined, conceptually and empirically, the dimensions of ISO 9001 objectives that depict ISO 9001 effectiveness, the impact of ISO 9001 effectiveness on the performance dimensions of the service companies is investigated. According to the findings, ISO 9001 effectiveness has a significant direct impact on product/service quality and operational performance. On the other hand, surprisingly, considering both ISO 9001 effectiveness and operational performance as possible direct contributors to product/service quality, the results do not confirm any direct impact of operational performance on product/service quality. This indicates that the strength of the direct impact of ISO 9001 effectiveness on product/service quality is significant to such a level that it limits the respective direct impact of operational performance on product/service quality. However, this is not the case as far as the contribution of operational performance to financial performance is concerned. More specifically, improving operational performance results directly in increased financial performance. By contrast, the impact of ISO 9001 effectiveness and product/service quality on financial performance seems to be indirect.

The findings of this work are in line and confirm the similar study of Psomas *et al.* (2013) in the manufacturing sector. It argues in favour of three latent factors depicting the ISO 9001 objectives (continuous improvement, customer satisfaction focus and prevention of nonconformities) based on which ISO 9001 effectiveness is described. Trigueros Pina and Sansalvador Selles (2008) demonstrate, similar to the present study, the connection of ISO 9001 effectiveness with the objectives of the standard, without, however, mentioning the ISO 9001 objectives revealed in the present study. Augustyn and Pheby (2000) also relate ISO 9001 effectiveness to the objectives of the standard and demonstrate, similarly to the present study, that ISO 9001 has a positive impact on a company's performance. As far as the meaningful performance dimensions for a company operating in the service sector are concerned, Zaramdini (2007) and

Singh *et al.* (2006) determine, similar to the present study, dimensions related to product/service quality, operational and financial performance. Improved internal operations and service quality as a result of ISO 9001 implementation, as revealed through the present study, are also evident from the study of McAdam and Canning (2001), Singh and Mansour-Nahra (2006), Lee *et al.* (2009) and Wahid and Corner (2009). The indirect relationship between ISO 9001 effectiveness and financial performance revealed in the present study is in line with the findings of the study of Su *et al.* (2008). Ronnback and Witell (2008), studying the economic value of quality management, demonstrate, similar to the present study, that the improvements of profitability are not a direct result of winning an excellence award but of the improvement of quality principles/practices within the company. Similarly, Parast and Fini (2010), studying the effect of operational performance (productivity) and quality on profitability in the airline industry, find a positive link between productivity and profitability, while the link between conformance quality and profitability is not supported.

6. Conclusions

The implementation of the ISO 9001 standard has been an important research subject for many years now, focusing on all the versions of the standard and examining for example, its success, effects and benefits. However, it will continue to be an important research subject since there are many unexplored topics regarding the optimization and contribution of the QMS. This is evident from the literature gap and the future research proposals that have been identified in the literature. The present study contributes to the existing body of literature by investigating the effects of ISO 9001 effectiveness on service company performance. However, the major point that differentiates the present study from similar studies concerns the fact that ISO 9001 effectiveness is introduced here and assessed by definition through the degree of achievement of the ISO 9001 objectives, namely continuous improvement, customer satisfaction focus and prevention of nonconformities. Other studies consider this ISO 9001 effectiveness as a by-product that is directly linked to the company performance and not vice versa. It is also worth noting that, while ISO 9001 effectiveness has been widely mentioned in the literature as a significant parameter of quality management and company performance, no studies, to the best of authors' knowledge, use these ISO 9001 objectives and their indicators in order to assess ISO 9001 effectiveness in service companies. The fact that the business environment, in which the service companies participating in the present study operate, is suffering from an unprecedented economic downturn and financial crisis, enhances the contribution of the present study to the literature. According to the study findings, by achieving the ISO 9001 objectives (in other words by increasing ISO 9001 effectiveness), product/service quality and operational performance are directly improved, while financial performance is indirectly improved through operational performance.

7. Managerial implications

The findings of the present study carry a managerial message. Service companies should focus their efforts on fully achieving the objectives of the ISO 9001 standard. Through continuously improving processes, product/service quality and the internal business environment; strongly focusing on satisfying customers; and maximizing the prevention and minimizing the detection of nonconformities, a service company increases ISO 9001 effectiveness. As a consequence, tangible benefits are derived for a

service company, including product/service quality and improvement of operational performance. This leads to increasing the financial indices of a service company. Thus, this can help a service company withstand the current downturn and survive in an unstable and financially unhealthy business environment. The fact that the current economic downturn and financial crisis prevail not only in Greece but in many other European countries too, strengthens this point of view and managerial message. Moreover, the noncertified service companies can be motivated to implement the ISO 9001 standard, and through increasing the standard's effectiveness improve their performance and be more competitive compared to the already ISO 9001 certified service companies.

8. Limitations and future research recommendations

The present study suffers from some limitations. The sample of the responding ISO 9001 certified service companies is small and it mostly includes SMEs, since the large-sized companies are not adequately covered in the sample. Moreover, due to the small sample size, the relationships between ISO 9001 effectiveness and the performance dimensions of service companies are determined through multiple linear regression analyses that are applied separately. Consequently, the structural equation modelling (SEM) technique, that allows the concurrent determination of the relationships among several factors, cannot be applied due to sample size restrictions. Thus, future research studies should be conducted based on a larger sample of service companies with a balanced distribution of all company sizes, to which the SEM technique can be applied. In doing so, the statistically significant differences among small-, medium- and large-sized companies can also be detected (regarding ISO 9001 effectiveness and company performance).

Bearing in mind the unstable business environment in which the responding service companies operate and furthermore, the fact that the data collected represents the subjective opinions of the company representatives, bias may be an issue in the present study with regard to the assessment of ISO 9001 effectiveness and company performance. Thus, future research studies can be based on objective business evidence coming from the documents of the ISO 9001 QMS and the company financial indexes. As far as the service company dimensions are concerned, it is apparent that dimensions such as market performance and customer satisfaction have been excluded from the purpose of the present study. So, it is suggested that future studies incorporate such performance dimensions, on which the impact of ISO 9001 effectiveness can be determined.

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