

TQM and business success. Do all the TQM drivers have the same relevance? An empirical study in Spanish firms.

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Abstract

Purpose

Prior studies by Salaheldin (2009) and Talib et al. (2011) have assessed the relationships between TQM critical success factors (CSF) and business results. This study builds upon this research by considering the relationships between these CSFs and their sequencing during the implementation of TQM. Furthermore, the influence exerted by the maturity of TQM implementation on the link between instrumental drivers and performance is explored.

Design/methodology/approach

The TQM drivers are clustered by means of three constructs: strategic enablers, tactical drivers and instrumental drivers and a model employed in which the strategic and tactical factors are treated as antecedents of the instrumental drivers. The direct effect of each cluster on business results and the indirect relationship of strategic and tactical factors via the mediating role of the instrumental drivers are assessed. These assessments use the Partial Least Squares (PLS) approach which is a variance-based

Structural Equation Modeling technique using a sample of 113 Spanish organizations with experience of implementing a TQM program.

Findings

The findings confirm the existing relationships among the CSFs and business performance identified by studies Salaheldin (2009) and Talib et al. (2011). However, our results reveal that instrumental drivers possess the highest variance explanation power over business performance outcomes and it is possible to identify a CSF implementation sequence that generates the greatest impact on business performance. Furthermore, the study was inconclusive with regard to the influence exerted by the number of years of TQM implementation on the link between the instrumental drivers and performance.

Originality/value

The results suggest the need to consider whether all the CSFs are equally relevant on the basis of their contribution to business success. For example, strategic enablers are generally considered to be of primary importance with tactical and instrumental drivers assuming a secondary position. Our study challenges this view and highlights the role of instrumental drivers over strategic and tactical factors with the clear implication that managers should focus strongly on daily implementation tasks such as benchmarking, zero-defects mentality and continuous improvement processes in order to achieve good business performance outcomes.

Keywords: Total quality management, TQM drivers, Business success, Structural equation modeling, Partial least squares

1. Introduction

Much of the literature concerning TQM implementation programs suggests that there is a positive correlation between TQM practices and performance both operational (Hendricks and Singhal, 1997) and organizational (Serman et al., 1997; Feng et al., 2006; Khan, 2011), and they bring numerous and varied benefits to the organizations that have successfully adopted them (Lam et al. 2011; Rahman and Sohal, 2002; Douglas and Judge Jr., 2001). A number of empirical research studies provide evidence of a positive link between the effective implementation of TQM and both financial and non-financial performance improvement in firms (Yusuf et al., 2007; York and Miree, 2004; Easton and Jarrell, 1998; Ittner and Larcker, 1996). Nevertheless, this topic has not been completely exempt from some controversy as other empirical studies have failed to support this link (Chapman et al., 1997; Mohrman et al., 1995). On the other hand, several other authors have discussed the failure of TQM programs and suggest the causes related to implementation factors rather than shortcomings in the content of TQM programs (Thiagaragan et al., 2001; Krumwiede and Lavelle, 2000; Gurnani, 1999). In this vein, Seetharaman et al. (2006, p. 676) argue that “the effectiveness of TQM implementation involves the defining and deployment of several key elements. The main reason why TQM fails is because of the lack of knowledge about the proper TQM implementation”. While there is no consensus on the reasons leading to failures in TQM implementation there does appear to be widespread agreement that this situation results in organizations not achieving the desired outcomes with the associated waste of resources occasionally prompting the organization to abandon its implementation and development of a TQM philosophy (Idris and Zairi, 2006; Rahman, 2001).

Several studies blame the failure on the TQM program implementation to the lack of an adequate implementation guide and sequence (Tamimi and Sebastianelli, 1996;

Sebastianelli and Tamimi, 2002). In this vein, Fisher et al. (2011) replicated the work from Tamimi et al. (1995) attempting to validate a guide to an effective TQM implementation. To this end, they applied the originally proposed methodology to a sample of 100 manufacturing and service companies of all sizes across the USA and Canada. The results obtained by this replication reinforced and strengthened the measurement proposed by Tamimi (1995) as well as providing a practical guide to the implementation of Deming's 14 points. However, none of these studies were concerned about assessing the links between TQM practices or offered an importance related perspective of these practices.

Several studies have indicated that distinct clusters of TQM implementation factors can be identified. For example, Salaheldin (2009) has identified and integrated the TQM CSFs into three groups, namely strategic, tactical and operational, and offers an integrated theoretical framework that validated the links between the CSF groups and business performance (both operational and organizational). This author highlights the strong relationship existing among strategic factors and performance and argues that, without such factors, successful and effective TQM implementation turns out to be impossible. However, it is important to understand the relationships among the distinct CSF groups and their indirect impacts on performance before such a conclusion can be confirmed. In this vein, Talib et al. (2011) provide a very interesting framework concerning the prioritizing of TQM CSFs in which the relative relevance of TQM practices (both independently and grouped) is analyzed by using the Analytic Hierarchy Process (AHP) method. In their study, the TQM CSFs were grouped within three different clusters though the relative importance that these groups might possess was not addressed. Consequently, a central concern remains in terms of answering the question: "Do all the CSF clusters have the same relevance and impact when

successfully implementing a TQM program?” As Talib et al. (2011, p. 1332) suggest, “much has been written about TQM practices and their implementation in different sectors but little attention has been paid to prioritizing these practices”.

Consequently, our paper investigates if any one group of CSFs in TQM is more impactful than another in terms of its relationship with business performance. In order to do this, the research model needs to consider the direct effects of each CSF cluster on business results, but also the indirect relationship of strategic and tactical factors with performance via the mediating role of instrumental drivers. In our study, the investigation is carried out using a Structural Equation Modeling technique with data drawn from a sample of Spanish organizations with experience of TQM implementation.

This paper is organized as follows: Section 2 contains a theoretical review concerning the main TQM drivers that our research identifies in the literature as well as the research model and hypotheses. Section 3 introduces the methodology applied, data collection and sample, as well as the measurements and data analysis. Section 4 summarizes the results concerning both the measurement and the structural models. Finally, Section 5 presents the discussion, practical implications and limitations.

2. Theoretical foundations, model and hypotheses

The study of TQM key success factors or drivers has been approached from various perspectives and methodologies. Rigorous attempts to identify them have been made by authors such as Rahman (2001), Dow et al. (1999), Grandzol & Gershon (1998) Black & Porter (1996), Powell (1995), and recently by Fisher et al. (2011). TQM drivers can be defined as the critical areas of managerial planning and action that must be fostered

in order to achieve effective quality management within a business unit, ensuring its successful implementation (Zairi and Leonard 1994).

According to Talib & Rahman (2010), many authors have used different sets of factors. For example, top management commitment and leadership, customer involvement, supplier involvement, process improvement and employee education and training are common to most of the frameworks developed by scholars (Shams-Ur Rahman 2004). Other studies have considered the following factors as TQM drivers: the adoption of the TQM philosophy and its open and flexible structure; empowerment; benchmarking; and a zero-defects mentality. Our study proposes a model within which three distinct constructs have been identified, namely: strategic enablers, tactical drivers and instrumental drivers. A summary of the different factors that comprise each construct is provided in Table 1.

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There is a great deal of literature concerning the main features or strategic elements that lead to a firm's successful implementation of a TQM program. A review of the literature suggests, in fact, that many factors can be considered drivers. Nevertheless, there have been few attempts to establish any sort of order or hierarchy among these factors. Salaheldin (2009) distinguishes a set of critical success factors of TQM practices. These key factors can be seen as those aspects that must prosper in order to guarantee the successful implementation of the TQM program in a firm. In other words, TQM CSFs are key factors dealing with best practices that firms and employees ought follow in order to effectively foster quality (Sila and Ebrahimpour, 2005a). On the other hand, Montes et al. (2003, p.195) argue that the main TQM elements "will always be guidelines to appraise the effectiveness of a TQM program following implementation.

Company results will differ depending on the successful implementation of said elements. Nevertheless, these elements have different degrees of importance in terms of their final contribution to the results”.

In our study, we have modeled the three constructs that comprise both the enablers and drivers of a TQM program that align with sequence of its implementation pattern within organizations. In this sense, we aim to analyze and test hypotheses that deal with both the direct relationships among the CSF constructs and business success, as well as the indirect effect that strategic and tactical factors exert over performance by means of instrumental drivers. The underlying reason for these mediation hypotheses deals with the debate concerning the key TQM implementation drivers. The major issue here is to discern which group of factors (ie. strategic, tactical or instrumental) contributes most to the achievement of business results. Our research model, as shown in Figure 1, encompasses the notion that instrumental drivers play a principal role in the link between TQM implementation and performance. The nature of these links and the hypothesized relationships are developed below.

2.1. Linking TQM Critical Success Factors and business success.

Traditionally, when a firm decides to implement a TQM program, the first step is to enable the adoption of the TQM philosophy and with the top management involvement and leadership. This encompasses creating a culture that fosters the principles of excellence and customer orientation. Such aspects are considered strategic pre-requisites in order to enable the climate needed to further implement the program in tactical and operative approaches. This study identifies strategic enablers with a construct that is shaped by top management commitment and leadership and by the extent to which the TQM philosophy is effectively adopted by the firm. Hence, this construct essentially

relies on the firm's cultural aspects and leadership style, considering that implementing TQM may suppose a significant change in the firm's approach and the manner in which the business is conducted (Turban et al., 1999). Top management commitment and leadership requires an unconditional and active defense of quality principles, complete involvement in the TQM program, and an efficient communication of this attitude. TQM-oriented firms need managers who are more closely linked to a transformational rather than a transactional leadership style. This means that they communicate the long-term vision of the firm, and motivate all employees to accept this vision and commit themselves to it.

On the other hand, TQM is not an activity in which firms can easily involve themselves. On the contrary, it requires a critical change in organizational mentality and procedures, in short, a new way of managing and working. An effective adoption of the TQM philosophy and principles also seems to be of significant relevance. According to Roldán et al. (2012, p.124), "some researchers have begun to explore TQM as a cultural phenomenon rather than as a set of tools and techniques". TQM philosophy adoption deals with the extent to which quality doctrine and principles are embedded within the values, mission and vision of the company. Performing as candidates for business excellence or quality awards such as the EFQM award is a good symptom of a properly adopted TQM philosophy. Hence, we posit the following hypothesis:

H1a: Strategic enablers are positively related to business success.

This study further introduces the construct "tactical drivers" to gather a set of five TQM key practices prevalent in the TQM literature. These practices comprise customer involvement, supplier involvement, open and flexible structure, employee education and training, and empowerment. Conventionally, the sequence to implement a certain philosophy, culture, technique or strategy encompasses three main stages: strategic,

tactical and operative. Once the first step is reached and the TQM philosophy is adopted at a strategic level, it is time to translate it and focus into the tactical level. In order to achieve a successful implementation of the TQM program, firms might assure that this philosophy reaches and begins to be assumed and integrated by their main stakeholders (e.g., employees, customers and suppliers).

According to Salaheldin (2009), this set of factors is not as crucial to TQM implementation as the strategic factors. However, tactical issues are also important, as they serve as support to the latter. Tactical drivers deal with more specific methods and actions that contribute to reaching the expected benefits of TQM implementation. Hence, we hypothesize:

H1b: Tactical drivers are positively related to business success.

To reach a successful implementation of the TQM program it seems essential that the firm resolutely commits to make the TQM philosophy permeate the firm's daily activities and routines. To this aim it becomes crucial to foster quality improvement practices such as benchmarking, process improvement and a zero-defects mentality, which comprise the construct of instrumental drivers. These instrumental drivers are the most visible and operative part of the TQM program. They constitute the driving force of continuous improvement and enhancement according to Richman & Zachary (1993, p.3) who suggest "setting a goal of zero defects and continuing to renew one's commitment to moving ever closer toward that goal will lead to improvements that continue to approach absolute perfection over time".

According to Das et al. (2000), TQM practices are strongly linked to customer satisfaction and, hence, to business performance and several studies have addressed the issue concerning the link between TQM factors and business results. Brah & Lim (2006) confirm the positive relationship existing between operational factors and firm

performance. Operational factors can be understood as instrumental drivers, given that they comply with being the observable or most evident part of the TQM program implementation. Specifically, their mission deals with the execution of TQM philosophy. Thus, we hypothesize that:

H1c: Instrumental drivers are positively related to business success.

2.2. The mediating role of instrumental drivers in the links between strategic enablers, tactical drivers and business success.

All the prior related studies have uniquely assessed the direct links among the distinct CSF constructs and business success. Thus, there are no empirical studies that examine the joint effects of these constructs on performance or the indirect relationships (mediation) between these constructs and business success. Hypothesizing these indirect relationships would enable us to identify which group of factors has the most influence on business results.

Although several studies suggest that strategic factors are the cornerstone of successful TQM implementation, other authors observe that operational factors should not be underestimated. Barker and Emery (2006) provide evidence that the effect of TQM on business performance essentially depends on the use of continuous improvement tools like benchmarking or relying on the use of process/product improvement teams. Moreover, some studies highlight the importance of the operational level while reaching excellence, although strategic factors such as top management commitment and leadership turn out to be a pre-requisite (Williams et al. 2004). Consequently, strategic factors are a necessary but not sufficient condition for business success and the nature and magnitude of these indirect relationships also needs to be considered. Thus, we posit the following hypotheses:

H2: The relationship between strategic enablers and business success is positively mediated by instrumental drivers.

H3: The relationship between tactical drivers and business success is positively mediated by instrumental drivers.

2.3. The moderating role of the number of years of TQM implementation on the instrumental drivers-business success link.

TQM instrumental drivers might also be associated with the concept of an operational capability in the extent to which a firm's daily TQM-related activities are focused on a series of routines and procedures that guide the employees' behavior and performance.

Winter (2003), defines capabilities as high-level routines (or a collection of routines). A routine is a "behavior that is learned, highly patterned, repetitious, or quasi-repetitious, founded in part in tacit knowledge and the specificity of objectives" (p. 991). Operational capabilities imply the ability to "make a daily living" (Winter, 2003, p. 991). Winter (2003) labeled operational capabilities as ordinary or "zero-order" capabilities whose goal is to "earn a living by producing and selling the same product, on the same scale and the same customer population" (p. 992). Therefore, operational capabilities deal with the ability to effectively accomplish with day-to-day activities.

Operational capabilities, like for instance TQM instrumental drivers, tend to become enhanced and improved with the passage of time through mechanisms such as learning, feedback and embedding knowledge in organizational routines. This would imply that the number of years' experience of TQM implementation may have a significant reinforcing effect on the tie between instrumental drivers and business success.

Several empirical studies have analyzed the effects of the passage of time on the TQM program implementation. The literature on TQM from its pioneer works like those of

Deming (1993), and Feigenbaum, (1982), to the more recent empirical studies from Saravanan and Rao (2007), Terziovski and Power (2007), and Pinar and Ozgur (2007), support the positive influence of time on business results. Therefore, additionally, a secondary purpose of this study is to examine the influence exerted by the number of years of TQM implementation on the link between instrumental drivers and performance. As such, the following hypothesis is offered for testing.

H4: The relationship between instrumental drivers and business success is positively moderated (reinforced) by the number of years of TQM implementation.

-INSERT FIGURE 1-

3. Method.

3.1. Data collection and sample.

This study has been carried out in two phases. During the first phase we visited 27 firms involved in the implementation of TQM programs in Spain. A total of 20 out of these 27 companies are organizations belonging to the *Club de Excelencia en Gestión* (Excellence in Management Club), which periodically organizes open days for members. Some of these firms have obtained the European Quality Award.

Throughout this first phase, we have been observing, noting and examining the similarities and differences to be found in different practices and focuses of TQM in these firms. A total of 39 individual interviews were also carried out with the senior managers responsible for coordinating TQM programs in Spanish firms. The main

purpose of these interviews was to test and improve the questionnaire and measurement instruments used.

Once this first phase was completed and the research design was established, the second phase of the study considered the following study population: Spanish firms which offered clear and sufficient indications of having implemented TQM strategies. In this context, our population comprised the 850 Spanish organizations awarded a seal of excellence in the context of the Spanish *Club de Excelencia en Gestión* (Excellence in Management Club). Within this group of organizations, 65% of them are enterprises. Therefore, our sample was made up of 552 firms which had implemented a TQM program. The survey was directed to the CEOs or senior managers of the companies chosen. A total of 113 valid responses were obtained with a response rate of 20.4%. A summary of the sample's main demographic features is provided in Table 2.

-INSERT TABLE 2-

3.2. Measures.

The questionnaire was designed from the basis of the literature review described earlier and the items used to measure the different constructs have been derived and adapted from prior, validated surveys. In particular, we used existing scales taken from a previous study carried out by Leal-Millán (1997).

The three constructs related to TQM drivers that make up our research model have been designed as multidimensional constructs. We have followed a super-ordinate procedure (Polites et al., 2012) in which relationships flow from the construct to its dimensions. A super-ordinate construct characterizes a broad concept which is manifested by its

dimensions (Edwards 2001). Each dimension represents a distinct manifestation or realization of the underlying high-order construct.

Each of the factors that compose the distinct TQM drivers was modeled as a reflective first-order construct. Then, three second-order constructs have been modeled which are composed of the first-order ones. Three indicators or manifest variables have been used to measure each of the TQM factors. In this section, the respondent was asked to indicate the extent to which the following aspects of quality were being implemented in his/her company. To this end, we used a five-point Likert scale ranging from “1=we have not implemented this yet, although we have the intention of doing so in the future” to “5=implementation is at a very advanced stage”. The final measurement instrument for this block of TQM key factors was composed of 30 items (3 items for each factor).

The business success construct has been modeled as a reflective first-order construct, made up of five items or manifest variables essentially related to financial and overall performance indicators. This section of the questionnaire was intended to require the respondent to express the global performance of the firm for the previous four years. For this purpose, we also used a five-point Likert scale ranging from “1=I totally disagree” to “5=I totally agree”. Finally, we assess the time the firm has been applying and committed to the TQM program by posing the following question: “How many years has your firm been implementing a TQM program?”

3.3. Data analysis.

In order to assess the relationships between constructs as well as the predictive power of the research model, Structural Equation Modeling (SEM) has been applied. Our research model has been specifically tested using Partial Least Squares (PLS), a variance-based structural equation modeling technique (Roldán and Sánchez-Franco

2012) which is an alternative to classic covariance-based techniques such as AMOS, Lisrel or EQS. The PLS approach has been used because this technique is mainly oriented to causal-predictive analysis, in which the problems explored are complex (high numbers of variables and relationships) and theoretical knowledge is limited (Wold 1979). According to Barclay et al. (1985), this technique is generally recommended for predictive research models which stress theoretical development, such as this study.

PLS represents a mathematical and statistical data-analysis technique that fits the conditions and requirements inherent to social sciences. In addition, the size of the final sample used also suggested the use of PLS rather than to covariance-based structural equation modeling (maximum-likelihood) (Reinartz et al. 2009).

The purpose of PLS modeling is the prediction of manifest and latent variables (Wold 1985). This goal translates into the attempt to maximize the explained variance (R^2) of the dependent variables. This leads to the fact that parameter estimations are based upon the independent variable's capacity to minimize residual variances (Chin, 1998c).

For this reason, the software that has been selected to carry out the PLS analysis was SmartPLS, developed by Ringle et al. (2005).

4. Results.

PLS models are assessed and interpreted through two phases: (1) the evaluation of the reliability and validity of the measurement model (outer model), and (2) the evaluation of the structural model (inner model). Following this sequential procedure guarantees the validity and reliability of the constructs' measures before attempting to draw conclusions concerning the links between the constructs (Roldán and Sánchez-Franco 2012).

4.1. Measurement model

The evaluation of the measurement model comprises assessing individual item reliability, construct reliability, convergent validity and, finally, discriminant validity.

For the case of variables with reflective indicators, such as those in our model, individual item reliability is considered satisfactory when the factor loadings of the items are greater than 0.707 in their respective constructs (Carmines and Zeller 1979).

As can be observed in the table below, all standardized loadings are greater than 0.707.

Individual item reliability is thus adequate.

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Construct reliability assessment leads us to verify the internal consistency of all items while measuring the concept. Our aim here is to definitely verify how rigorously the manifest variables measure the same latent variable. To this end, the measure called composite reliability of the construct (ρ_c) (Werts et al. 1974) was used which is defined by the following formula, where λ_i = standardized loading of the indicator i , ε_i = measurement error of the indicator i , and $\text{var}(\varepsilon_i) = 1 - \lambda_i^2$.

$$\rho_c = \frac{(\sum \lambda_i)^2}{(\sum \lambda_i)^2 + \sum_i \text{var}(\varepsilon_i)}$$

In order to assess this measure, we follow the indications posited by Nunnally (1978), who suggests a level of 0.7 for a modest degree of reliability in early research stages, and 0.8 for more strict research.

The evaluation of convergent validity is carried out through a measure developed by Fornell & Larcker (1981), called Average Variance Extracted (AVE). This measure

provides the amount of variance a construct obtains from its indicators with respect to the amount of variance due to the measurement error. According to these authors, the AVE has to be greater than 0.5, which means that more than half of the construct's variance is due to its indicators.

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As can be seen in Table 4, all the constructs meet the requirement of construct reliability since their composite reliabilities surpass the 0.8 level proposed by Nunnally (1978). Additionally, these latent variables are consistent with convergent validity criteria because their AVE measures are greater than 0.5.

Finally, the construct's discriminant validity must be assessed. Discriminant validity shows the extent to which one given construct is different from others. This is accomplished through the comparison of the square root of the AVE with the correlations. In order to obtain acceptable discriminant validity, the diagonal elements should be considerably greater than the off-diagonal elements in corresponding rows and columns. As can be seen in Table 5, this requirement is met and, hence, all the constructs attain discriminant validity.

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Therefore, having passed the four tests above (individual item reliability, construct reliability, convergent validity and discriminant validity), the strength and reliance shown by the measurement model proposed can be sustained.

4.2. Structural model

The structural model was tested on the basis of the path coefficients' intensity or standardized regression weights (β) and the variance explained in the endogenous variables (R^2). Both coefficients were obtained from the execution of SmartPLS software. In addition, a non-parametric Bootstrap resampling technique is used in order to assess the accuracy and stability of the estimates provided by SmartPLS.

Table 6 shows the variance explained (R^2) in the dependent constructs and the path coefficients in the different models considered. Consistent with Hair et al. (2011), a bootstrapping technique (5000 resamples) was used to generate standard errors and *t*-statistics, which permitted the statistical significance of the links contemplated in the models to be assessed. The results contained in Table 6 corroborate that the structural model has acceptable predictive relevance for the two endogenous variables: instrumental drivers and business success.

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We have followed the methodological approach proposed by Preacher & Hayes (2008) and Taylor et al. (2008) in order to verify our mediation hypothesis (H2). The indirect effect is quantified and contrasted with the mediator (Table 7). Following Williams & MacKinnon's (2008) proposals, the bootstrapping technique was used to test the mediation effect. Chin (2010) suggested a two-step procedure for assessing indirect effects on PLS. The first step deals with using the specific model in question including both direct and indirect paths, performing N-bootstrap resampling and finally multiplying the direct paths that make up the indirect path under evaluation. The second

step is the estimation of significance and the size of the indirect effect in relation to the total effect, through the assessment of the variance accounted for (VAF). Thereby, it is possible to determine the extent to which the variance of the dependent variable is indirectly explained via the mediator variable. $VAF = (b_1 * c) / (b_1 * c + a_1)$. VAF values under 20% imply the direct effect is very strong and there is no mediation. Values among 20% and 80% reveal the existence of partial mediation, whereas when VAF reaches values over 80% we can affirm the existence of a full mediation (Hair et al., 2014). As Table 7 reveals, for both hypothesis (H2 and H3), there exists full mediation, as VAF values surpass the critical value of 80%. Figure 2A shows how both direct links (strategic enablers-business success and tactical drivers-business success) are significant. Figure 2B illustrates that when the mediator variable is introduced into the model, the relationships between strategic enablers and business success becomes non-significant. The same occurs to the link between tactical drivers and business success. This means that instrumental drivers fully mediate the influence of strategic enablers and tactical drivers on business success. Finally, a second purpose of this study was to examine the moderating role played by the number of years of TQM implementation on the link between instrumental factors and business success. Hypothesis H4 suggested that the number of years of TQM implementation would positively moderate (reinforcing) the effect of TQM instrumental factors on business success. This hypothesis, as shown in Table 6, is not supported. These results will be extended and explained within the subsequent section.

5. Discussion and implications for research and practice.

According to Eldridge et al. (2014), many firms strive to reach business excellence and success by using approaches rooted in TQM programs. As Van der Wiele et al. (2011)

point out, within the currently turbulent and uncertain economic environment, TQM approaches should face not only the tools and instruments needed to measure and control performance in order to find deviations from the goals, but should also involve methods to foster and enable a more interactive management framework. The main purpose of this study was to shed some light on the relationship existing between the implementation of the TQM program and business success. Concretely, we focused on the identification of the most relevant factors or TQM drivers. To this end, and on the basis of a wide theoretical review, a set of ten key factors was selected and divided into three distinct groups. Thus, we distinguish between strategic enablers, tactical drivers and instrumental drivers.

In contrast to many studies that emphasize the impact of top management commitment, leadership and a firm's adoption of the TQM culture (enablers) in the TQM program implementation success, and hence, in business results, we suggest that success is better explained by means of a set of instrumental drivers. In this sense, we posit the existence of two indirect effects. Thus, instrumental drivers mediate the strategic enablers-business success and tactical drivers-business success links. Our model is partly consistent with the previous studies of Salaheldin (2009) and Talib et al. (2011) on the extent to which our results validate the existence of significant direct relationships among the three CSF constructs and business success. Nevertheless, our study goes a step beyond on the existing debate concerning the importance of these key TQM factors. In contrast to the results reached by other studies, in our work there appear significant differences in the relevance of these three constructs. Our results reveal that instrumental drivers appear to be crucial on their tie with performance, and hence, may have the greatest priority, followed in this order by tactical drivers and strategic enablers. Thereby, managers should focus their attention and energies on implementing

and improving instrumental practices such as benchmarking, process improvement and zero-defects mentality with utmost priority and all efforts must be done in order to adhere to them. Such instrumental factors positively reinforce the effects of strategic and tactical factors on performance.

Prior literature on this field has traditionally emphasized the role of strategic factors on their relationship with performance, relegating tactical and especially instrumental factors to a secondary role. Nonetheless, our results reveal that although all factors are relevant and have a positive impact on performance, instrumental factors come to occupy the central role. Therefore, unlike prior works, our research model not only tests the direct effects of each CSF cluster on business results, but also the indirect relationship of strategic and tactical factors with performance via the mediating role of instrumental drivers. In this sense, not only the direct effect of instrumental drivers on performance is greater than those of strategic and tactical factors, but equally are the indirect effects that strategic and tactical factors exert on performance via instrumental drivers.

The study by Talib et al. (2011) finds that strategic factors may have the greatest priority, followed by tactical and operational factors. These authors argue that firms should focus on strategic factors with the utmost priority. The next step would be to concentrate the firm's efforts and attention on tactical factors, which are viewed as supporting practices for the successful implementation of the TQM program. Finally, the firm ought to emphasize operational factors. One possible explanation could be that Talib et al. (2011) focus their study on service industries, whereas our study considers both service and manufacturing firms, with a higher representation of the latter in the sample.

Although plenty of the empirical studies that assessed the effects of the passage of time on the TQM program implementation success support the positive influence of time on business results, this hypothesis (H4) is not supported in our study. This is not inconsistent with other recent studies. For example, Gotzamani et al. (2006), using a sample of firms that had implemented an ISO quality management system, conclude that these organizations' performance was enhanced during the first year after the implementation but the results were inconclusive three years later. Thus, there is no evidence to support that performance gets maintained nor enhanced with the passage of time. Other empirical studies such as those developed by Singels et al. (2001) and Terziovsky et al. (2003) also suggest that firms that have been implementing a TQM program for years do not necessarily obtain better performance than newcomers. Moreover, there are works that even show evidence about the existence of a counter-productive effect of time on business success while implementing TQM (Jones et al., 1997). As previously shown, there exists a lack of congruence around this issue and more research is needed in this area.

From the managerial perspective, this study offers a substantial number of conclusions and practical implications. First, we have contributed to the establishment of a prioritization or hierarchy among the key TQM factors. Secondly, without a proper implementation of the daily practices involving the TQM instrumental factors, it is hard for TQM to be effectively and successfully implemented. The importance of instrumental drivers implies that top management needs to set clear objectives and policies for continuous improvement in the quality of products and services to meet the customers' needs and expectations. Firms' managers should emphasize that continuous improvement, benchmarking, and zero-defects mentality is a never-ending process.

Especially, they should understand that reliable product/service design is critical to exceed the customers' expectations, leading to improved business success.

Although, the literature agrees that strategic factors are valuable assets and have a crucial role in the deployment of TQM systems, our study empirically validates this assertion. However, at the same time it shows that this impact on performance is stronger and much more significant by reconfiguring instrumental factors. This implies that strategic and tactical factors do have an effect on business success, but they do so indirectly, by reconfiguring and reinforcing instrumental factors that better fit the stakeholders' needs and expectations. Overall, it can be concluded that there is a strong causality between instrumental drivers of TQM practices and business success.

The results of this study should also lead managers to seeing a "return on investment" in their efforts to implement a TQM program by firstly, paying more attention on how to implement the instrumental factors, and secondly, avoiding the belief that the passage of time and experience-based learning will bring business performance enhancement and success on their own.

There are several limitations within this work that should be mentioned. The first is related to organizational bias. It seems likely that those firms which are not satisfied with their TQM program performance would be less likely to be motivated to contribute to the development of this study. Therefore, we have included in the sample a higher proportion of "good" programs than is the case in the population at large. Secondly, although we provide evidence of causality, causality itself has not been proven. According to Fornell (1982), causal relationships between variables cannot be proven; they are always assumed by the researcher. Thirdly, this research relies mainly on perceptions and we only used a single method to elicit these perceptions. Finally, this

research was carried out in a specific geographical setting (Spanish companies) and we must be cautious about generalizing these results in other contexts.

However, our study does highlight potential future research directions. We are interested in setting this study in a different geographical context, with the aim of assessing the results in comparison with the ones obtained in Spain. Furthermore, we are also interested in verifying our results we obtain using hard data (eg., financial ratios, etc) to measure business success and performance.

References

- Barclay, D., Higgins, C. and Thompson, R. (1985), “The partial least squares (PLS) approach to causal modelling: Personal computer adoption and use as an illustration”, *Technology Studies*, No. 2, pp. 285–309.
- Barker, A.M., Sullivan, D.T. and Emery, M.J. (2006), *Leadership competencies for clinical managers: The renaissance of transformational leadership*, Jones & Bartlett Learning.
- Black, S.A. and Porter, L.J. (1996), “Identification of the critical factors of TQM”, *Decision Sciences*, Vol. 27 No. 1, pp. 1–22.
- Brah, S.A. and Lim, H.Y. (2006), “The effects of technology and TQM on the performance of logistics companies”, *International Journal of Physical Distribution & Logistics Management*, Vol. 36 No. 3, pp. 192–209.
- Carmines, E.G. and Zeller, R.A. (1979), *Reliability and validity assessment*, Sage Publications, Beverly Hills, Calif.
- Caroline M. Fisher, Cassandra C. Elrod and Rajiv Mehta. (2011b), “A replication to validate and improve a measurement instrument for Deming’s 14 Points”,

- International Journal of Quality & Reliability Management*, Vol. 28 No. 3, pp. 328–358.
- Castro, I. and Roldán, J.L. (2013), “A mediation model between dimensions of social capital”, *International Business Review*, Vol. 22 No. 6, pp. 1034–1050.
- Chapman, R.L., Murray, P.C. and Mellor, R. (1997), “Strategic quality management and financial performance indicators”, *International Journal of Quality & Reliability Management*, Vol. 14 No. 4, pp. 432–448.
- Chin, W.W. (1998), “Structural Equation Modeling in IS Research”, Presented at the ISWorld Net Virtual Meeting Center at Temple University.
- Chin, W.W. (2010), “How to write up and report PLS analyses”, V. *Esposito Vinzi, W.W. Chin, J. Henseler, & H. Wang (Eds.) Handbook of Partial Least Squares Concepts, Methods and Applications.*, Springer, Dordrecht, pp. 645–689.
- Das, A., Handfield, R.B., Calantone, R.J. and Ghosh, S. (2000), “A Contingent View of Quality Management-The Impact of International Competition on Quality”, *Decision Sciences*, Vol. 31 No. 3, pp. 649–690.
- Deming, E.W. (1989), *Calidad, productividad y competitividad. La salida de la crisis*, Díaz de Santos, Madrid.
- Douglas, T.J. and Judge Jr., W.Q. (2001), “Total Quality Management Implementation and Competitive Advantage: The Role of Structural Control and Exploration”, *Academy of Management Journal*, Vol. 44 No. 1, pp. 158–169.
- Dow, D., Samson, D. and Ford, S. (1999), “Exploding the Myth: Do All Quality Management Practices Contribute to Superior Quality Performance?”, *Production and Operations Management*, Vol. 8 No. 1, pp. 1–27.

- Easton, G.S. and Jarrell, S.L. (1998), "The Effects of Total Quality Management on Corporate Performance: An Empirical Investigation", *Journal of Business*, Vol. 71 No. 2, pp. 253–307.
- Edwards, J.R. (2001), "Multidimensional Constructs in Organizational Behavior Research: An Integrative Analytical Framework", *Organizational Research Methods*, Vol. 4 No. 2, pp. 144–192.
- Eldridge S., van Iwaarden J., van der Wiele T. and Williams R., (2014), "Management control systems for business processes in uncertain environments", *International Journal of Quality and Reliability Management*, Vol. 31 No. 1, pp. 66–81.
- Feigenbaum, A.V. (1982), "Quality and business growth today", *Quality progress*, Vol. 15 No. 11, pp. 22–25.
- Feng, J., Prajogo, D.I., Tan, K.C. and Sohal, A.S. (2006), "The impact of TQM practices on performance: A comparative study between Australian and Singaporean organizations", *European Journal of Innovation Management*, Vol. 9 No. 3, pp. 269–278.
- Fornell, C. (1982), "A Second Generation of Multivariate Analysis: An Overview", C. Fornell (ed.): *A Second Generation of Multivariate Analysis*, Praeger, New York, N.Y., Vol. 1, pp. 1–121.
- Fornell, C. and Larcker, D.F. (1981), "Structural equation models with unobservable variables and measurement error: Algebra and statistics", *Journal of marketing research*, pp. 382–388.
- Gotzamani, K.D, Theodorakioglou, Y.D. and Tsiotras, G.D (2006), "A longitudinal study of the ISO 9000 (1994) series' contribution towards TQM in Greek industry", *The TQM Magazine*, Vol. 18 No. 1, pp. 44-54.

- Grandzol, J.R. and Gershon, M. (1998), "A survey instrument for standardizing TQM modeling research", *International Journal of Quality Science*, Vol. 3 No. 1, p. 80.
- Gurnani, H. (1999), "Pitfalls in total quality management implementation: The case of a Hong Kong company", *Total Quality Management*, Vol. 10 No. 2, pp. 209–228.
- Hair, J.F., Ringle, C.M. and Sarstedt, M. (2011), "PLS-SEM: Indeed a Silver Bullet", *The Journal of Marketing Theory and Practice*, Vol. 19 No. 2, pp. 139–152.
- Hair, J.F., Hultt, G. T. M., Ringle, C., Sarstedt, M. (2014). "A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)". SAGE Publications, Inc.
- Hendricks, K.B. and Singhal, V.R. (1997), "Does Implementing an Effective TQM Program Actually Improve Operating Performance?", *Management Science*, Vol. 43 No. 9, pp. 1258–1274.
- Idris, M.A. and Zairi, M. (2006), "Sustaining TQM: A Synthesis of Literature and Proposed Research Framework", *Total Quality Management & Business Excellence*, Vol. 17 No. 9, pp. 1245–1260.
- Ittner, C.D. and Larcker, D.F. (1996), "Measuring the impact of quality initiatives on firm financial performance", *Fedor, D.F., Ghosh, S. (Eds.), Advances in Management of Organization Quality*, JAI Press, Greenwich, Conn.; London, Vol. 1, pp. 1–37.
- Jones, R., Arndt, G. and Kustin, R. (1997), "ISO 9000 among Australian companies: impact of time and reasons for seeking certification on perceptions of benefits received", *International journal of Quality & Reliability Management*, Vol. 14 No. 6/7, pp. 650-60.

- Khan, M.A. (2011), "Total Quality Management and Organizational Performance-Moderating Role of Managerial Competencies.", *International Journal of Academic Research*, Vol. 3 No. 5.
- Krumwiede, D.W. and Lavelle, J.P. (2000), "The Effect of Top Manager Personality on a Total Quality Management Environment", *Engineering Management Journal*, Vol. 12 No. 2, pp. 9–14.
- Lam, S.-Y., Lee, V.-H., Ooi, K.-B. and Lin, B. (2011), "The relationship between TQM, learning orientation and market performance in service organisations: An empirical analysis", *Total Quality Management & Business Excellence*, Vol. 22 No. 12, pp. 1277–1297.
- Mohrman, S.A., Tenkasi, R.V., Lawler, E.E. and Ledfor, G.E.J. (1995), "Total quality management: practice and outcomes in the largest US firms.", *Employee Relations*, Vol. 17 No. 3, pp. 26–41.
- Montes, F.J.L., Jover, A.V. and Fernandez, L.M.M. (2003), "Factors affecting the relationship between total quality management and organizational performance", *International Journal of Quality & Reliability Management*, Vol. 20 No. 2, pp. 189–209.
- Nunnally, J.C. (1978), *Psychometric theory.*, McGraw-Hill, New York.
- Pinar M. and Ozgur, C. (2007), "The Long-Term Impact of ISO 9000 Certification on Business Performance: A Longitudinal Study Using Turkish Stock Market Returns - Do ISO 9000 firms have higher returns and lower variability than non-ISO 9000 firms?", *The Quality management journal.*, Vol. 14 No. 4, p. 21.
- Polites, G.L., Roberts, N. and Thatcher, J. (2012), "Conceptualizing models using multidimensional constructs: A review and guidelines for their use", *European Journal of Information Systems*, Vol. 21 No. 1, pp. 22–48.

- Powell, T.C. (1995), "Total Quality Management as Competitive Advantage: A Review and Empirical Study", *Strategic Management Journal*, Vol. 16 No. 1, pp. 15–37.
- Preacher, K.J. and Hayes, A.F. (2008), "Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models.", *Behavior research methods*, Vol. 40 No. 3, pp. 879–91.
- Rahman, S. (2001), "A comparative study of TQM practice and organisational performance of SMEs with and without ISO 9000 certification", *International Journal of Quality and Reliability Management*, Vol. 18 No. 1, pp. 35–49.
- Rahman, S. and Sohal, A.S. (2002), "A review and classification of total quality management research in Australia and an agenda for future research", *International Journal of Quality & Reliability Management*, Vol. 19 No. 1, pp. 46–66.
- Reinartz, W., Haenlein, M. and Henseler, J. (2009), "An empirical comparison of the efficacy of covariance-based and variance-based SEM", *International Journal of Research in Marketing*, Vol. 26 No. 4, pp. 332–344.
- Richman, E. and Zachary, W.B. (1993), "Building an Operations Management Foundation That Will Last: TQM, JIT and CIM", *Industrial Engineering -New York Then Atlanta Norcross- American Institute of Industrial Engineers Incorporated-*, Vol. 25 No. 8, p. 39.
- Ringle, C.M., Wende, S. and Will, A. (2005), *SmartPLS 2.0 (M3) beta*, Hamburg, Germany.
- Roldán, J.L. and Sánchez-Franco, M.J. (2012), "Variance-Based Structural Equation Modeling: Guidelines for Using Partial Least Squares in Information Systems Research", *Mora, M., Gelman, O., Steenkamp, A., Raisinghani, M. (Eds.) Research methodologies, innovations, and philosophies in software systems*

engineering and information systems, Information Science Reference, Hershey, PA.

- Salaheldin, S. (2009), "Critical success factors for TQM implementation and their impact on performance of SMEs", *International Journal of Productivity and Performance Management*, Vol. 58 No. 3, pp. 215–237.
- Saravanan, R. and Rao, K.S.P. (2007), "The impact of total quality service age on quality and operational performance: an empirical study", *The TQM Magazine*, Vol. 19 No. 3, pp. 197–205.
- Sebastianelli, R. and Tamimi, N. (2002), "How product quality dimensions relate to defining quality", *International Journal of Quality & Reliability Management*, Vol. 19 No. 4, pp. 442–453.
- Seetharaman, A., Sreenivasan, J. and Boon, L.P. (2006), "Critical success factors of total quality management", *Quality and Quantity*, Vol. 40 No. 5, pp. 675–695.
- Shams-Ur Rahman. (2004), "The Future of TQM is Past. Can TQM be Resurrected?", *Total Quality Management & Business Excellence*, Vol. 15 No. 4, pp. 411–422.
- Singels, J., Ruel, G. and Van de Water, H. (2001), "ISO 9000 series – certification and performance", *International Journal of Quality & Reliability Management*, Vol. 18 No. 1, pp. 62-75.
- Sterman, J.D., Repenning, N.P. and Kofman, F. (1997), "Unanticipated side effects of successful quality programs: Exploring a paradox of organizational improvement", *Management Science*, Vol. 43 No. 4, pp. 503–521.
- Talib, F. and Rahman, Z. (2010), "Critical Success Factors of TQM in Service Organizations: A Proposed Model", *Services Marketing Quarterly*, Vol. 31 No. 3, pp. 363–380.

- Talib, F., Rahman, Z. and Qureshi, M.N. (2011), "A study of total quality management and supply chain management practices", *International Journal of Productivity and Performance Management*, Vol. 60 No. 3, pp. 268–288.
- Tamimi, N., Gershon, M. and Currall, S.C. (1995), "Assessing the psychometric properties of Deming's 14 principles", *Quality Management Journal*, Vol. 2 No. 3, pp. 37-51.
- Tamimi, N. and Sebastianelli, R. (1996), "How firms define and measure quality", *Production and Inventory Management Journal*, Vol. 37, pp. 34–39.
- Taylor, A., MacKinnon, D. and Tein, J.Y. (2008), "Tests of the Three-Path Mediated Effect", *Organizational Research Methods*, Vol. 11 No. 2, pp. 241–269.
- Terziovski, M., D. Power, and A. Sohal. 2003. "The longitudinal effects of the ISO 9000 certification process on business performance." *European Journal of Operational Research*, Vol. 146 No. 3, pp. 580-596.
- Terziovski M. and Power, D. (2007), "Increasing ISO 9000 certification benefits: a continuous improvement approach", *International Journal of Quality and Reliability Management*, Vol. 24 No. 2, pp. 141–163.
- Thiagaragan, T., Zairi, M. and Dale, B.G. (2001), "A proposed model of TQM implementation based on an empirical study of Malaysian industry", *International Journal of Quality & Reliability Management*, Vol. 18 No. 3, pp. 289–306.
- Turban, E., McLean, E., and Wetherbe, J. (1999), *Information technology for management : making connections for strategic advantage*, Wiley, New York.
- Van der Wiele, T., Van Iwaarden, J., Williams, R. and Eldridge, S. (2011), "A new foundation for quality management in the business environment of the twenty-

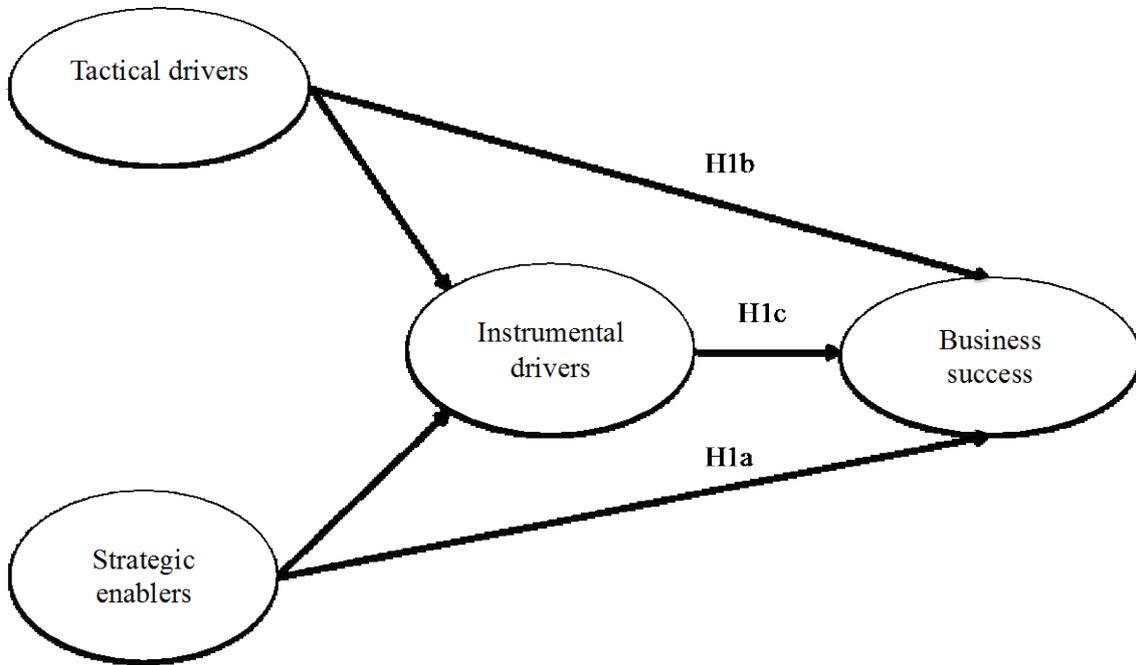
- first century”, *Total Quality Management & Business Excellence*, Vol. 22 No. 5, pp. 587–598.
- Werts, C., Linn, R.L. and Joreskog, K.G. (1974), “Intraclass Reliability Estimates: Testing Structural Assumptions”, *Educational and Psychological Measurement*, Vol. 34 No. 1, pp. 25–33.
- Williams, J. and MacKinnon, D. (2008), “Resampling and Distribution of the Product Methods for Testing Indirect Effects in Complex Models”, *Structural Equation Modeling: A Multidisciplinary Journal*, Vol. 15 No. 1, pp. 23–51.
- Williams, R., Van der Wiele, T., Van Iwaarden, J. and and Visser, R. (2004), “TQM: why it will again become a top management issue”, *International Journal of Quality & Reliability Management*, Vol. 21 No. 6, pp. 603–611.
- Winter, S.G. (2003), “Understanding dynamic capabilities”, *Strategic Management Journal*, Vol. 24 No. 10, pp. 991–995.
- Wold, H. (1979), *Model construction and evaluation when theoretical knowledge is scarce: an example of the use of partial least squares*, Université de Genève Faculté des Sciences Économiques et Sociales, Genève.
- Wold, H. (1985), “Systems analysis by partial least squares”, *P. Nijkamp, H. Leitner, & N. Wrigley (Eds.), Measuring the unmeasurable*, Dordrecht ; Boston : M. Nijhoff ; Hingham, MA : Distributors for the U.S. and Canada, pp. 221–251.
- York, K.M. and Miree, C.E. (2004), “Causation or covariation: an empirical re-examination of the link between TQM and financial performance”, *Journal of Operations Management*, Vol. 22 No. 3, pp. 291–311.
- Yusuf, Y., Gunasekaran, A. and Dan, G. (2007), “Implementation of TQM in China and Organisation Performance: An Empirical Investigation”, *Total Quality Management & Business Excellence*, Vol. 18 No. 5, pp. 509–530.

Zairi, M. and Leonard, P. (1994), *Practical benchmarking: the complete guide*,
Chapman & Hall, London.

Table 1. TQM factor classification

CONSTRUCTS	CRITICAL SUCCESS FACTORS	STUDIES
Strategic enablers	1. Top Management commitment and leadership	Ahire et al. (1996); Waldman (1994); Idris and Ali (2008); Nwabueze (2011); Roldán et al. (2012)
	2. TQM philosophy adoption	Powell (1995); Issac et al. (2004); Hafeez et al. (2006); Roldán et al. (2012)
Tactical drivers	3. Customer involvement	Flynn et al. (1994); Khanna et al. (2011); Mugion and Musella (2013)
	4. Supplier involvement	Ahire et al. (1996); Trent and Monczka (1999); Rao et al. (1999)
	5. Open and flexible structure	Powell (1995); Black and Porter (1996); Khanna et al. (2011)
	6. Employee education and training	Powell (1995); Hoang et al. (2010); Sadikoglu and Zehir (2010)
	7. Empowerment	Waldman (1994); Gatchalian (1997); Tang et al. (2010)
Instrumental drivers	8. Benchmarking	Ahire et al. (1996); Youssef and Zairi (1995); Rao et al. (1999)
	9. Process improvements	Powell (1995); Rao et al. (1999); Fuentes et al. (2006)
	10. Zero-defects mentality	Powell (1995); Black and Porter (1996); Agus (2005)

Figure 1. Research model and hypotheses



H2 = Strategic enabler → Instrumental drivers → Business success
H3 = Tactical drivers → Instrumental drivers → Business success

Table 2. Respondent demographics

Type of business	Number	Percentage
Manufacturing company	70	62.0%
Service company	21	18.6%
Mixed	22	19.4%
Number of years implementing TQM	Number	Percentage
Five years or more	57	50.50%
Less than five years	56	49.50%
Size of the company	Number	Percentage
Big enterprise	62	54.9%
Small/Medium enterprise (SME)	51	45.1%
Multinational	Number	Percentage
Yes	49	43.4%
No	64	56.6%

Table 3. Individual item reliability

Strategic enablers		Tactical drivers		Instrumental drivers		Business success	
Item	Loading	Item	Loading	Item	Loading	Item	Loading
Adop	0.9405	Req1	0.8812	Mej	0.8937	R1	0.8247
Comp	0.9301	Req2	0.8155	Ment	0.8444	R2	0.828
		Req3	0.8998	Bench	0.8692	R3	0.8707
		Req4	0.8847			R4	0.8361
		Req5	0.9342			R5	0.8843

Table 4. Construct reliability and convergent validity

Construct	Composite	
	Reliability (ρ_c)	AVE
STRAT	0.9332	0.8748
TACT	0.9469	0.7813
INSTR	0.9027	0.7557
BSUC	0.9281	0.721

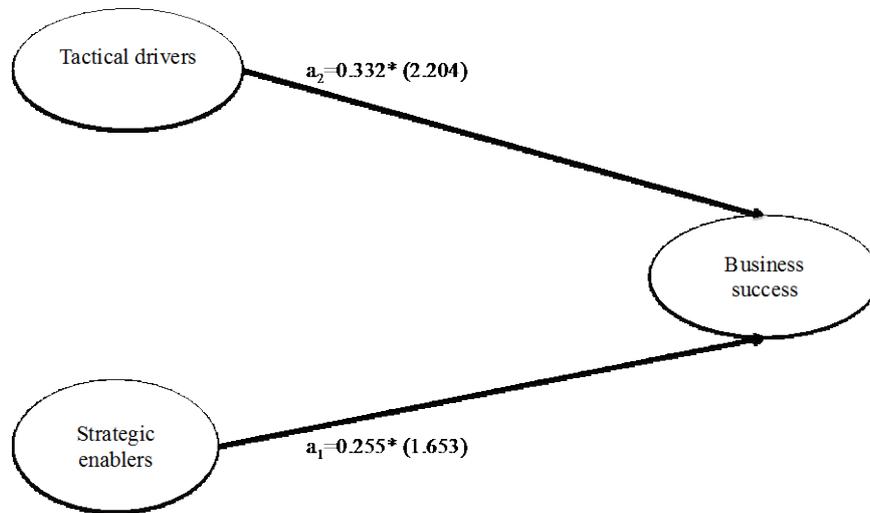
Table 5. Discriminant validity coefficients¹

	BSUC	STRAT	TACT	INSTR
BSUC	0.849			
STRAT	0.545	0.935		
TACT	0.528	0.861	0.884	
INSTR	0.636	0.799	0.873	0.869

¹ The diagonal elements (boxes in shadow) correspond to the square root of the construct's AVE, while the rest of the boxes represent the latent variable correlations.

Figure 2. Structural model.

A. Model with direct effects



B. Model with total effects

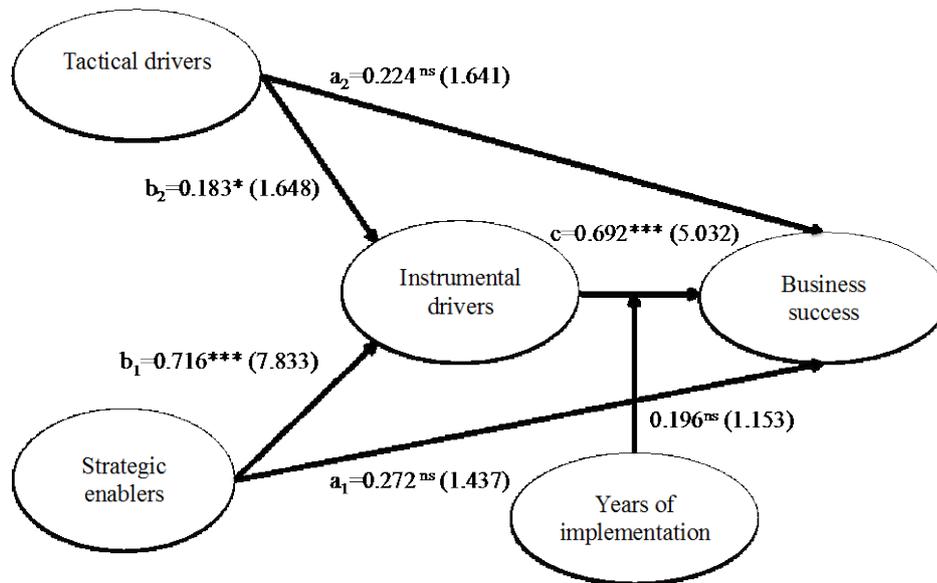


Table 6. Structural Model Results

Relationships	Model 1	Support	Model 2	Support
	$R^2_{Inst} = 0$		$R^2_{Inst} = 0.772$	
	$R^2_{Perf} = 0.426$		$R^2_{Perf} = 0.417$	
H1a: Strat → Bsucc	0.255* (1.653)	Yes	0.272 ^{ns} (1.437)	No
H1b: Tact → Bsucc	0.332* (2.204)	Yes	0.224 ^{ns} (1.641)	No
H1c: Inst → Bsucc			0.692*** (5.032)	Yes
H2: Strat → Inst			0.716*** (7.833)	Yes
Inst → Bsucc			0.692*** (5.032)	
H3: Tact-Inst			0.183* (1.648)	Yes
Inst → Bsucc			0.692*** (5.032)	
H4: Time*Inst → Bsucc			0.196 ^{ns} (1.153)	No

t(0.05, 4999) = 1.645, t(0.01, 4999) = 2.327, t(0.001, 4999) = 3.091. Sig. denotes a significant direct effect at 0.05; Nsig. denotes a non significant direct effect at 0.05. * p < 0.05. ** p < 0.01. *** p < 0.001. ns Not significant (based on t(4999), one-tailed test).

Table 7. Summary of mediating effect tests

	VAF	VAF %	Mediation
H2	0,96	96%	Full mediation
H3	0,83	83%	Full mediation