

# The Impact of SCQM Practices on Organizational Performance

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**Abstract:** In today's global market place, the traditional approaches to supply chain management increasingly prove to be ineffective. However much attention has been focused on supply chain management (SCM) concepts in recent years, its interlinking with the quality management perspective is often limited and tangential in nature. Whereas the importance of quality management has been generally recognized, more focused approach in evaluating quality management issues within the supply chain contexts is needed by academic researchers. Consequently, this study defines the concept of supply chain quality management (SCQM) and its practices by comprehensively reviewing prior QM and SCM literature in major journals. The main goal is to examine the synergistic relationships between SCQM practices and performance. A conceptual model is developed and tested through path analysis using the cross-section data collected from automotive industry in Iran. The data was collected from managers of 280 suppliers of Iran Khodro Company by using of PLS software, structural model is solved. The results of this study show that SCQM practices have a positive effect on organizational performance.

**Keywords:** Supply chain quality management, Supply chain management, Quality management and Organizational performance.

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## 1. Introduction

The trend towards globalization along with higher rate of innovation has led to the development of networks of firms. SCM has been regarded as a major organizational practice to achieve competitive advantage particularly for alliances and networks with suppliers and customers (Rungtusanatham et al., 2003; Janvier-James, 2012). Successful design and implementation of supply chains reduces cost, improves flexibility, enhances quality, and ensures customer satisfaction; therefore it would be a valuable way to maintain competitive advantage (Li et al., 2006). Researchers and scholars are interested in determining the factors that are critical to design and maintain effective supply chains (Childerhouse et al., 2002; Vonderembse et al., 2006; Stevenson and Spring, 2009). In this regard, understanding of the quality issues at the supply chain is critical to the success of the firm and supply chain performance (Kuei and Madu, 2001; Sila, 2006). Lin et al. (2005) also pointed out that quality management (QM) practices integration with the supply chain management ones can provide necessary collaboration lead to an improved organizational performance.

The QM and the SCM have distinct initiations and primary goals, which can complicate an integrated implementation. However, they have evolved in similar ways to reach the same ultimate goal: customer satisfaction. The QM emphasizes on the internal (employee) participation and SCM focuses on the external (business partners) partnerships despite there is a necessity for stipulating on the both internal and external partnerships. Although both QM and SCM are critical to organizational performance, they are rarely studied together (Gunasekaran and McGaughey, 2003; Robinson and Malhotra, 2005; Casadesus and Castro, 2005). Recent product recalls and vulnerability of supply chains to risk and disruptions reveals that although the philosophy of QM and SCM has been investigated successively, supply chains suffers from the malicious implementation of the quality issues (Zhang et al., 2011). Based on our knowledge, there is a negligible quantity of knowledge concerning these two crucial concepts simultaneously in conjunction with each other (Sitkin et al., 1994; Ross 1998; Foster, 2008; Foster et al., 2011; Zhang et al., 2011). Empirical studies suggest that organizational performance is achieved when quality approaches and supply chain practices are implemented concurrently (Tan et al., 1998, 1999). This has resulted in a merging of quality management and supply chain management principles.

In this regard, the notion of SCQM has been introduced by previous researchers (Malhotra et al., 2005; Lin et al., 2005; Flynn and Flynn, 2005; Yeung, 2008; Sroufe and Curkovic, 2008; Kaynak and Hartley, 2008; Kuei et al., 2011; Azar et al.,

2009). However, more work is needed as this merger is still far from complete and supply chain quality management practices must advance even further from a focus on traditional firm-centric and product-based mindset to an inter-organizational supply chain orientation involving customers, suppliers, and other partners (Robinson and Malhotra 2005). Although there have been some attempts to empirically demonstrate a positive relationship between SCQM and performance (Easton and Jarrell, 1998; Hendricks and Singhal, 1997), concerns have been raised about whether SCQM programs have generated real economic gains and/or improvements in operating performance (Agus and Abdullah, 2000).

Despite the fact that the importance of quality is of great importance for many supply chain managers, the association between the supply chain quality management practices and organizational performance is still controversial and further research is required to determine the critical SCQM practices (Kuei et al., 2008). SCQM is still in the definitional stage and rigorous studies of SCQM practices have yet to emerge. However, the proposed list of SCQM practices is not exhaustive (Mellat-Parast, 2012) since most of the previous studies in SCQM practices have focused on the quality management practices that addressed the internally driven product-oriented (Azar et al, 2009; Malhotra et al., 2005) and the essential features lead to performance achievement have not been fully explored (Lin et al., 2005; Robinson and Malhotra, 2005; Zeng et al., 2013). The necessity is to fill the gap of research for a unique set of practices that address both external and internal factors that govern the SCQM practices.

## **2. Theoretical background and hypotheses**

This section discusses four topics: SCQM practices, organizational performance, the relationship between SCQM and organizational performance, and a research model.

### **2.1. SCQM practices**

Supply chain quality management is defined as “a holistic management system to improve performance by using QM and SCM practices jointly”. Several authors have addressed supply chain quality and have defined and proposed practices to improve the quality of supply chain. In view of the limitations of traditional quality management philosophy, SCQM was proposed as a new quality management philosophy. This new philosophy advocated extending the traditional firm-centric and product-based mindsets to an inter-organizational supply chain orientation involving customers, suppliers, and other partners (Kannan and Tan, 2005; Lin et al., 2005; Flynn and Flynn, 2005; Sila et al., 2006; Foster and Ogden, 2008; Robinson and Malhotra, 2005; Saraph et al., 1989).

Nevertheless, SCQM has received scant research attention until recently, even though this perspective is sorely needed in delivering value to customers, especially in globally scattered supply chains (Robinson and Malhotra, 2005). In previous work, QM and SCM were treated as separate entities, because of the different focus: QM focused on quality performance improvement, while SCM emphasized on reducing cost (Vanichchinchai and Igel, 2009) by synchronizing decisions and activities of all the partners throughout the supply chain (Li, 2007).

Fourteen dimensions of SCQM developed by Kuei and Madu (2001) comprise of modified version of eight critical factors of quality management by Saraph, et al. (1989). The factors are top management leadership, training, product design, supplier quality management, process management, quality data reporting and employee relations. Kuei and Madu (2001) introduced four new quality factors; customer relations, benchmarking, supplier selection, and supplier participation. Three additional IT-driven change factors were also included; information technology, IT-driven operations process and IT-driven organization integration.

The paper by Kuei and Madu (2001) also confirmed that a firm’s organizational performance can be discriminated by SCQM practices. The findings indicate that supplier participation and supplier relationship can have an impact on organizational performance. In conclusion the study identified three critical factors of SCQM, namely, quality of IT system, supplier relationship and customer focus to build competitive advantage. Supporting components such as QM infrastructure, QM tools and QM practices and QM culture are required for successful SCQM.

Leadership support for SCQM is important, to ensure the goals of customer satisfaction, trusted customer-supplier relationship and high level IT based capabilities. Besides that, innovation culture must be emphasized. Lin et al. (2005) mentioned that traditional quality management practices and pertinent QM practices can be incorporated in SCQM process. In addition, interactions between manufacturers and suppliers based on factor such as cooperation, trust and long-term relationships could enhance quality improvements among supply chain members (Wong, et al., 1999). For instance, Wong

(2003) emphasized that buying firms should develop cooperative relationships with suppliers instead of adversarial relationships to ensure that suppliers able to meet the final customers' requirements.

The research by Lai, et al. (2005) also suggested that SCQM programs should include traditional quality management practices by concentrating on operational matters. Suppliers' participation including QM practices should be incorporated in SCQM in the supplier organizations. By considering suppliers as important trading partners and members of the value chain organizational performance can be optimized. The researchers also stated that quality continues to be an important attribute in any relationship between the company and its suppliers. This is made possible by involving suppliers as partners in the design and new product development process in a supply chain relationship to ensure that quality is built into the product. This development would lead to improved product quality and increased in customer satisfaction.

Fynes, et al. (2005) researched the impact of several dimensions supply chain relationships (trust, commitment, adaptation, communication and collaboration) on quality performance. The findings indicate supply chain relationship quality dimension has a positive impact on design quality. The researchers also suggest suppliers to be proactive in the design and product development process. This can be accomplished through supply chain relationship such as partnership. Their findings are similar to (Lin, et al., 2005) which stated that suppliers need to be involved in the product design at the early stage. The net effect of this relationship is improved conformance quality and customer satisfaction. 80% of the manufacturing cost of new products is committed in the early stage or 20% of the design stage. Involving suppliers in the early stage may help to design quality which in turn helps to improve the conformance quality, customer satisfaction, time-to-market. Improve design quality has an impact on product cost reduction and external quality-in-use. Conformance quality is an order qualifier whereas design quality is an order winner (Fynes and De Burca, 2005).

In supply chain quality management, the six quality management factors that are related to supply chain performance are leadership, strategic planning, human resources management, supplier quality management, customer focus, and process management (Azar et al., 2010). Based on the most important influencing factors collected for both SCM and QM practices, a new set of SCQM practices were developed in order to take the benefit of formerly noted SCM and QM practices in the SCQM. The SCQM practices using in this study are as follow: leadership, customer focus, training and education, information analysis, strategic supplier partnership, and internal lean practices.

## **2.2. Organizational performance (OP)**

Organizational performance (OP) can be defined as the financial and economical performance of the company (Venkatraman and Ranmanujam, 1986). OP can be measured by ROI, profits, return on assets and equity and also its performance in the stock market (Garcia, 2005; Tharenou, Saks & Moore, 2007). Some scholars (e.g. Davis & Pett, 2002; Hubbard, 2009; Ostroff & Schmidt, 1993) have suggested different views with respect to organizational performance, however there is not much agreement between them.

Tan (1998) states that SCQM has two types of objectives, short term and long term. Short term objectives include aspects such as high productivity or lower cycle and inventory time, whereas longer term objective include increasing profit and market share. According to Holmberg (2000), financial metrics have always been an useful tool to help compare the performance of different organizations. Li et al (2006) believe that any kind of organizational practice say, supply chain management must eventually end up increasing OP.

Hubbard (2009) suggested another way to measure organizational performance, namely Sustainable Balanced Scorecard (SBSC). The SBSC contains both environmental and social issues present in the current Balanced Scorecard (BSC) and also includes the triple bottom line. In this concept, triple bottom line means the wider perspective with respect to all stakeholders and well as the usual BSC financial measurements as a factor of measuring performance. In addition, Ford and Schellenberg (1982) further classified OP into four categories. Behavioral, non behavioral, intended and unintended consequences (Park, 2009).

Other researchers such as (Davis & Pett, 2002; Ford & Schellenberg, 1982; Ostroff & Schmitt, 1993) have also suggested effectiveness and efficiency as a good measure of organizational performance. According to Ford and Schellenberg (1982) when both effectiveness and efficiency are concentrated it can lead to high OP. In addition Davis and Pett (2002) provided a classification tool that helps by giving indicators to both the dimensions, i.e. effectiveness and efficiency. Efficiency includes total sales, return on assets as well as after tax return. Effectiveness includes the sales and employment growth of the company.



Park (2009) states that, in relation to the discussion above, business performance is a much wider perspective since it includes both financial and non financial performance. As mentioned earlier, factors such as after tax return, total assets, effectiveness and so on are included in the financial performance (Venkatraman and Ramanujam 1986). However, since the scope of this study is limited, it will only include financial performance such as ROI, profit margins and market shares as the measures of OP.

### **2.3. The relationship between SCQM practices and performance**

One of the very important ability in leading an organization is leadership. It is the ability of a person to foresee and have capability in satisfying the customer needs (Deming, 1982). Higher level of management in the organization is responsible for initiating the process of providing the customers with value added products and better performance (Ahire et al., 1996). They only can help in providing the other with quality resources to achieve the goals and improve the organization. They stand as a role model for the others such as teams in the organization, training department, individuals and increase the communication between them to implement the efficient process and outputs (Reed et al., 2000; Wilson and Collier, 2000). Leadership is very necessary for the implementation of the SCQM. Skills such as executive-quality leadership knowledge, ability to prioritize, executive knowledge of systems, executive knowledge of quality and executive knowledge of change management (Antonaros, 2010) are important for a leader. When the leader in the top management has all these qualities, the success of implementing the SCQM becomes easier. He also says that training of the top level is not only important but the depth of knowledge in quality systems and system planning is also necessary. Most of the leaders think that the implementation of SCQM is a short term achievement to reach success. This leads us to the following hypothesis:

#### **H1. Management leadership is positively associated with organizational performance.**

Customer focus is a key performance indicator within business. In a competitive marketplace where businesses compete for customers, customer satisfaction is seen as a key differentiator and increasingly has become a key element of business strategy. Within organizations, customer satisfaction ratings can have powerful effects. They focus employees on the importance of fulfilling customers' expectations. Furthermore, when these ratings dip, they warn of problems that can affect sales and profitability. These metrics quantify an important dynamic. When a brand has loyal customers, it gains positive word-of-mouth marketing, which is both free and highly effective (Gitman et al., 2005). Thus, it is imperative for organizations to take care of customer satisfaction. In order to do this, there needs to be a valid tool to measure satisfaction. This is usually done by asking the customers if the product or service has met their set expectations or even exceeded it. Therefore expectation is an important tool of measure for satisfaction. On the other hand, if the reality does not meet the customer's set expectations then they will rate the experience as less satisfying. This is why a luxury hotels receive lower satisfaction ratings than budget motels since the expectations in the former is much higher than the latter, and may be difficult to meet (Farris et al., 2010).

#### **H2. Customer focus is positively associated with organizational performance.**

The "human capital" of the firm needs to be trained and developed (Dean and Bowen, 1994; Sitkin et al., 1994; Hackman and Wageman, 1995). Training as well as education techniques such as brainstorming is important to equip the employees with the essential tools needed to perform SCQM effectively (e.g. Ahire et al., 1996; Hackman and Wageman, 1995). Furthermore the philosophy of SCQM is that it should also change the attitude of individuals in order to shape the organizational culture hence training is useful for this too (Reed et al, 2000)

#### **H3. Education and training is positively associated with organizational performance.**

Strategic Suppliers Partnership is defined as "the long-term relationship designed to leverage the strategic and operational capabilities of individual participating organization to achieve significant benefits to each party" (Li et al., 2006b; Li et al., 2005). A true supplier partnership, encourages mutual planning and problem solving efforts (Gunasekaran et al., 2001), and is critical in operating a leading-edge supply chain. Azaret al. (2009) have investigated the impact of supplier management on the performance and have found that effective supplier management is directly related to higher level of performance.

#### **H4. Strategic Suppliers Partnership is positively associated with organizational performance.**

Information analysis include two parts information sharing and information quality. Information sharing can be defined as the degree to which information about the product, the market and customer is communicated among the members of the supply chain (Mentzer et al., 2001; Li et al., 2006a). Information quality however is the degree to which the information is

actually accurate and credible (Li et al, 2006b). There have been a number of studies that show the effective management of the supply chain leads to better performance (Li et al., 2006; Lyons et al., 2004, Moberget al., 2002). In addition, Forslund and Jonsson (2007), indicated that the useful of the forecast and the performance may be affected due to the deficiency of information quality.

**H5. Information analysis is positively associated with organizational performance.**

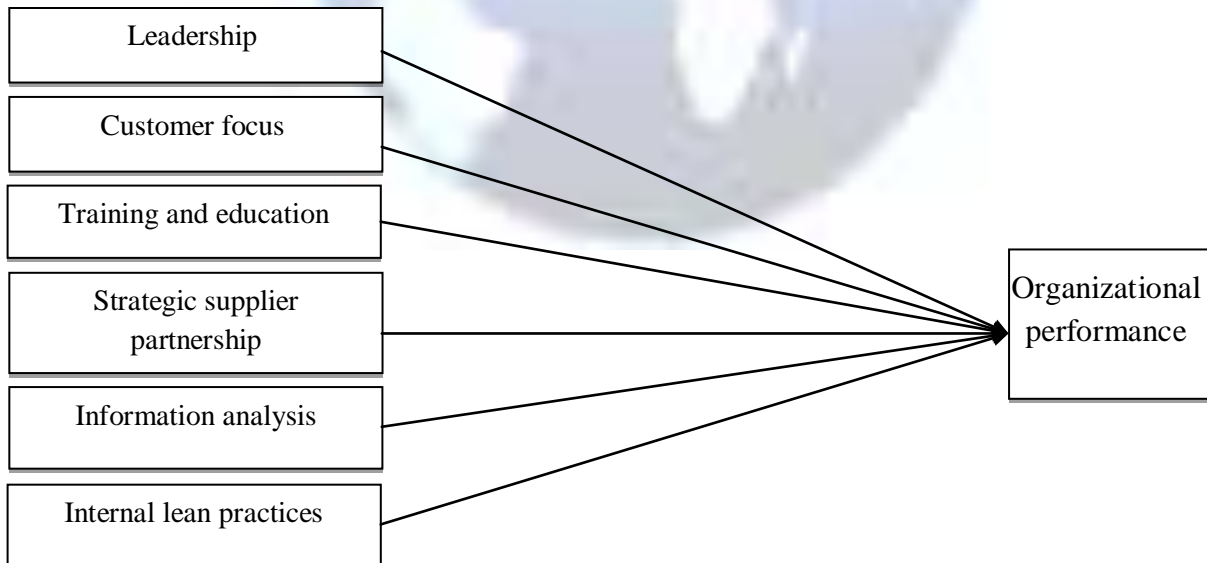
The practices that eliminate any type of waste such as time and money by decreasing the time to set up and reducing the lot sizes is known as lean practices (Womack and Jones, 1996; McIvor, 2001; Taylor, 1999). The word “lean” is used to describe the process through which the least amount of resources is used to mass produce and satisfy the customer needs. Waste elimination is a fundamental concept in lean production. Womack and Jones (1996) wrote “Lean Thinking” in which they have identified five characteristics to eliminate waste. (1) identify the aspects do and do not create value for the customers, (2) specify all the stages needed to order the materials and produce it in order to recognize the non value adding parts, (3) create the actions so that there is no need for backflows or detours, (4) just in time should only be implemented for the products that is pulled by the customers, and (5) strive to perfect the process by scraping any step that seems to cause wastage. By using these principles to reduce lead times, setup time, pull production and paperwork it could lead to efficient performance.

**H6. Internal lean practices are positively associated with organizational performance.**

Postponement can help the business be flexible in terms of innovating new products or improving the existing ones in order to cope up with the changing customer specifications (Waller et al, 2000). Furthermore, by undifferentiating its materials for a long time, it allows the organization to be able to meet the customer requirements as quickly as possible. This also decreased the cost of the supply chain(Lee and Billington, 1995; Van Hoek et al., 1999).

**2.4. Research model**

The conceptual framework presented as in Fig. 1 is drawn from the SEM approach. In our conceptual model, each unobserved (latent) variable comprises a number of constructs. For example, SCQM practice is represented by the following six constructs: management leadership, customer focus, training and education, strategic supplier partnership, information analysis and internal lean practices. For the purpose of this study, SCQM practices are considered as latent-independent (exogenous) variables, while organizational performance is used as latent-dependent (endogenous) variables. From this conceptual model, a number of hypotheses relating these variables are developed.



**Figure 1: Study Full Conceptual Framework, Relationship among SCQM practices and Organizational Performance**

### **3. Methodology**

#### **3.1. Sample and data collection**

Automotive industry is our target industry, because this industry has attracted a lot of attention recently due to the quality problems and a higher product recall rate than others. To ensure the representativeness of the sample, we use the suppliers list of automotive industry. Then we strategically selected only the first tire suppliers. Thus, senior, quality or executive-level managers are targeted respondents of this study as these personnel were deemed to have the best knowledge in the supply chain area. A significant problem with organizational-level research is that senior, quality and executive-level managers receive many requests to participate and have very limited time. Because this interdisciplinary research collects information from several functional areas, the size and scope of the research instruments must be large and time consuming to complete. This further contributes to the low response rate. To solve this problem and also reduce respondents' perceived effort, a brief questionnaire was designed. **The questionnaire contained only 87** questions. This attempt was aimed at reducing respondents' expected time and retaining respondents' attention while answering a questionnaire. Data will collect using a large-scale web-based survey. Quality of respondents and response rate are two important factors that influence the quality of an empirical study.

With respect to the questions' reliability and validity, most questions were adapted or borrowed from the literature, so they were expected to clearly and appropriately operationalize constructs. However, to ensure the appropriateness of the constructs, some researchers will review the questionnaire. The final version of the questionnaire will be prepared through this revision procedure. Carr et al. (2000) experienced that many Asian firms would be reluctant to cooperate in research surveys without first developing a relationship with the researchers. To overcome such potential obstacles, various methods such as personal requests via telephone, supportive requests from professional organizations and incentives and rewards for respondents will use to obtain a high response rate. For the electronic questionnaire distribution, target companies will be identified through a directory of Iran Automotive industry. The paper-based questionnaire will be manually distributed during public seminars about the automotive industry organized by Iran Productivity Institute.

The first step of data collection was to obtain written permission from the companies to administer the survey to employees. A written letter was sent to the vice presidents of the organizations via e-mail explaining the nature of the study, how it is to be conducted and the benefits of allowing employees to participate in the study. The survey was administered via a link in the participant survey invite e-mail, which linked the participants to the survey site at Zoomerang.com. All participants had the option to complete the survey from any location with Internet access, which eliminated the fear of doing the survey at work where privacy could be comprised. The participants were requested to complete the survey as soon as possible or within 14 days from the receipt of the e-mail invite.

Prior to proceeding to the survey, the participant will be shown the Informed Consent information and asked to read and indicate clear understanding and agreement with the terms in the Informed Consent section. Participants are free to submit concerns or questions to the researcher. Contact information will be provided in the Informed Consent section. After the close of the survey, data analysis, and approval of the results, all prospective participants will be received an e-mail with a thank you for participating and an executive summary of the survey results. Many researchers have indicated advantages of questionnaire in the last two decades. Stone and Collin (1984) concluded that advantages of the questionnaire include it is cheaper to administer than other methods, and data collection is less time consuming. In addition, respondents are less likely to over-report on a questionnaire. Furthermore, an anonymous style allows respondents to maybe feel freer to express themselves on a questionnaire. Additionally, a questionnaire study can drive the respondents directly to the research topic.

In the same vein, Stanton et al (2005) indicated that a questionnaire offers a very flexible way of collecting large volumes of data from large participant samples as 1) when the questionnaire is properly designed, the data analysis phase should be quick and very straight forward; 2) very few resources are required once the questionnaire has been designed; 3) very easy to administer to large number of participants; 4) skilled questionnaire designers can use the questions to direct the data collection. On the other hand, limitations of the questionnaire have also been specified. Because of low levels of responses, questionnaire results may be distorted. More specifically, people who do not return questionnaires probably have different views or behavior patterns to the other respondents. In addition, respondents may be unable to complete a questionnaire for various reasons (Stone and Collin, 1984). Although the questionnaire is an efficient method for collecting data, designing, piloting, and analyzing a questionnaire is time consuming. And questionnaires can offer a limited output (Stanton et al., 2005).



### **3.2. Measures**

To design the measurement instrument, we used existing measurement items addressed in the literature. SCQM practices measurement for the automotive industry in Iran was developed based on the research of Li et al. (2006), Min and Mentzer (2004), Tan et al. (2002), Lee and Kincade (2003), Sahay and Mohan (2003), Chin et al. (2004), GSCF in Lambert et al. (2005) and Kim (2006). To improve the content validity, four academic experts in SCQM three industry experts in the automotive industry in Iran will assess these measurement items. As a result, SCQM practices include, top management commitment, customer focus and relationship, training and education, continuous improvement, strategic suppliers partnership and relationship, materials management, level and quality of information sharing. Items will measure on five-point scales ranging from 1 (not at all implemented) to 5 (fully implemented).

Measurement of organizational performance is an issue of continued interest in SCM. There are measurements or indications of organizational performance proposed by previous researchers and practitioners concerning SCQM. Measurements for organizational performance should provide insightful information on different aspects of SCQM, both within the organization and in relation with suppliers. In this study, organizational performance is measured in terms of financial and operational performance. This study modified the measurement items of organizational performance, based on the studies of Bowersox et al. (1999), Gunasekaran et al. (2004), Lin et al. (2005), Soosay and Chapman (2006), and Lee et al. (forthcoming). These items have a five-point scale (1 = significant decrease, 2 = decrease, 3 = same as before, 4 = increase, 5 = significant increase, 6 = not applicable) to measure organizational performance.

### **3.3. Measurement analysis**

Structural equation modeling was used to investigate the direct and indirect effects between the variables of the study's proposed model. The following section explains in-depth the descriptive analysis methods and discusses as well the multivariate analysis techniques employed in the current study; exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and structural equation modeling (SEM). The results of these data analysis methods are presented in the next chapter. Exploratory factor analysis (EFA) has long been employed to test the structure of the measurement items (Rubio et al., 2001). EFA can identify the number of factors present in a specific scale as well as the items that weight most highly onto each factor (Field, 2006; Hair et al., 2006; Tabachnick and Fidell, 2007; Pallant, 2007). Confirmatory factor analysis (CFA) was employed in the current study to achieve two main objectives: to test the (a) dimensionality and (b) validity of the measurements (Gerbing and Anderson, 1988; Tellefsen and Thomas, 2005; Hair et al., 2006).

The term structural equation modeling suggests two main features of the procedure: (a) that the causal processes are characterized by a series of structural (i.e. regression) equations, and (b) that these structural relations can be modeled in a picture to enable a clearer conceptualization of the theory under study (Tabachnick and Fidell, 2007). Structural equation modeling was employed in the current study not only because this data analysis technique can test the causal direct and indirect relationship between the research variables (Byrne, 2010), but also to test whether or not the structural model (paths of the causal structure) are equivalent (i.e., invariant) across two groups (Byrne, 2010) of hotels (above average financial performance and under average financial performance) to identify which quality management practices can generate a competitive advantage. First, in this thesis, the Cronbach's  $\alpha$  is used as an assess of internal scale consistency, utilizing "SPSS (Statistical Package for the Social Sciences)". According to McMillan and Schumacher (2001) a coefficient alpha of 0.90 implies a highly reliable instrument; nevertheless, coefficients ranging from 0.70 to 0.90 are acceptable for most instruments. "Cronbach's alpha", also identified as coefficient of reliability, shows the degree of internal consistency for a set of items (or variables), assuming that they assess a one-dimensional latent construct. All Cronbach's  $\alpha$  value in that column are in the close approximation of one another, which indicates good reliability of the data.

Additionally, validity was assessed in terms of convergent validity and discriminant validity. Convergent validity refers to the agreement among measures that are theoretically related. This study utilized one method to test for convergent validity; average variance extracted values (AVE). AVE captures the amount of variance explained by the construct as a proportion to the captured plus the measurement error. Thus, a value above 0.50 reflects that the variance explained by the construct is greater than the measurement error; displaying a convergent validity. The AVE scores of the constructs, presented in Table 4.15, range between 0.55 and 0.78, providing further evidence for convergent validity. Overall, looking at the AVE scores, we can congregate that the main constructs demonstrate convergent validity. Discriminant validity was performed to show that all of the constructs were different from each other. Fornell & Larcker (1981); Gefen & Straub (2005) stated that discriminant validity is evaluated by considering the correlation among the constructs. Square root of AVE values of each constructs should higher than all of the correlation values of constructs. The diagonal shows the square root of AVE values of each constructs and these values were higher than the other correlation values among the constructs.

### 3.4. Hypotheses testing

Based on the results from the SEM, the six hypotheses offered in this study were examined. Basically, SEM is a regression model with observed and latent variables (Lee, 2007). A regression analysis was conducted to examine if the independent variables predicted the dependent variables as hypothesized. According to Kachigan (1991), a regression analysis equation describes the nature of the relationship between two variables and regression analysis supplies variance measures which allow us to assess the accuracy with which the regression equation can predict values on the criterion variable (Byrne, 2009). A p-value of 0.5 or less was utilized as the criterion to decide if the degree of prediction was significant. Four out of six hypotheses in this study were supported. Tables 1 summarize the outcomes of testing the hypotheses.

**Table 1. Path Coefficients (Mean, STDEV, T-Values) for direct effects**

	Original (O)	Sample (S)	Standard (STERR)	Error (E)	T ( O/STERR )	Statistics	P Values
<b>CF -&gt; OP</b>	0.150		0.050		2.975		0.002
<b>IA -&gt; OP</b>	0.468		0.069		6.736		0.000
<b>ILP -&gt; OP</b>	0.245		0.062		3.977		0.000
<b>SSP -&gt; OP</b>	0.059		0.043		1.388		0.083
<b>TAE -&gt; OP</b>	-0.001		0.030		0.022		0.491
<b>LEAD -&gt; OP</b>	0.160		0.062		3.296		0.001

Based on Table 1 the path coefficient ( $\beta=0.160$ ), T. statistics= $3.296$ , P-Value= $0.001 < 0.05$ . The paths exceed this criterion and the bootstrap critical ratios are of the appropriate size (greater than 1.96;  $< 0.05$ ). The Path coefficient (Beta),  $\beta = 0.160$  explains the positive and direct relation between leadership and performance. So, performance is significantly influenced by leadership and H1 is supported. Based on Table 1 the path coefficient ( $\beta=0.150$ ), T. statistics= $2.975$ , P-Value= $0.002 < 0.05$ . The paths exceed this criterion and the bootstrap critical ratios are of the appropriate size (greater than 1.96;  $< 0.05$ ). The Path coefficient (Beta),  $\beta = 0.150$  explains the positive and direct relation between customer focus and performance. Thus, performance is significantly influenced by customer focus and H2 is supported. Based on Table 1 the path coefficient ( $\beta = -0.001$ ), T. statistics= $0.022$ , P-Value= $0.491 > 0.05$ . The paths exceed this criterion and the bootstrap critical ratios are not of the appropriate size (greater than 1.96;  $< 0.05$ ). The Path coefficient (Beta),  $\beta = -0.001$  explains that there is no relationship between training and performance.

Thus, performance is not influenced by training and H3 is not supported. The path coefficient between strategic supplier partnership and performance is 0.059 with a non-significance T-statistics= $1.388$  and P-Value ( $P < 0.384$ ). This non-significant (T-value) indicates that strategic supplier partnership does not have a positive direct effect on performance. Thus, performance is not influenced by strategic supplier partnership and H4 is rejected. Based on Table 1 the path coefficient ( $\beta=0.468$ ), T. statistics= $6.736$ , P-Value= $0.000 < 0.05$ . The paths exceed this criterion and the bootstrap critical ratios are of the appropriate size (greater than 1.96;  $< 0.05$ ). The Path coefficient (Beta),  $\beta = 0.468$  explains the positive and direct relation between information analysis and performance. Thus, performance is significantly influenced by information analysis and H5 is supported. Based on Table 1 the path coefficient ( $\beta=0.245$ ), T. statistics= $3.977$ , P-Value= $0.000 < 0.05$ . The paths exceed this criterion and the bootstrap critical ratios are of the appropriate size (greater than 1.96;  $< 0.05$ ). The Path coefficient (Beta),  $\beta = 0.245$  explains the positive and direct relation between internal lean practices and performance. Thus, performance is significantly influenced by internal lean practices and H6 is supported.

### 4. Discussion and implications

This study explores the contribution of SCQM practices to performance through an empirical analysis. The analysis demonstrates strong support for the relationship between SCQM practices and performance. The results of the latent variable model analysis and the multi-group analysis using PLS indicate that 4 out of 6 hypotheses are supported. The supported hypotheses clearly show how SCQM practices have statistically significant direct effects on performance. This finding is consistent with those of other studies (e.g., Flynn et al., 1995; Sila and Ebrahimpour, 2005). The impacts of SCQM practices could be achieved if an organization implements even a single or a few SCQM practices and some of the SCQM practices do not have a direct relationship with performance but they have an indirect relationship with performance through innovation. In this model (supply chain quality management practices on organizational performance) empirical evidence indicates that supply chain quality management practices have a positive impact on performance.



The results of this model clarify the significant positive direct impact of **internal lean practices** on performance. The results of the SEM indicate a positive  $\beta$  (0.245), T-value (3.977) with significant impact ( $P < 0.00$ ) of ILP on performance. This result is consistent with the results of previous studies conducted by Lawrence and Hottenstein, 1995; Sakakibara et al., 1997; Nakamura et al., 1998; Callen et al., 2000; Fullerton and McWatters, 2001; Ketokivi and Schroeder, 2004. Specifically, our results show that internal lean practices can improve quality levels. This supports the statement that lean practices are not only associated with a reduction in human effort, manufacturing space, specific tool investment and lead time, but with 200-500 percent quality improvement (Zayko et al., 1997). Once again, despite the methodological and context differences between these studies and current study, the similar results may be due to employing similar dimensions to measure supply chain quality management construct.

In addition, the results clarify the direct and significant effect of customer focus on improving firm performance. The  $\beta$  for the impact of CF on Performance was positive (0.150), T-value (2.975) and significant ( $P < 0.002$ ). This finding is in line with the studies of Dow et al. (1999), Samson and Terziovski (1999), Chonga and Rundus (2004), Rahman and Bullock (2005), Lakhali et al. (2006), Fening et al., (2008) and Zehir and Sadikoglu (2010). This conclusion is not surprising as customer focus is the second (just next to TML) most frequently employed practices to measure quality management in the literature, given the common wisdom (based on the previous empirical evidence) that fulfilling customer requirements is the main goal of all types of organizations, to increase profitability.

Specifically, firm financial performance will increase when the firm is in contact with customers to keep up-to-date about their requirements, which should be considered in the product design process to produce new products that satisfy their requirements. This should be combined with resolving any complaints derived from the customer satisfaction survey in a timely manner (Rahman and Bullock, 2005; Dow et al., 1999; Zehir and Sadikoglu, 2010). The results give evidence that CF have positive significant impact on financial performance.

The results also show an evidence that information analysis ( $\beta = 0.468$ , T-value (6.736) and  $P = 0.000$ ) have a significant impact on performance. These results are consistent with previous studies such as those by Flynn et al. (1995), Zu et al. (2008), and Zu et al. (2009) and contradicts other studies such as those by Powell (1995), Samson and Terziovski (1999), Sila and Ebrahimpour (2005), and Zehir and Sadikoglu (2010). The reason of this contradiction is because (as previously discussed) these studies employed this practice to completely mediate the relationship between the other SCQM practices (i.e. TML, CF, ILP, and SSP) and organization performance.

Furthermore, the results also show evidence that leadership does have a significant impact on performance. This finding is in line with previous researches. Leadership is needed to drive the focus on innovation, to define the role and responsibilities of each team, and to make final decisions regarding the allocation of resources. The senior team needs to be very clear in expectations and in their ability to balance between process and innovation, centralization and decentralization. Companies lacking strong leadership can have hostile relations between functional areas and innovative teams (Govindarajan, Koppale, & Danneels, 2011). Top management leadership as SCQM practice has a positive impact on various organization aspect such as performance (Ab Wahid, James Corner, & Tan, 2011; Ang, et al., 2011; Ibrahim, Amer, & Omar, 2011; Jusoh, Zien Yusoff, & Mohtar, 2008; Noor Hazilah, 2009; Rohaizan & Tan, 2011; Sit, Ooi, Lin, & Chong, 2009; Oke et al., 2009).

Conversely, the results of this model raise serious doubts as to the useful role of two supply chain quality management practices: training and strategic supplier partnership in improving firm performance. Specifically, this model shows that strategic supplier partnership does not have a positive  $\beta$  (0.059), T-value (1.388) and significant ( $P < 0.083$ ) impact on firm performance. This result is consistent with previous studies, such as those by Dow et al. (1999), Powell (1995), and Sila and Ebrahimpour (2005). However, other studies' findings support the positive impact of SSP on performance, such as those by Rahman and Bullock (2005), Kaynak and Hartley (2008), Chen & Paulraj (2004), Li et al. (2006), and Tate (2007). This finding reflects that quality of the supplied materials from long-term contracts with trusted supplier, to an extent, determines the final product quality. Moreover, supplier capabilities to react to the firm need, in turn, can determine the firm flexibility in responding to customer requirements that should be met to improve financial performance (Ahire and O' Shaughnessy, 1998; Rao et al., 1999; Conca et al., 2004; and Rahman and Bullock, 2005).

This contradiction may be due to the limitation of Iranian manufacturer to select their suppliers (Azar et al., 2010). Sometimes Iranian companies do not have any option for choose their supplier and they will be forced to work with suppliers which are not interested for them. This inconsistency may be also due to the differences in the study context between these studies and the current study. For example, Dow et al. (1999) did their study in 698 USA manufacturing firm; Powell (1995) did his study in 54 USA manufacturing firm; and Sila and Ebrahimpour (2005) did their study in 220 USA manufacturing firm, while the results of the current study are based on investigating 281 manufacturing firm in Iran.

The results also show an evidence that, training ( $\beta = -0.001$ , T-value (0.022) and  $P = 0.491$ ) does not have significant impact on performance. This result is consistent with the results of previous studies conducted by Powell (1995), Dow et al. (1999), Samson and Terziovski (1999), De Cerio (2003), Lakhal et al. (2006), Tari' et al. (2007), Fening et al. (2008), and Zehir and Sadikoglu (2010). Once again, despite the methodological and context differences between these studies and current study, the similar results may be due to employing similar dimensions to measure supply chain quality management construct. On the other hand, this finding is inconsistent with findings of other previous studies such as Flynn et al. (1995); Kaynak (2003); Su et al. (2008); and Zu et al. (2008). This contradiction may be because either some of these studies investigated TRIN in a way that did not allow a direct relationship between TRIN and financial performance.

## 5. Conclusion

This study examines the relationship between SCQM practices and performance. A proposed model comprises six SCQM practices and performance. To test the proposed model, data were collected from a sample of manufacturing firms. The analysis shows that SCQM practices are associated with performance directly. To answer the basic research question and to achieve the research objective, this study developed a basic conceptual model, and a framework for conceptual insight. Based on sound reasoning of modification indices in SEM analysis, the proposed model was tested as modified. This identified the modified proposed model as parsimonious and comparatively better with explanatory power as well as fitting the data and the theory. In this model, it was found that four out of six direct hypotheses have been accepted. The current study investigated suppliers in automotive industry in Iran, however further studies can investigate dealers to find out how SCQM can contribute to improve the firm performance in these companies. Additionally, this study can be replicated in a different country or industry. Additionally, other methodologies and performance measures could be used to test the causal impacts of SCQM practices on performance.

Limitations of this study should be recognized, providing researchers with future research opportunities. First, cultural discrepancy might cause some findings that are invalid. This research directly uses some commonly-applied western theoretical frameworks, constructs, and models, originally developed mainly by US and western scholars in US and western contexts that might not fit in the Iranian context. Efforts were made to modify the instruments through establishing content validity within this Iranian context. Nevertheless, the results may still not fully detect the cultural nuances in the Iranian workers and may not fully catch the essence of the interrelationships among the three constructs in native Iranian companies.

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