

# Literature review of QM and SCM: a perspective of integration

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## Abstract

**Purpose** – To explore the practices of supply chain management and quality management, in order to study the integration of both management fields by means of a structural model.

**Design/methodology/approach** – An overview of the main concepts of supply chain management and quality management were reviewed from the literature, and some practices have been identified in order to understand how these areas are related to each other, and the benefits that this integration can bring to companies' performance.

**Findings** – The use of integrated approaches to quality management and supply chain management becomes necessary to accomplish some objectives as produce value and optimize sustainability. Due to similar characteristics of these two management areas as: the adoption of holistic approaches, the promotion of continuous improvement and innovation; customer satisfaction; leadership; strategic planning, among others; they can be seen as complementary, and improved global performance can be achieved from their synergies. Thus, they offer a unique framework to integrate participation and partnership between stakeholders.

**Research limitations/implications** – This paper presents a structural model that is based on a literature review. A comprehensive validation process is required to get further insight on the subject, allowing to understand how companies implement supply chain management and quality management strategies and the way it impacts on the overall organization performance.

**Originality/value** – There are some studies concerning the relationship between supply chain management and quality management, although, as far as we were able to find out based on the literature review carried out, there is a lack of studies that covers downstream and upstream dimensions of the whole supply chain. For that reason, we present a conceptual model proposal where it is possible to see the major areas that affect both quality management and supply chain management. We also present some practices that affects quality management and others that affect supply chain management, that the authors consider being of great importance for the integration of these two areas. With this model we consider that we can embrace the most important issues concerning both areas.

**Keywords:** Supply chain management, quality management, integration.

**Article Classification:** Research paper

## 1. Introduction

The supply chain management (SCM) extends the concept of integrated management to all organizations involved in the process, from suppliers of raw materials to end customers.

The growing competition, globalization of economies and the need to increase the competitiveness of organizations through operational efficiency, promote new opportunities and challenges in the management and organization of the entire supply chain. Thus, the SCM appears as an essential tool for competitive advantage in the market, since it allows the development of a link between the market, the distribution network, the production process and procurement activities, offering to customers a service of excellence at a low cost.

Likewise, quality management (QM) is another concept that promotes the competitiveness of organizations. Considering that customers are becoming more demanding, they are increasingly looking for companies that meet their needs in terms of products/ services, and companies that can indeed outweigh their expectations. Thus, QM influences the performance of companies and customer satisfaction, as well as other stakeholders.

The understanding of how quality management and supply chain management are related in a particular organization and the impact that this integration has in the organizational performance is still very limited (Ramos et al., 2007; Agus, 2011). Flynn and Flynn (2005) realized that organizations that pursue both quality and supply chain goals achieve a competitive advantage. Also, other researchers found mixed results of the effect of QM practice on supply chain performance. This suggests that more research is required in order to provide some guidance to both researchers and supply chain managers. New findings could help managers to understand, how they can effectively distribute resources to issues that are critical for the QM integration in order to improve supply chain performance and consequently analyze the impact of this integration in companies' performance (Fynes et al., 2005; Flynn and Flynn, 2005; Min and Mentzer, 2004; Forker et al., 1997; Yeung, 2008).

Thereby, the main goals of this paper are to discuss the key topics related to the integration of these two crucial organizational areas and to develop a conceptual model that provides new insights about their impact on the organization.

In the next section, the literature concerning QM, SCM and the integration of both areas will be reviewed. Based on the literature review, a conceptual model is proposed and presented in section 3. Section 4 contains final considerations about the work.

## **2. Literature Review**

There are several definitions concerning Quality Management (QM). Many authors defined QM as a "management philosophy" (Perry and Sohal, 2001, Khan, 2014, Bon and Mustafa, 2013). In any case, QM corresponds to a type of management that can be characterized by the constant search for continuous improvements in the processes and procedures, in order to achieve excellence. Therefore, this philosophy supports the companies to attain efficiency, sustainability and competitiveness (Oakland, 1993, Terziovski, 2006). With that, companies can improve their organizational performance and business, customer and employees' satisfaction, relationships with suppliers and positive attitudes, by improving organizational quality culture (Talib et al, 2011; Reed et al., 2000).

The measure of the quality performance is fundamental to effectively manage an organization. Thus, it is necessary to determine how QM is implemented and to measure the impact that their practices have on the organizational performance. Saraph et al. (1989) and Lu and Sohal (1993) were the first ones to try to measure how the QM practice affects organizations.

The research on QM has been progressing over the last two decades and therefore empirical research has defined and measured a set of practices (Kaynak and Hartley, 2008). It is known that there is a strong relationship between those practices and organizational performance including non-financial performance in small and medium enterprises (Hassan et al., 2012; Chung et al., 2008; Demirbag et al., 2006; Hendricks and Singhal, 2001). Hassan et al. (2012) demonstrated that QM philosophy improves the production performance and all the performance indicators related to customer. With the increasing of market's competitiveness, the importance of the QM practices will become increasingly important, namely, customer focus, product design among others (Chong et al., 2004).

The globalization of the economy and also the rivalry that exists between companies, leads to the necessity of increasing companies competitiveness. This competitiveness can be achieved through operational efficiency which promotes challenges and opportunities on managing and on the organization of the entire supply chain.

Since the 80s, the interest in supply chain management (SCM) topic is increasing because companies realized that collaborative relationships within and beyond their organizations brought benefits for all the interested parts (Lummus and Vokurka, 1999). Since then, different descriptions of SCM have been

proposed. One of the definitions is that SCM “*encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies*” (CSCMP).

The SCM help companies to find suppliers that can offer better services with lower prices, allowing companies to become more specialized and competitive. Therefore, it is fundamental for companies to manage all the network of supply in order to optimize the performance of the whole system. Robinson and Malhotra (2005) also noted that each time a certain company deals with another one that will provide the next phase of the supply chain, both stand to benefit from the other’s success.

Cooper and Ellram (1993) suggested that the implementation of SCM has three major objectives that are: to reduce inventory investment in the supply chain; to increase customer service through increased stock availability and reduced order cycle time; and to help build competitive advantage for the network in order to create customer value.

Some researchers stated that companies have to focus on their products, production and quality improvements, not just because of the market requirements, but especially to make their company more competitive than the others, ensuring its survival (Agus, 2011).

## **2.1. Quality Management and Supply Chain Management Integration**

Quality management has been considered an important strategic management tool over the past two decades, which involves the application of principles and practices of quality at all levels of an organization (Talib et al., 2011).

Some studies define the integration between QM and SCM as the concept of Supply Chain Quality Management – SCQM (Lin and Gibson, 2011). From the perspective of quality management, SCM could be recognized as providing quality products and services across every organization in the supply chain, to address client’s expectations. Robinson and Malhotra (2005) stated that SCQM “*is the formal coordination and integration of business processes involving all partner organization in the supply channel to measure, analyze and continually improve products, services, and processes in order to create value and achieve satisfaction of intermediate and final customers in the marketplace*”.

SCM assumes a methodical and integrative methodology to manage all the operations and relationships between all the stakeholders of a supply chain. In other words, it integrates all parties of a value chain into one whole entity and manages them as assets of a wide company (Simchi-Levi et al., 2000, Mentzer et al., 2001; Kannan and Tan, 2005; Wang et al., 2004).

The improvement of quality in all supply chain processes leads to cost reductions, improve resource utilization, and improve process efficiency (Wang et al., 2004). There are some studies that investigate how QM can be used to improve the performance of the entire supply chain. Some of them are related with troubleshooting concerning supply network (Lin and Gibson, 2011; Dowlatshahi, 2011; Flynn and Flynn, 2005; Fynes et al. 2005) and other studies identify numerous theoretic and methodological features of the way in which knowledge management applications are proposed in the supply chain context (Robinson and Malhotra, 2005). However, there are still some issues that remain unexplored (Yeung, 2008 Forker et al., 1997). Some authors suggest that further research is still needed in order to provide a better understanding about quality practices along the supply chain and also the relationship between quality practices and the overall performance. Therefore, some authors suggest some directions for future research that could be very helpful for the companies (Marra et al., 2012; Kim, 2007; Cao and Zhang, 2011; Craighead et al., 2009; Bozarth et al., 2009). For example, Terziovski and Hermel (2011), presented an exploratory study about the role of QM practice in the performance of integrated supply chain, concluding similarly to Robinson and Malhotra (2005), that traditional QM programs should be transformed in a SCM perspective, so that quality initiatives cooperate and coordinate across all the network of companies in the supply chain. In this study, Terziovsky and Hermel (2011) proposed that future research should focus in why quality practices are strong predictors of an integrated supply chain,

and suggested that future models of quality and SCM integration need to empirically examine the aforementioned research question using different methods, as survey and case study approaches with multinational samples.

Lin et al. (2005) concluded that if key QM practices could be integrated in the supplier participation programs, that would provide collaboration between a company and its suppliers, which would have as a consequence an enhanced organizational performance. The organizational performance can also be optimized if a company considers its suppliers as member of its own firm. Although, they consider that more research is needed to extend these conclusions to other countries or regions.

Kannan and Tan (2005) have empirically examined the level to which just in time (JIT), SCM and QM are correlated, and consequently their impact on business performance. Their study validated that at both strategic and operational levels, there are relationships between how these areas are held by organizations. For example, both organizational areas are seen as a part of their operations strategy; and that there is a commitment to quality and an understanding that supply chain dynamics have the greatest effect on performance. Their empirical study although interesting is like others studies, limited in scope for all the supply chain and quality practices.

Based on the literature review carried it is possible to state that the integration between SCM and QM is a natural evolution of management practices, because, to the best of our knowledge, this integration is so far focused on specific features such as purchasing, manufacturing and distribution in order to support logistics processes. But due to the competitive environment, it is essential to improve the performance controlling some points such as: cost, efficiency, service levels, rapid response and quality of products and services (Lin et al., 2005).

The practices that will be used in this research have been analyzed and proposed by some researchers. In table 1 one can find a few examples of those practices.

**Table 1. SCM and QM practices**

<b>PRACTICES</b>	<b>SCM</b>	<b>QM</b>
<b>Leadership</b>	Cooper and Ellram (1993), Andrews and Stalick (1994)	Bon and Mustafa (2013), Talib and Idris (2014)
<b>Management and strategic planning</b>	Li et al. (2005), Talib et al. (2010)	Bon and Mustafa (2013), Talib et al. (2010), Talib and Idris (2014)
<b>Stakeholders involvement and commitment</b>	Yu et al. (2013), Li et al. (2005)	Bon and Mustafa (2013), Talib et al (2010)
<b>Information management</b>	Li et al. (2005), Talib et al. (2010), Kushwaha and Barman (2010)	Li et al. (2005), Bon and Mustafa (2013), Talib and Idris (2014)
<b>Continuous improvement and innovation.</b>	Soosay et al. (2008)	Bon and Mustafa (2013), Talib et al. (2010)
<b>Sustainability</b>	Pagell and Wu (2009), Seuring and Müller (2008), Carter and Rogers (2008), Svensson (2007)	Fotopoulos and Psomas (2009), Ahmad and Schroeder (2002), McAdam and Leonard (2003), Isaksson (2006)
<b>Product/service quality</b>		Saravanan and Rao (2004), Samat et al. (2006), Ueno (2008), Baird et al. (2011),

<b>Quality culture</b>	Black and Porter (1996), Harvey and Stensaker (2008), Irani et al. (2004), Kanji and Yui (1997), Kanji and Wong (1998)
<b>Procurement</b>	Koh et al. (2007), Thomas and Griffin (1996), (Spekman et al., 1998)
<b>Internal logistics</b>	Ulusoy (2003), Kim (2006), Stock et al. (2000),
<b>Distribution</b>	Vidal and Goetschalckx (1997), Croom et al. (2000), Cooper and Ellram (1993),

### 3. Structural model proposal

In the recent past, a few number of contributions have been proposed to address the integration between SCM and QM. As referred before, they focus on specific aspects of the logistic system leaving out key aspects of SCM.

Integration of QM and SCM has already been described as a process that will improve (Casadesús and Castro, 2005), for example, customer satisfaction and the performance of supply chain parties, but it is also important for the improvement of the competitiveness of the companies (Kaynak and Hartley, 2008).

To further study the potentialities and hurdles of integration of these two areas we propose a structural model (Figure 1) to represent, in a comprehensive way, the key areas of both domains and the relationships between them.

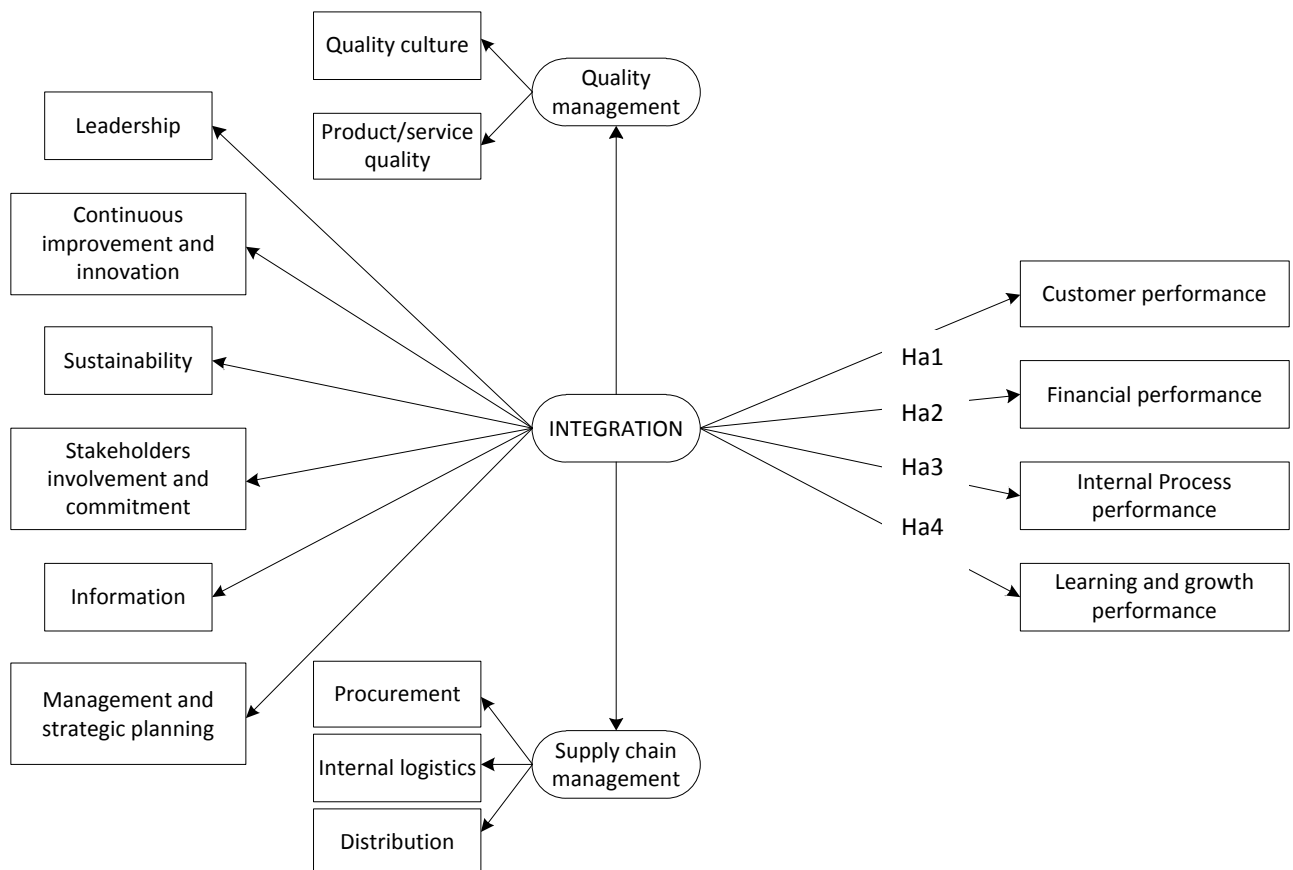


Figure 1. Structural model developed with hypothesis.

Leadership is a practice that is common to these two areas. It is focused on creating and maintaining an environment within the organization, where people become fully involved and committed to achieve the quality objectives of the organization. Also in the context of supply chain management, leadership is responsible for maintaining stability in the supply chain that promotes the performance improvement (Sharif and Irani, 2012).

As stated before, the main objective of QM and SCM is the continuous improvement and the innovation of the companies. Thus, the innovation capacity is of great importance in terms of competitiveness and to promote a dynamic capability to respond to active markets and customer needs. This means that companies should be prepared to quick changes in the market by continuously innovating.

Sustainability is related to the achievement of a sustainable performance in three dimensions: economic; social, and environmental. Supply chain sustainability is crucial and necessary to ensure long-term profitability, and is related to structural and organizational changes throughout the chain, promoting robust collaborations with suppliers and customers, reducing costs and environmental impacts (Seuring and Gold, 2013). In the quality perspective, sustainability can help companies develop their long-term success, and for this it is necessary to optimize procedures and systematize the structures that comprise an entity (Reed et al., 2000). Thus, there is a commitment between all parties involved, which certifies that the sustainability criteria are respected.

The stakeholders' involvement and commitment consider all the interested parts that could influence the success of a business. Concerning the employees, their involvement and commitment at all the levels of an organization is crucial, since their complete involvement allows their capacities to be used for the benefit of the organization (OSHA, 2005). Additionally, the involvement and commitment of the supply chain is critical to the internal and external integration and will have a significant impact on organizational performance.

Information systems allow the production of a well-timed information, which makes this a critical tool for managers struggling in highly competitive environments. In fact, it has been stated by some researchers that the performance of supply chain is influenced by managing and integrating key elements of information into the supply chain (Gunasekaran and Ngai, 2004). Thus, it is imperative that firms can have information technology system implemented, in order to plan, control and make adequate decision, balancing trade-offs between quality, costs, level of service, profit, among others aspects. Additionally, information and communication technologies are a key element for a fully integrated relationship between stakeholders and the drivers for the implementation of coordinated relationships.

Management and strategic planning in SCM includes a large set of complex issues, such as: network design, inventories location and management, suppliers' management, production planning, information management and quality. On the other hand, QM involves: human resources; quality strategy; planning; responsibility; authority; communication, and commitment.

Two major QM practices were identified: product/service quality, and quality culture. We believe that these two practices are well correlated with organizational performance. Product/service quality is what a customer expects in the product/service that he is acquiring. If a customer expects 'excellence' in everything he purchases, then his expectations are very high (Murthy, 2007). Therefore, it is important that company financial policies, marketing strategies, and products are well designed and established. It is also imperative for the company to establish quality assurance steps and follow them.

The development of a quality culture is an approach that is related with sharing of values, beliefs, attitudes and patterns of behaviour that characterize the members of an organization, and aims to improve the overall organizational performance (Woods, 1998). In a healthy corporate culture, all transactions are carried out correctly and the relationships between all the people involved (employees, suppliers and customers) are successful.

Regarding SCM, three main practices were proposed: procurement, internal logistics and distribution. Procurement activity defines all the actions and processes in order to acquire goods and services. All inbound supply processes are executed by procurement (Stadtler and Kilger, 2000). This activity includes

all the actions engaged in the establishment of fundamental requirements, such as, identification and featuring material requirements, receipt of orders, goods selection, and payments, among others.

The internal logistics should be seen as a value-adding supply chain process (Stank et al., 2001), since it ensures the movement and storage of product inventories throughout the company. Thus, logistics has a critical importance to organizational performance, since it is responsible for the reduction of stocks and tasks that do not add value to the final product.

The distribution includes a wide range of activities related to the effective and efficient movement of material from the source of supply to the point of use or consumption (Sanders, 2012). Those activities include, not only the choice of the most adequate distribution channel, but also a set of activities, such as the freight transportation, warehousing, material handling, packaging, inventory management systems and information systems management.

The measure of the organizational performance is related with the balance of the current results with its planned goals. In this study, organizational performance will be measured based on the balanced scorecard perspectives. The balanced scorecard is a performance measurement matrix designed to capture financial and non-financial metrics that link the critical success factors of an organization in a cause-and-effect manner, to organizational strategy (Houck et al., 2012). The balanced scorecard covers four perspectives: customer; financial performance; internal processes; and the learning and growth environment. Each one of these areas contains multiple measures.

When analysed separately, different QM and SCM practices have a positive impact on organizational performance. Kaynak (2003) has stated that quality performance is related to higher organizational performance, considering different quality practices - management leadership, training, quality data and reporting, product/service design, etc. Concerning SCM, Ou et al. (2010) analyzed the relationships among SCM practices such as: customer focus; management leadership; process management; among others, and their impact on the organizational performance. Similarly to Kaynak (2003), they also concluded that there is a positive relationship between those practices and the organizational performance.

Thereby, in this research, to get insight into relationship between the integration of these practices and various aspects of organizational performance, the following hypotheses are suggested:

- *Ha1: The QM and SCM integration will have a significant impact on the customer perspective performance.*
- *Ha2: The QM and SCM integration will have a significant impact on the financial perspective performance*
- *Ha3: The QM and SCM integration will have a significant impact on the internal process perspective performance.*
- *Ha4: The QM and SCM integration will have a significant impact on the learning and growth perspective performance.*

As a consequence of the stated above, we consider that this model is an adequate representation of QM and SCM integration, and it is expected that it could contribute to understand the integration of these two areas, taking advantage of their complementarities and similarities, and may, in fact, be important to the overall organizational performance.

#### **4. Conclusions**

Much attention has been dedicated to SCM concepts in recent years. However, the analysis of the relationship between SCM and QM and their integration is still very limited (Robinson and Malhotra, 2005). There are many similarities and differences between those areas and the understanding of those points can contribute for future operations management future research.

In order to go deeper in this topic, this paper presents the first result of a research project that we are conducting in order to analyze the integration of SCM and QM and its impact on the companies'

performance. This is important since both areas are seen as management philosophies which can have an unlimited potential for scope and applications in organizational context.

There are a high number of studies that suggest that more research is needed, and we think that this conceptual model can help to fill some of the gaps stated in other works.

Therefore, the conceptual model proposed in this paper will be statistically validated using the structural equation model technique, based on a survey that will be performed on an international basis.

A comprehensive validation process of the model is required to get further insight on the subject allowing to understand how companies implement and integrate SCM and QM strategies and how that integration impacts on the overall organization performance. For that purpose, it is necessary to implement different investigation lines in multiple contexts.

Currently, a questionnaire has been developed and a large-scale survey is conducting. Based on the results, the research model can be validated and the relationship between the QM and SCM integration and organizational performance can be established.

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