

## Exploring the Role of TQM and Supply Chain Practices for Firm Supply Performance in the Presence of Organizational Learning Capabilities: A Case of Textile Firms in Pakistan

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### ABSTRACT

This paper has examined the mediating effect of Organizational Learning Capabilities (OLC) on the relationship between Total Quality Management Practices (TQMP), Supply Chain Management Practices (SCMP) and Firm Supply Performance (FSP). 248 Textile firms were surveyed for the purpose of data collection pertaining to the variables used in the study. A structured questionnaire was used as an instrument for data collection. Data were analyzed using structural equation modeling technique by employing AMOS software. Findings of the study revealed that TQM practices and SCMP significantly affect Firm Supply Performance. Moreover, Organizational Learning Capability partially mediates the relationship between TQM practices, SCMP, and Firm Supply Performance. **Keywords:** Supply Chain Management, Firm Supply Performance, Organizational Learning Capability, Textile sector, Pakistan.

### INTRODUCTION

In response to intense competitive pressures in the business world, organizations are facing numerous challenges to attain sustainable competitive advantages. The ultimate goal of all kinds, types, and sizes of organizations is to provide a high-quality product with shortened lead time and high responsiveness to their consumers (Kannan et al., 2005; Ali et al., 2014). To meet such overwhelming competitive pressures, companies are incorporating proven approaches and techniques of total quality management (TQM) and supply chain management (SCM). With the evolution, the 21st century has witnessed the postmodern era of business; which come along many strategic and operational challenges such as SCMP and total quality management (TQMP). SCMP and TQMP became the most important strategies in achieving sustainable competitive advantage. Researchers from across the world with different models explored TQM and SCM as among the most important determinants of firm performance.

TQM is a set of practices that accentuates continuous improvement, continual measuring of outcomes, fulfilling customer demands, collective problem-solving approach, competitive benchmarking, reducing work schedule, long term planning and strong relationship with suppliers (Feigenbaum, 1991). Meanwhile, in recent decades, SCM has emerged as one of the most important and effective competitive strategies for manufacturing businesses. The key supply chain management principle can be concluded as;

it receives input from suppliers, does value addition and delivers it to the consumer (Levi et al., 2004).

From prior findings, it is revealed that TQMP has a positive and significant relationship with organizational performance. However, to date, only a few attempts have been made to explore the role of OLC between TQMP and FSP. OLC are defined as the organizational and managerial attributes, competencies and practices that expedite individual and organizational learning process (Jezer-Gomez, Cespedes-Lorente & Valle-Cabera, 2005). Literature suggests that TQMP enables the firms to capture, interpret, translate and deploy the knowledge, skills, and attitudes of people throughout the organization to establish a collective learning capability which in turn affects firm performance (Ali et al., 2014). Therefore, the role of OLC between TQMP, SCMP, and FSP is an important and interesting area of study.

Textile sector; with 8.5 percent contribution in GDP, 40 percent of employment and 52 percent in export is the largest manufacturing sector of Pakistan (Economic Survey, 2015). However, it is not the only reason of particularly focusing on Textile industry supply chain; rather, the adoption of TQM standards in the whole supply chain to maintain and expand international market makes this sector interesting for this study. Further, SCM and TQM as business strategies proved themselves more effective for manufacturing sector than the service sector, which is also a significant reason for selecting the textile sector. It is anticipated that the present study will help managers of textile firms to formulate a successful competitive strategy for both local as well as international markets.

Keeping in view all the facts, the study has the following objectives to be fulfilled within the context of the textile sector of Pakistan:

1. Examining the impact of TQMP and SCMP on firm supply chain performance of the textile sector of Pakistan.
2. Investigating the mediating role of OLC in the relationship between TQMP, SCMP, and FSP

In authors' knowledge, this study is among the few pioneer studies if any to assess the relationship between SCMP, TQMP, and FSP through OLC on Pakistani manufacturing firms in general and textile firms in particular.

### LITERATURE REVIEW

#### Firm Supply Performance

SCMP circumscribe perspectives and practices that effectively relate all suppliers, manufacturers, distributors,

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and consumers to achieve all long-term performance objectives (Chopra & Meindl, 2007; Tseng, 2009; Soares et al., 2017). Information sharing serves as a key to supply chain integration; through information sharing an organization can be more responsive towards ever-changing consumer needs (Li & Lin, 2006). Most of the operational research scientists are agreed on some common goals of SCM. Kaufman (2002) declared the removal of communication barriers and eradication of redundancies as the ultimate goals of SCM. Later, Choon et al. (2002) defined waste reduction, synchronized operations, delivery performance, quality management, and flexibility in production as SCM goals. Simchi-Levi et al. (2004) also confirmed Serve et al. (2002) and regarded customer satisfaction, time cost, warehousing and supplier relations as SCM goals in literature.

Hence, in last few decades SCM has emerged as an integrated approach, which comprises of waste reduction, synchronized operations, delivery performance, quality management, flexibility, customer satisfaction, time, cost, warehousing and long-term supplier relations (Gunasekaran et al., 2004; Tolossa et al., 2013) to achieve competitive advantage (Wouters et al., 2009), enhance effectiveness (Janvier-James, 2012). To measure supply chain performance, two measures models have been used predominantly by different models in supply chain literature (1) Cost: may include inventory costs and operating costs (2) The combination of cost and customer responsiveness: including inventory costs and operating costs. Cost, relationship, activity time, customer responsiveness and flexibility have all been used as supply chain performance measures either singly or jointly (Estampe et al., (2013); Gunasekaran et al., (2004). Vanichchinchai et al. (2011) argued cost (CT), flexibility (FL), relationship (RL) and responsiveness (RS) as dimensions of a success full supply chain.

Cost control is one of the basic measures of firm performance and every firm is striving to provide quality products at the lowest possible cost. Cost efficiency especially inventory cost is one of the most important determinants of supply chain performance. Inventory cost holds a significant portion of the firm's total operational cost. The cost which includes manufacturing cost, outsourcing cost, and the delivery cost has become one of the major competitive forces in today's competitive market (Tatsis et al., 2006).

The smooth flow of information and materials across the supply chain is a strategic decision and financial performance of any supply chain cannot be measured without taking into account the total logistics cost. The decision to a tradeoff between shipping expense and time cost is of acute importance as most of the times expensive but speedy shipping saves enough from storage and other inventory costs and reduces the cost to a competitive level (Gunasekaran, 2001). Shipment from longer distances is a continuous threat on cost management decisions, as it makes inventory level volatile; resulting in very high or low level of inventory which ultimately leads us to high administrative and opportunity cost (Levy, 1997).

Nowadays products and services place great importance on customers', suppliers' and distributors' perception. To get an optimal yield, understanding and wisely responding to this triangulation is a prerequisite (Gunasekaran, 2007). The importance of supplier relations management (SRM) can be explained by the fact that the poor coordination among suppliers has become one of the major issues in US food industry and is accounted for the waste of almost \$30 billion annually outsourcing constituent 50-60 percent of total product (Sambasivan, 2009).

Vanichchinchai et al. (2014) defines partnership a function of knowledge sharing, working for improvised benefits, development of long term relationship, product development and shared goals among trade partners. In earlier literature about the partnership, conflict management and effective communication are discussed (Mohr & Speckman, 1994). But afterward, many researchers have explored dimensions of partnership management in the supply chain. Recently, Nyaga et al. (2010) have explained the role of partnership management in SCM and found integrated efforts, information sharing, joint relationship efforts, dedicated investments, and relationship outcomes as attributes of partnership management.

Sodhi and Son (2009) examined Korean firms with two different perspectives of partnership namely strategic partner performance and operational partner performance. They found trust, information sharing, joint relationship management, asset-specific relationship as an important determinant of supply chain partner management; they further argued strategic partnership as an important determinant of a successful partnership. Their findings were also consistent with prior findings of Mentzer et al. (2000) and Lambert et al. (2005). Product variety and innovation has a great impact on supply performance and may greatly influence supply chain strategy selection (Estampe et al., 2013; Vanichchinchai et al., 2014; Vanichchinchai & Igel., 2011). Fisher (1997) claimed products and services range as a strategic metric and proposed it among potential performance evaluators.

A delivery performance which includes delivery channel, warehousing location, distribution mode, and vehicle scheduling is an important credential in supply performance. Delivery performance is dependent upon certain factors i.e. delivery channels, location policies, and scheduling and can be increased by suitable selection of above-mentioned factors (Gunasegaram, 2007; Anand & Grover 2015). In a survey conducted in Belgium by Gelders et al. (1994), the researchers explored that supply chain performance can be increased by reducing lead time in the delivery process. Andries (2013) found a positive relationship between delivery performance and supply chain performance and explored delivery to request date, order fills lead time, and delivery to commit date as an important measure of delivery performance which is central to supply chain performance.

Customer satisfaction is at the heart of every supply chain strategy, no performance measurement is possible without taking into account customer satisfaction (Gunasekaran, 2007; Anand & Grover, 2015). Product design, delivery methods, and all above feedback should be integrated with customer requirements. As with increasing environmental

uncertainty and diversity companies are using supply chain as a strategic tool to gain a competitive advantage. So, flexibility can be seen as a key dimension of Supply chain management (Gerwin, 1993; Yusuf & Shehu, 2017). More broadly, flexibility can be seen as a firm's ability to adjust or respond to ever-changing environmental factors i.e. market demand and customer needs (Upton, 1995). The following hypothesis tries to investigate the relationship.

**H1.** A firm's SCM practices have a significant positive effect on FSP

#### **TQMP and FSP**

TQMP and SCMP both are management philosophies to achieve customer satisfaction and optimal performance (Gunasekaran et al., 2001; Vanichchinchai, 2014; Vanichchinchai & Igel, 2011). However classical approaches of quality management emphasized on specification-based performance and defect free products (Prajogo & Sohal, 2001; Vanichchinchai & Igel, 2011). Meanwhile, the recent goal of SCM is a satisfying customer with timely delivery of quality products (Vanichchinchai & Igel 2011; Vanichchinchai & Igel, 2009). This change in paradigm can be because of the reason that traditional SCM was only concerned with logistics (Croom et al, 2000). Prior studies of Chini et al. (2003) and Kuei et al. (2001) basing their studies on Jayaram et al. (2000) abstracted that timing has been the center of attention of SCM research. They further argued that low cost and timely delivery is the hallmark of SCM performance.

Samaranayake (2005) found that SCM strategy always aims to achieve customer satisfaction via quick response to their ever-changing needs with minimum cost. Prior researches identified behavioral dimensions of TQM such as Resource focus, leadership, customer focus and human resource focus which are also known as soft concepts of TQM as important determinants of performance (Curkovic et al., 2000; Prajogo & Hong, 2008). Many prior studies by supply chain researchers (Chase et al., 2007; BüilentSezen, 2008; Prajogo & Olhage, 2012) concluded SCM as a system through which materials and information flow in the supply chain. Inevitably with greater emphasis on delivery, there are chances that quality will be compromised at the cost of timely delivery. But customer satisfaction can act as a synergic relater and ultimate goal to bring both the objectives align (Vanichchinchai & Igel, 2011). Prior findings (Vanichchinchai & Igel, 2011) also suggest a positive and significant relation between TQM and FSP.

The quantitative results of a study carried out by Vanichchinchai and Igel (2011) suggest that TQM practices can directly facilitate the implementation of SCM and can directly enhance the firm's supply performance. Moreover, TQM practices can indirectly improve a firm's supply performance through SCM practices. The primary data of the study, carried by Vanichchinchai and Igel (2011), has been gathered from 171 managers of automotive industry of Thailand and they found a significant relationship between SCMP, TQMP, and FSP. Similarly, in a study carried by Vanichchinchai et al. (2014), researchers who surveyed first tier supplier, other tier suppliers, and other large automotive firms with ISO/TS 16949 from Japanese and Thailand automobile industry found measures of SCMP, TQMP, and

FSP as reliable. The following hypothesis tries to investigate the relation.

**H2.** A firm's TQM practices have a significant positive effect on FSP

#### **TQM, SCM, FSP and OLC Relationship**

TQM and SCM as concepts and strategies are complex and to understand and implement one needs to have in-depth knowledge of both. Meanwhile, in today's dynamic business environment, approaches and related implantation strategies are changing radically. Because of the result oriented competitive market, many organizations are deploying large resources to establish a knowledge-driven system based on very philosophies of knowledge management (Mills & Smith, 2011). Since last two decades, exploration of key determinants of a successful supply chain has been the prime objective of operational management research.

Deming (1995) proposed a theory which is known as "theory of profound knowledge" which claims that success or failure of any quality program is dependent on the integration of its subsystems. Prior findings suggest that firms learning capabilities can help researchers to make a better understanding of the relationship between TQMP and firm performance (Ali et al., 2014). Martínez et al. (2009) explored the effectiveness of TQM and their results indicate that the relationship between TQM and OL, and between TQM and performance through OL is positive. Hult et al. (2003) claimed OL as a strategic resource of SCMP and found that learning has a positive effect on a set of supply management and performance consequences.

The role of OL in the firm's performance has long been considered important in the literature (Ellinger et al., 2002). For example, firms which are following OL philosophies are better able to install up to date operational systems to achieve superior performance (Calantone, Cavusgil, & Zhao, 2002).

OL includes system view which asks organizational stakeholders to promote and share a common culture, joint actions and shared knowledge. TQM and SCM both contribute to the reduction of wastage, defective products and a smooth flow of operations. Barrow (1993) argued two pieces of evidence in the relation between OL and TQM; according to the first evidence there is the cause and effect relationship between TQM and OL, whereas, second evidence declares TQM and OLC as two powerfully correlated systems. Martinez et al. (2009) stated that TQM as a concept can be considered as a strong stimulator of OL. Guasekaran (2004) and Sufian (2010) found that the management of key elements of knowledge information has a significant impact on FSP.

Past researchers have seen OLC as a catalyst for TQM outcomes. According to Barrow (1993), OL can be seen as the major outcome of TQM and both are interlinked. Chang and Sun (2007) has also shown constancy with Barrow (1993) and considered TQM principles and procedures as drivers of OL capability. Love et al. (2000) presented a system view and declared TQM practices as a source of a learning system in organizations; helpful in creating a learning culture which ensures effective learning. Chang and Sun (2007) declared TQM as a source of OL and argued that this culture can be strong by empowering and involving employees in decision making. Love et al. (2000) has also

shown consistency with Chang and Sun (2007) and added that TQM implementation is a source of learning cultivation. Hence from the above discussion, TQM and OLC can be seen as complementary concepts.

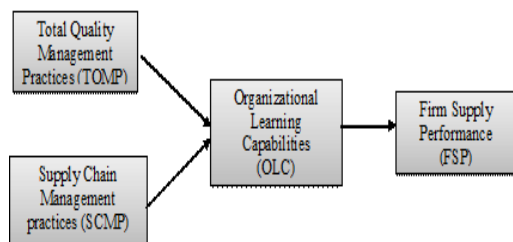
From prior findings, it is cited that TQMP has a positive and significant relationship with organizational performance. However, still, only a few attempts have been made to explore the role of OLC between TQMP and FSP. OLC is defined as the organizational and managerial attributes, competencies and practices that expedite individual and OL process (Jezer-Gomez, Cespedes-Lorente, & Valle-Cabera, 2005). Literature suggests that TQMP enables the firms to capture, interpret, translate and deploy the knowledge, skills, and attitudes of people throughout the organization to establish a collective learning capability which in turn affects firm performance (Ali et al., 2014). Therefore, the role of OLC between TQMP, SCMP and FSP performance is an important and interesting area of study. The following hypothesis tries to investigate the relation.

**H3.** A firm's OLC has a significant positive effect on FSP

**H4.** A firm's TQM practices have a significant positive effect on FSP through OLC

**H5.** A firm's SCM practices have a significant positive effect on FSP through OLC

In line with all the hypotheses presented earlier, this research proposed a conceptual model (figure 1) that investigates the structural relationships among these four variables namely FSP, TQMP, SCMP, and OLC.



**Figure 1:** Conceptual Framework

## METHODOLOGY

### Sample and Data Collection

It is a quantitative study and the data is collected by using questionnaires adopted from previous studies as referred and 5-point Likert scale (1 for strongly agree to 5 for strongly disagree) is used in these questionnaires for the purpose of data collection. A mix of mail survey and face to face survey is used. As the textile sector of Pakistan is our target sample so, the primary data has been collected from APTMA (All Pakistan Textile Mills Association) listed textile firms. Out of all firms listed with APTMA, we got a response from 248 firms. The response rate is about 62.6 %. We got three questionnaires from one organization. The response rate of our study is higher than prior studies of Hung et al (2011); Lee et al., (2012); the average response rate of 18 percent and minimum range of 9 and maximum of 39 percent; thus, our response is considerably higher than previous studies.

### Results

Prior to the explanation of the main analysis and subsequent results, we will discuss data examination. During data entry, data was accessed and examined for missing values and potential errors in data entry. During the examination, we found no such error. Afterward, we analyzed for missing values. According to Hair et al. (2007), it is almost impossible to have a large set of data with no missing value. The mean core substitution procedure was used to replace the random missing values in the data (Shammout, 2007).

Descriptive statistics show that the mean of FSP is 4.30 indicating that most of the Pakistani textile sector firms' managers are not satisfied with the supply performance of the firm. The mean value of TQMP is 3.32 indicating a neutral attitude towards TQMP. The mean value of SCMP is 3.81 revealing the fact that Pakistani textile managers are unable to make SCM strategies practical. The mean value of OLC is 2.82 which is also close to the neutral value and shows that Pakistani textile firms are not so concerned about learning and knowledge-based systems.

Following the criterion of construct validity, some of the items namely RL4, RS1, LS4, LS6, PM1, PM4, PM5, CS1, CS3, and HR6 were dropped from the analysis because their estimated value was less than 0.50. The selected model has undergone model fit analysis and multiple fit indices i.e. CFI, TLI, RMSEA index are used for this purpose.

Results of CFI (0.94), TLI (0.92) and RMSEA (0.04) indices prove our model a good fit model. Composite Reliability (CR) of three variables namely FSP (0.924), TQM (0.933), SCM (0.955) and OLC (0.957) reveal higher internal consistency and reliability. The values of AVE for all the variables is greater than 0.50, for all variables the value of MSV < AVE and ASV < AVE meanwhile Square root of AVE has greater inter-construct correlations. So it shows a strong validity. The results are presented in table 1 and more is shown in figure 2.

According to table 2 all variables i.e. FSP, SCMP, TQMP, and SCMP are positively and significantly correlated at a moderate level. To find hypothesized relations of our model (fig 1) we have used Structural equation modeling (SEM). Path analysis SEM is a technique for observed variables, it measures the direct and indirect relationship as well as its measures model fit (Meyers et al., 2006). This is the reason we have preferred structural equation modeling over conventional multiple regression techniques.

**Table 1.** Convergent Validity

Hypothesized Results	Estimates	CR
OLC ← TQMP	0.438	8.90
OLC ← SCMP	0.188	3.853
FSP ← OLC	0.291	3.675
FSP ← SCMP	0.264	4.152
FSP ← TQMP	0.465	6.535

Note: All values are significant at  $p > 0.001$

	CR	AVE	MSV	ASV	TQMP	FSP	SCMP	OLC
TQMP	0.933	0.503	0.336	0.289	0.709			
FSP	0.924	0.529	0.336	0.276	0.580	0.727		
SCMP	0.955	0.508	0.227	0.208	0.457	0.476	0.712	
OLC	0.957	0.631	0.323	0.259	0.368	0.515	0.435	0.794

Bootstrapping procedure is used to test the proposed causal model (Meyers et al., 2006). The entire suggested path has shown consistency with the proposed relation and is statistically significant. Overall all results have shown a great deal of agreement with our predicted or hypothesized relations. The results of hypothesis 1 to 3 shows that Supply chain practices (SCMP), TQMP and OLC has a significant direct and positive impact on FSP and are consistent with Vanichchinchai et al. (2014) and Vanichchinchai and Igel. (2011). Standardized coefficients from TQMP to SCMP show a weak but significant direct relation. SCMP and TQMP have also positive and significant direct relation with OLC.

**Table 2. Correlations**

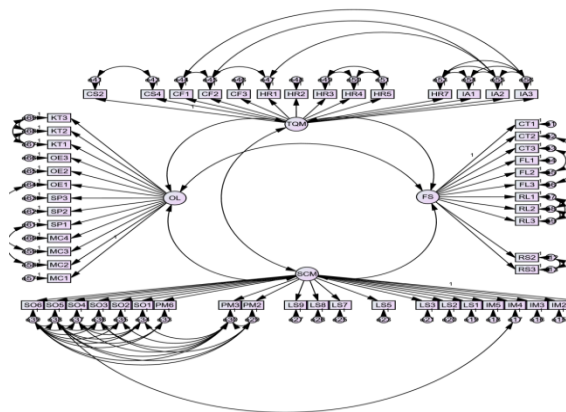
	FSP	SCMP	TQMP	OLC
FSP	1			
SCMP	.504**	1		
TQMP	.622**	.481**	1	
OLC	.546**	.452**	.598**	1

\*\* Correlation is significant at the 0.01 level (2-tailed).

It is also proposed that OLC will mediate the effect of TQMP on FSP and of SCMP on FSP. From figure 1 and tables 3 and 4 it is clear that both variables have shown statistically significant results so OLC is mediating partially between TQMP and FSP and between SCMP and FSP. Overall, TQM appears as a strong determinant of FSP with an estimated coefficient of 0.45. While corresponding values pertaining to SCMP and OLC are 0.264 and 0.291 respectively.

**Discussion**

The prime objective of this study was to explore how TQM and SCM affect FSP, and how OLC affects the relation between SCMP and FSP, and between TQMP and FSP. Our first and second hypothesis regarding the direct relationship between TQMP and FSP, and SCMP and FSP are accepted significantly. They suggest that TQM practices can directly facilitate the implementation of SCM and can directly enhance the firm’s supply performance.

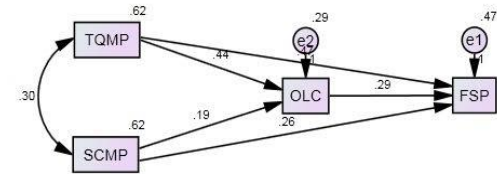


**Figure 2: Confirmatory Factor Analysis**

**Table3: Direct effect**

Hypothesized Results	Estimates
TQMP → OLC → FSP	0.127***
SCMP → OLC → FSP	0.055***

\*\*\*All values are significant at p>0.001



**Figure 3: Indirect Effects**

Samaranayake (2005) also found that SCM strategy always aims to achieve customer satisfaction via quick response to his ever-changing needs with minimum cost. Our findings are also consistent with prior researches, which identified behavioral dimensions of TQM such as Resource focus, leadership, customer focus and human resource focus which are also known as soft concepts of TQM as important determinants of performance (Curkovic et al., 2000; Prajogo & Hong, 2008). Many prior studies by supply chain researchers (Chase et al., 2007; BülentSezen, 2008; Prajogo & Olhage, 2012) concluded SCM as a system through which materials and information flow in the supply chain. Inevitably, with greater emphasis on delivery, there are chances that quality will be compromised at the cost of timely delivery. But Customer satisfaction can act as a synergic relater and ultimate goal to bring both the objectives aligned together (Vanichchinchai & Igel, 2011). Prior findings (Vanichchinchai & Igel, 2011) also suggest a positive and significant relation between TQM and FSP. Yazdani et al. (2016) found that both, the core and infrastructure aspects of quality management (QM) practices have a significant positive effect on organizational performance.

OLC also appears in a positive and significant relation with FSP. Our findings are supporting Hult et al. (2003), who claimed organizational learning as a strategic resource of (SCMP) and found that learning has a positive effect on a set of supply management and performance consequences. And when we see FSP as a chapter of firm performance then the role of organizational learning in the firm’s performance has long been considered important in the literature (Ellinger et al., 2002). For example, firms which are following OLC are able to predict all macro and microenvironmental changes and they are also questioning their operational systems to achieve superior performance (Calantone, Cavusgil, and Zhao 2002).

Not much attention has been given by prior researchers in explaining the role of OL capability as a mediator between TQM and firm performance in general and FSP in particular. Martinez-Costa and Jimenez-Jimenez (2009) found how TQM is related to firm performance for Spanish SMEs. Later, Hung et al. (2011) abstracted a positive significant association of TQM with OLC. Ali et al. (2014) found the mediating effect of OLC and innovativeness between TQM and Financial performance and found that OLC plays a significant role in relating TQM with FSP. Recently, Mahmood et al. (2015) also found the partial mediating effect of OLC between TQM and firm performance for the sample of Pakistani textile firms.

According to findings of the present study, OLC appears as a partial mediator between SCMP, TQMP, and FSP,

which indicates that in presence of OLC, TQMP and SCMP affect FSP directly. The results are consistent with prior findings of Ali et al. (2014) who found OLC and business innovativeness a strong mediator between TQM and financial performance. Martínez et al. (2009) explored the effectiveness of TQM and their results indicate that the relationship between TQM and OL, and between TQM and performance through OL is positive. OLC includes system view which asks organizational stakeholders to promote and share a common culture, joint actions and shared knowledge. TQM and SCM both contribute to the reduction of wastage, defective products and smooth flow of operations.

Guasekaran (2004) and Sufian (2010) found that that management of key elements of knowledge information has a significant impact on FSP. From prior findings, it is cited that TQMP have a positive and significant relationship with organizational performance through OLC. But in the authors' knowledge, no attempt has been made to explore the mediating effect of OLC between TQM and FSP. These findings are also constant with the findings of Mahmood et al. (2015), they also found the partial mediating effect of OLC between TQM and firm performance for the sample of Pakistani textile firms.

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