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Supply chain quality management and organizational performance

Empirical evidence from telecom industry in the UAE

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Abstract

Purpose – Supply chain quality management (SCQM) has gained less attention in the Arab world, and there is a clear dearth in existing research on this topic, particularly in service organizations. Therefore, the purpose of this paper is to propose a conceptual framework for investigating the impact of SCQM and associated indicators on organizational performance (OP).
Design/methodology/approach – Empirical data have been collected through a survey distributed to a sample of major telecom companies in United Arab Emirates (UAE). To test the conceptual framework, structural equation modeling (SEM) has been used to analyze the data collected from 248 respondents of telecom companies.
Findings – The empirical data showed that SCQM practices are significantly correlated with innovation and operations performance. Statistical analysis through SEM also revealed that customer satisfaction has highest direct impact on OP.
Research limitations/implications – External factors (government regulations, policies and culture) also affect the SCQM practices. Hence, future work should incorporate these parameters as well.
Practical implications – This is a contribution to the continuing research into SCQM, giving supply chain managers and designers a practical way for measuring and implementing SCQM practices across service supply chains.
Originality/value – The contribution of this research, through successive stages of data collection, measurement analysis and refinement, is a set of reliable and valid framework that can be subsequently used in conceptualization and measuring quality of service supply chains.

Keywords Quality management, Supply chain, Organizational performance
Paper type Research paper

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1. Introduction

Collaboration among business partners has long been known to benefit all the stakeholders and shareholders in a business. This close relationship between entities was named as supply chain management (SCM) at the end of the last century. This term is defined to be the close relationship between all the entities that play a role in the process through procuring raw material, processing subassemblies to packaging finished products (Drake *et al.*, 2013). Although the term seems a perfect fit for manufacturing industry, more and more

researchers are investigating this vital association among the partners in a service supply chain, such as Akkermans and Vos (2003).

A similar notion that is conventionally linked to manufacturing is quality management (QM) or more specifically, total quality management (TQM). This notion calls for a strategy to improve all the activities through development and delivery of a product or service (Oakland, 2012). Although the idea of studying various aspects of product quality is not new (El Saadany *et al.*, 2011), there is a recent trend to study different folds of quality in the supply chains of service-based firms (Agus and Hassan, 2008; Agus *et al.*, 2000). An even newer trend is to investigate the features that impact the overall quality of a service. While these factors may be linked to the financial constraints in a supply chain, quality is essentially affected by the inherent norms and culture of the firms involved in a service supply chain (Baird *et al.*, 2011; Gimenez-Espin *et al.*, 2013). Quality in all aspects of a product/service is the core requirement of today's customers. The mere achievement of specified goals is no longer enough to assure that customers are satisfied with products and services. Quality management must become an integral part of a company's value chain today.

Supply chain quality management (SCQM) is a key component in achieving competitive advantage (Lin *et al.*, 2005). Kuei *et al.* (2001) defined SCQM as follows: SC = a production–distribution network; Q = meeting market demands correctly and achieving customer satisfaction rapidly and profitably; and M = enabling conditions and enhancing trust for supply chain quality.

Most of the previous research studies on SCQM have focused on manufacturing supply chains, for example Kuei *et al.* (2001), Fynes *et al.* (2005), Benaissa *et al.* (2010) and Song *et al.* (2017). Other similar studies focused on supplier side (upstream tiers) of supply chain (Akamp and Müller, 2013; Kumar *et al.*, 2014), whereas others explored the impact on the distributors and retailers (downstream tiers) (Mokhtar, 2013; Mukerjee, 2013). However, Hussain, Khan and Saber (2016) mentioned that supply chains never exist in isolation and local optimization does not guarantee global optimization. Besides, Quang *et al.*, 2016; Fernandes *et al.*, 2017 mentioned that the integration of supply chain and QM is still unexplored in the literature, and it is essential to have a more focused approach in assessing QM issues within the supply chain contexts. This paper aims to fulfill above research gaps in literature.

Telecommunications, one of the biggest service providing firms, plays a vital role in stimulating economic growth of UAE and bridging international cultural gaps. Telecommunications are now the enabler of many services – most noticeably in government. A clear example is the electronic government we have seen here in the UAE. It contributed nearly 4.9 percent to UAE GDP. Consequently, this research aims to investigate the impact of SCQM practices on the performance of telecom companies of UAE. Through extensive literature review, a comprehensive framework of SCQM and associated factors has been developed to hypothesize the direct and indirect relationship between SCQM and organizational performance (OP). Empirical data have been collected through a survey distributed to a sample of selected telecom companies, and structural equation modeling (SEM), a statistical technique, has been applied to assess the proposed framework. The study will help the supply chain operations managers and practitioners to understand and quantify the impact of SCQM and associated indicators on the performance of their organization.

The structure of this paper is as follows. Section 2 presents the literature review. Section 3 introduces the model and variables. Section 4 discusses the research methodology. Data analysis and results are explained in Section 5. Section 6 offers discussion and some concluding remarks.

2. Literature review

The intrinsic culture plays a vital role in the readiness and implementation of TQM practices in an organization. Ahire (1996) studied the impact of ten quality constructs on the

performance of 181 small firms in auto parts and electronics industry. He found that adaptation of a formal TQM strategy results in superior quality, whereas the presence of unions negatively impacts the implementation of quality constructs. Baird *et al.* (2011) demonstrated that there is a positive association between organizational culture (outcome orientation, teamwork/respect and innovation) and the extent of the use of TQM practices in manufacturing and service organizations in Australia. Mehra and Ranganathan (2011) showed that job characteristics such as autonomy, overload and enrichment have an impact on job satisfaction, and that TQM practices impact the employee environment in an organization. They suggested that a group of senior managers must be formed to customize the TQM practices according to the business environment in an organization. Al-Swidi and Mahmood (2012) also studied the impact of organizational culture on Yemeni banks and suggested that organizations should foster quality and entrepreneurial culture for the effective implementation of TQM and entrepreneurial orientation. Gimenez-Espin *et al.* (2013) proposed a mixture of adhocracy and clan cultures in an organization that fosters TQM. Their empirical study of 451 companies indicated that whereas adhocracy culture has a positive impact on TQM, clan culture does not have any significant impact.

One of the major objectives of SCM is to improve the firm's performance at the operational level (Fugate *et al.*, 2009; Hussain and Drake, 2011; Hussain, Khan and Saber, 2016). In this way SCM practices can significantly impact the operational performance (OPP) of an organization: Koh *et al.* (2007), Iyer (2011) and Hussain *et al.* (2012) suggested that the demand chain collaboration (relationship with the downstream supply chain partners to create end-customer value) in SCM has a positive and significant impact on the OPP. OPP, in turn, has a significant and direct impact on the OP (Salaheldin, 2009; Koh *et al.*, 2007). Along with OP, supply chain practices greatly affect innovation performance (Chong *et al.,* 2011). Green *et al.* (2008) proved that SCM practices have a positive and direct impact on the performance of logistics and marketing, and financial performance is positively affected by marketing performance.

There is strong evidence from research (Johnson and Templar, 2011; Huang *et al.*, 2008; Khan *et al.*, 2018) indicating that improved supply chain performance results in improved OP. Koh *et al.* (2007) in their research on Turkish SMEs, using exploratory factor analysis and SEM, reported that SCM practices have a positive and direct impact on the OP. Moreover, according to their study, operations performance mediates the relationship between the SCM practices and the OP pertinent to SCM. Implementation of SCM also improves the competitive performance by reducing the levels of inventory (Jharkharia and Shankar (2004). Similarly, Ou *et al.* (2010) noted that the management of external customer–supplier relations has a positive impact on the internal integration, which, in turn, has a positive impact on the firm performance.

Agus and Hassan (2008) pointed out that supplier management is a strategic decision in any supply chain, and external performance of supply chains depends on their internal process. It can be argued that supply chains can easily improve their performances by improving the efficiency of their internal processes. Furthermore, role of senior management cannot be ignored in this context. Rainbird (2004) and Hilletofth (2011) also supported the view and mentioned that senior management plays a crucial role in implementing appropriate strategy and achieving desired goals of meeting demand and supply in a timely manner.

TQM helps supply chains in terms of quality, customer relationship, innovation and partnership developments (Madu and Madu, 2003). Literature evidently shows that supply chain performance can be greatly improved by adapting TQM practices, see for example Kanji and Wong (1999), and strong correlation has been observed between supplier selection (SS) strategies and QM. Moreover, supplier partnership is given due importance in the literature of SCM, see for example Fawcett *et al.* (2008), Malik *et al.* (2016), Alkabi *et al.* (2017)

and Hussain and Al-Aomar (2018). Customer focus is a common practice of both TQM and SCM that emphasizes on satisfying the customer needs. This concept is opined as follows: to remain competitive in market, an organization must fully satisfy its customer wishes and such wishes must be met at the minimum operating cost.

QM tools and procedures may vary from time to time, depending upon the nature of the industry, but the underlying concept is equally applicable to both the manufacturing and service industries (Khan *et al.*, 2016; Humaid *et al.*, 2017). This implies that QM has standard tools and these can be simultaneously implemented in both manufacturing and service supply chains. The amalgamation of SCM and TQM practices has emerged as a popular business stagey across wide range of organizations. Both (TQM and SCM) disciplines have many commonalities including supplier partnership; customer management; innovation and management support Talib *et al.* (2011). Lin *et al.* (2005) mentioned that QM tools involving product and service design, training and continues development, capacity building, process improvement, etc., significantly and positively impact strategic SS strategies. Robinson and Malhotra (2005) termed these commonalities between SCM and QM as "Supply Chain Quality Management" or "SCQM." Since then, the issue of SCQM has been widely studied across many supply chains. For example, Akhlaghi and Jafari (2015) reviewed the important factors related to SCQM; Hu (2017) investigated this issue in Chinese automobile industry and provided exciting understandings for dealing with quality issues alongside supply chains; Liu and Guo (2018) proposed an empirical framework of SCQM for food supply chains; Arunkumar (2018) investigated the impact of information technology in integration of SCQM practices.

The above literature review provides a sparse coverage in establishing the linkage between SCQM, IP, CS, OPP and OP in service industry. The objective of this study is to develop and test a conceptual framework model to evaluate the relationship among the SCQM, IP, CS, OPP and OP for the Telecom industry in UAE. QM practices are used for identifying and developing model constructs. Subsequently, the model for measuring the impact of SCQM on the OP in Telecom industry of UAE is tested and analyzed empirically.

3. Model variables and hypotheses

The conceptual framework of this research has been derived from the work of Lin *et al.* (2005), Green *et al.* (2008), Ou *et al.* (2010) and Chong *et al.* (2011). The reason for choosing their works is that they have introduced and validated established frameworks related to SCM, TQM, IP and OPP. Table I presents five latent variables and their respective indicators of the proposed model. It can be seen that each latent variable is comprised of number of constructs; for example, SCQM practices are represented by management support and commitment, supplier participation, SS and customer focus.

There is a prerequisite of SEM that the anticipated relationships between the variables in the model must have a relevant literature support (Sila and Ebrahimpour (2005). Figure 1 represents the model and the hypothesis. One-headed arrows represent the hypothesized

Latent variables	Indicators
Supply chain quality management (SCQM)	Management support and commitment (MSC), Supplier participation (SP), Supplier selection (SS), Customer focus (CF)
Innovation performance (IP)	Product innovation (PDI), Process innovation (PCI), Innovation and continuous improvement (ICI)
Operations performance (OPP)	Flexibility (FL), Turnaround time (TAT), Cost saving (CS), Inventory level (IL)
Customer satisfaction (CS)	Improved satisfaction (IS), Reduced complaints (RC), Customer loyalty (CL)
Organization performance (OP)	Financial performance (FP), Non-financial performance (NFP), Human resource results (HRR)

Table I. Latent variables of the model along with their Indicators

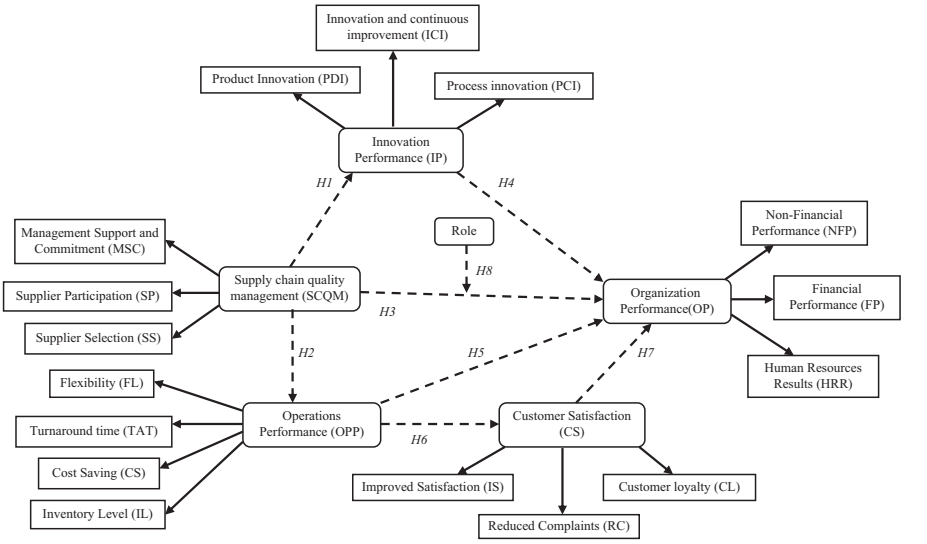

Figure 1.
Conceptual model framework

impact of one variable on another. As shown in Figure 1, eight research hypotheses have been developed. Pursuant to the literature review performed, QM and SCM practices are found to have a significant impact on the innovation and OPP of organizations (Chong *et al.,* 2011), Prajogo and Sohal, 2003); Fugate *et al.*, 2009). This suggests our first and second hypothesis. Kuei *et al.* (2001) investigated the relationship between SCQM and OP, and our third hypothesis identifies direction of this relationship. Innovation is an important element and provides a sustainable competitive advantage to the organizations (Huang and Liu, 2005), and this provides the basis for fourth hypothesis. It is widely believed that operational competency not only affects the level of customer satisfaction but also OP (Koh *et al.*, 2007; Ou *et al.*, 2010). These relationships are tested by fifth and sixth hypotheses, respectively. The seventh hypothesis is based on the preliminary work of Fotopoulos and Psomas (2010), and it explores the relationship between CS and OP. Several authors have identified the relationship between SCQM and OP. However, few authors believe that this relationship is being moderated by supply chain role of distributor, retailer and service provider. This suggests our last hypotheses.

4. Research methodology

The research is designed using an empirical study of selected telecom companies in UAE. Primary data are collected through a survey distributed to a sample of selected companies (the population frame of telecom companies in UAE). Secondary data are obtained from an extensive literature review of SCQM. The key research question is to assess the impact of SCQM practices on OP of Telecom industry of UAE. To answer this research question, a comprehensive research framework is developed. The proposed research methodology includes research design, survey design and distribution, and analysis of collected data using SEM technique. A software tool (AMOS 16) has been used for this analysis.

4.1 Survey instrument

The survey instrument is divided into six sections with a total of 53 indicators. Section 1 of the instrument deals with the general information of the selected company, whereas the remaining five sections are related to the five variables, as shown in Figure 1. These five

sections are selected through an extensive literature review (details are provided in Section 3). These five variables are measured by associated indicators that are used in the survey to measure the impact of SCQM practices on the performance of the companies. The survey instrument, so designed, is on a 1–7 likert scale (see Table AI for the details of the instrument). Before the finalization of the questionnaire, the content validity, face validity and pilot testing were performed for all the items contained in the questionnaire. Content validity of the instrument was tested through discussions and interviews with experts of various departments (operations, customer management, quality control and project management). The number of total items in the questionnaire is 47.

4.2 Sample

Target population comprised of telecom companies and their Tier 1 sub-contractors. Data were collected from employees of various levels belonging to quality assurance/control (QA/QC), procurement, customer service, engineering and IT departments of these organizations. Purposive sampling technique was used for this research. Purposive sampling is also known as judgmental, selective or subjective sampling, and it can be very useful in situations when you need to reach a targeted sample quickly (Palys, 2008).

For the purpose of data collection, two telecom companies and six sub-contractors were purposively selected. Next, a list of lower, middle and senior managers from the above-mentioned departments was established with 300 experts. An attempt was made to make sure that selected departments would have equal representation. In total, 300 questionnaires were distributed to the lower, middle and top managers of shortlisted departments; 41 respondents did not reply and 11 responses were incomplete. Overall, 248 responses were found eligible and have been considered in this study. Various rules of thumb have been advanced about sample size (e.g. Boomsma (1985) recommended a minimum of 100 responses). Thus, the 248 responses can be considered a good sample size for this study, as confirmed by Hair *et al.* (2010). A descriptive analysis summary of the respondents is depicted in Table II.

5. Data analysis and results

A total of 47 items of the instrument measure the five constructs. A minimum of three indicators are used for measuring each of the five latent constructs, and for measuring each indicator, a minimum of two items are used. Each indicator represents the mean of the responses of the items pertinent to that indicator.

5.1 Validity and reliability tests

The degree of consistency of a measure is referred to as its reliability. The reliability coefficient, Cronbach's α, is generally used to test the reliability of a scale. α values of 0.70 or greater are deemed to be indicative of good scale reliability (O'Leary-Kelly and Vokurka (1998). The reliability test was, therefore, applied to the collected data from the 248 surveys. As it can be seen from the results of Table III, the Cronbach's α for the five latent variables of the model ranges from 0.971 to 0.984. These results suggest that the theoretical constructs exhibit good psychometric properties.

5.2 Unidimensionality

Unidimensionality measures the extent to which the items in a scale measure the same construct. Confirmatory factor analysis is used to assess how well the observed variables, that is measurement items, reflect unobserved or latent variables in the studied construct (Hussain, Khan and Al-Amor, 2016). Table III confirms that the factors loadings, the standardized regression weights, are above 0.7, which are satisfactorily high and statistically significant. Squared multiple correlations (analogous to R^2) indicate the percentage of variance in an

	Frequency	%
Gender		
Male	197	79.4
Female	51	20.6
Qualification		
Intermediate	23	9.2
Bachelor degree	102	41.1
Master degree	110	44.3
Other	13	5.2
Age		
20–30	152	51.2
31–40	64	23
41–50	25	8.5
51–60	5	2
Above 60	2	0.8
Department		
Accounting/Audit/Taxation/Finance	12	4.8
IT/Software Development/Data Warehouse	11	4.4
Marketing/Sales and Distribution/Customer Services	93	37.5
Administration/HR/Procurement	64	25.8
Technical/Engineering/Quality Assurance	56	22.6
Others	12	4.8
Experience		
0–5	139	56
6–10	97	39.1
above 10	12	4.8
Job title		
Top	43	17.3
Middle	137	55.2
Lower	68	27.4
Role in supply chain		
Service provider	93	37.5
Distributor	69	27.8
Retailer	86	34.7

Table II.
Descriptive statistics of the respondents

indicator explained by a factor. Table III also shows that the relevant squared multiple correlations are adequately large, ranging from 0.861 to 0.987. This confirms that a significant degree of calculated variable's variance is provided by its latent construct. Hence, all of the five constructs have a good fit, and thus are unidimensional.

5.3 Convergent validity

Convergent validity can be evaluated by the use of the Bentler–Bonett Normed Fit Index (NFI). The rule of thumb states that if NFI values are equal or greater than 0.90, then measures of construct are related to each other and are counted as a valid fit index (Bentler (1992). Results of Table IV reveal that NFI values are greater than 0.90, and this provides evidence that all four items are related to the same construct.

5.4 Discriminant validity

Discriminant validity is the degree to which different latent constructs and their indicators are distinct to be distinguished from the other constructs and their indicators (Bagozzi *et al.,* 1991);

Factors	Indicators	Factor loading	R^2	Cronbach's α
Supply chain quality management (SCQM)				0.971
	MSC	0.958	0.919	
	SP	0.951	0.905	
	SS	0.928	0.861	
	CF	0.942	0.887	
Innovation performance (IP)				0.983
	PDI	0.990	0.981	
	PCI	0.993	0.987	
	ICI	0.990	0.890	
Operations performance (OPP)				0.980
	FL	0.972	0.944	
	TAT	0.969	0.940	
	CS	0.940	0.884	
	IL	0.965	0.932	
Customer satisfaction (CS)				0.984
	IS	0.963	0.928	
	RC	0.976	0.953	
	CL	0.990	0.980	
Organizational performance (OP)				0.984
	FP	0.978	0.956	
	NFP	0.972	0.946	
	HRR	0.981	0.963	

Table III.
Unidimensionality and reliability analysis

Variables	Convergent validity	Discriminant validity scale	Criterion-related validity
SCQM	0.99	0.493	0.358
IP	1.00	0.511	0.359
OPP	0.97	0.482	0.34
CS	0.98	0.58	0.56
OP	0.96	0.449	

Table IV.
Scale validity analysis

Hussain, Khan and Al-Amor, 2016). For calculating the discriminant validity, we can have a comparison of the Cronbach's α of a latent construct to its mean correlations with other model latent variables. If the α value of a latent construct is adequately high than the mean of its correlations with other variables, then there is a signal of discriminant validity (Ghiselli *et al.*, 1981). Table IV shows that the difference between the Cronbach's α value of every latent scale and the mean correlation of each latent scale with the other scales is sufficiently high, and this provides the evidence that scale does not correlate with other conceptually distinct constructs.

5.5 Criterion-related validity

Criterion-related validity provides the correlation between the predictor variables of a survey instrument and a relevant criterion variable. In this study, if the four latent predictor variables of the model are highly and positively correlated with the outcome variable, that is the OP, they have criterion-related validity. The bivariate correlations among each of the four predictor variables and the OP are greater than the acceptable limit of 0.30 (Sila and Ebrahimpour, 2005), thus illustrating a considerable criterion-related validity (see Table IV).

The latent variable of supply chain role is not accounted for the validity and reliability analysis, because it is measured only to distribute the data in three segments in order to analyze the data for the potential moderating impact. Moreover, it does not have a direct impact on the OP.

5.6 Assessment of model fit

The hypothesized model is tested by means of Amos 16 for investigating the relationships among the latent variables. To test the fitness of the proposed model, six model fit indexes (x^2/df, GFI, AGFI, NFI, CFI and RMSEA) are employed (Prajogo and Sohal 2003; Fotopoulos and Psomas, 2010). These indexes of model fitness are itemized in Table V. This table presents that all the goodness-of-fit statistics are in the acceptable range.

5.7 Hypothesis testing

Hypothesis testing was performed through SEM path analysis. Figure 2 (hereinafter referred as Model I) shows the results of the standardized regression weights on the paths. The regression estimate of SCQM on IP is significant at $p = 0.05$ with $b = 0.46$; therefore, *H1* is supported. Similarly, *H2* ($b = 0.48$) and *H3* ($b = 0.14$) have significant path coefficients and are accepted. SCQM has the highest direct impact on OPP, and IP and has the least direct impact on OP. *H4*, which stated that IP positively influences OP, is accepted, since

Index	Suggested value	Observed value
χ/df	$\leqslant 3.00$	2.29
GFI	$\geqslant 0.90$	0.90
AGFI	$\geqslant 0.80$	0.82
NFI	$\geqslant 0.90$	0.94
CFI	$\geqslant 0.90$	0.95
RMSEA	$\leqslant 0.080$	0.079

Notes: GFI, goodness-of-fit index; AGFI, adjusted goodness-of-fit index; NFI, normed fit index; CFI, comparative fit index; RMSEA, root mean square error of approximation

Table V.
Summary statistics of the model fitness indices

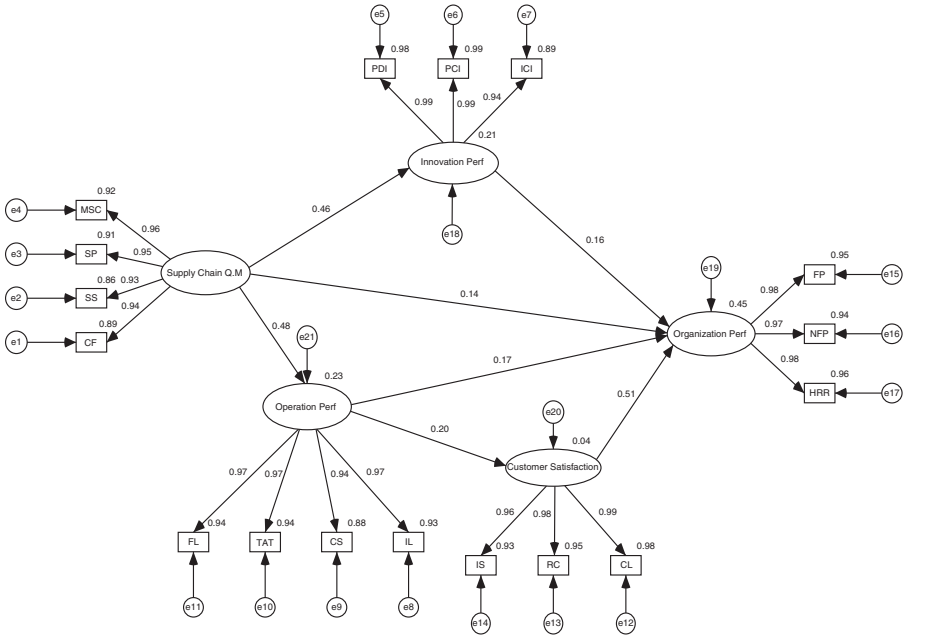

Figure 2.
SEM model calculated through AMOS 16

Figure 2 shows a significant positive relationship between IP and OP ($b = 0.16$, $p = 0.003$). The standard path coefficient estimate from OPP toward organizational OP is also significant at $p = 0.05$ with $b = 0.17$. Hence, *H5* is accepted, and it is proved that OPP positively and significantly impacts OP. Similarly, *H6* ($b = 0.20$) and *H7* ($b = 0.51$) have positive and significant path coefficients and are accepted. Amongst the all relationships in the model, CS has the maximum beta value, hence the highest impact on OP.

For examining the moderating impact in the study, the respondents were divided into three subgroups according to their roles in the supply chain, that is distributor, retailer and service provider. This technique to break up the data into subgroups has been previously employed in the literature (Pinho, 2008). *H8*, that shows moderating role of the service provider in the relationship of SCQM and OP, multi-group SEM technique was used to selected group 1. The standardized regression weight for group 1 ($b = 0.278$ with $p = 0.005$), as shown in Figure 3, is meaningfully much higher than Model I regression estimate ($b = 0.145$ with $p = 0.007$). This result shows that the relationship of SCQM and OP is moderated by the role of service provider; hence, *H8* is accepted.

6. Discussion and conclusion

This study intended to develop and validate a structural equation model for investigating the impact of SCQM practices on the performance of telecom companies in the UAE. Service supply chains today are recognized as good sources of comparative advantage.

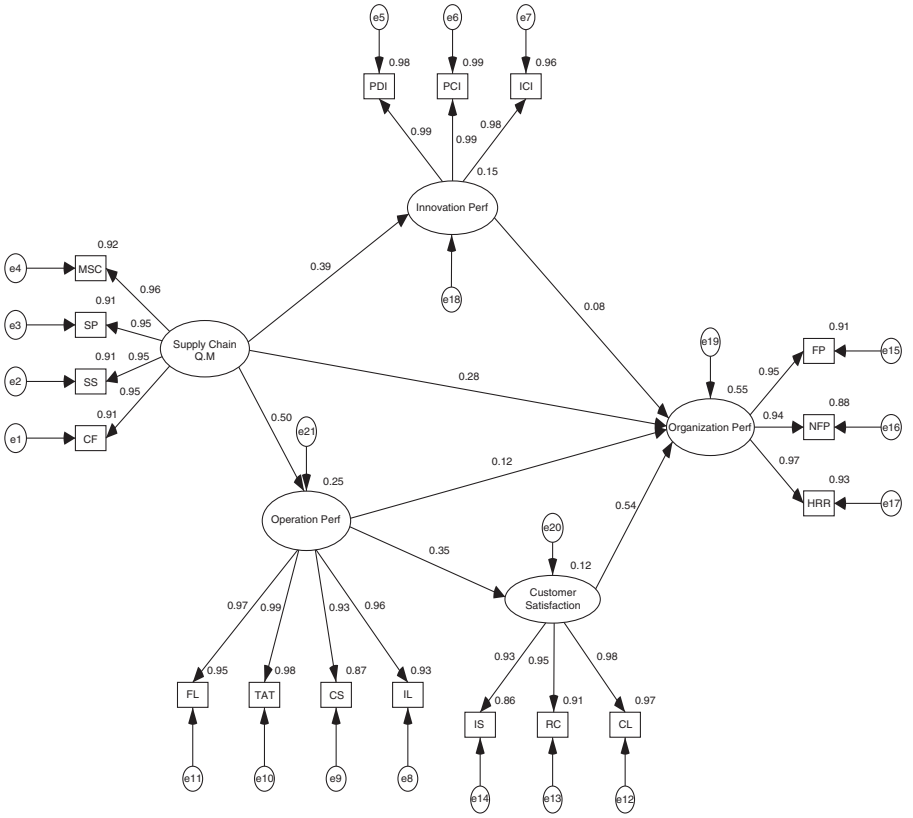

Figure 3.
SEM model for moderating impact calculated through AMOS 16

Indeed, services provide the single largest opportunity for revenue generation and maintaining margins (Brechbühl, 2004), and they continue to provide a pivotal role in the next cycle of economic development. The service sector in the UAE, where this study is positioned, accounts for approximately three-quarters of the economy's output, and Telecom sector is positioned among the top service providing companies.

Through extensive literature review, four exogenous variables (SCQM, operations performance, innovation performance and customer satisfaction), one moderating variable (role of service provider) and one endogenous variable (OP) have been identified. A total of 47 items of an instrument measure the five constructs. A minimum of three indicators are used for measuring each of the five latent constructs, and a minimum of two items measure each indicator. A total of 248 responses are collected from top, middle and lower management of two telecom companies and six sub-contractors in the UAE.

Cronbach's α reveals that the data are reliable, whereas confirmatory factor analysis showed that all proposed latent variables adequately measure the construct. Convergent validity was evaluated to check the degree to which the different approaches to measure the construct generate the same results, and Discriminant validity was evaluated to confirm that scale does not correlate with other conceptually distinct constructs. Criterion-related validity was evaluated to verify that the four latent predictor variables of the model are highly and positively correlated with the outcome variable. To test the fitness of the proposed model, six model fit indexes (x^2/df, GFI, AGFI, NFI, CFI and RMSEA) are employed. Hypothesis testing was performed through SEM path analysis. The bootstrapping procedure with 3,000 bootstrap samples was performed to obtain the significant probabilistic estimates of standardized regression weights.

The SEM analysis shows that the SCQM practices positively and significantly influence the OP. This is quite intuitive since effective SCQM has become a potentially valuable way of securing competitive advantage and improving OP. As today's competition is moving from "among organizations" to "between supply chains," more and more organizations are increasingly adopting SCQM practice in the hope of reducing costs, improving efficiency and securing competitive advantage. The findings of this research support the view that SCQM practices can have a discernible impact on competitive advantage and OP.

The path diagram represents that SCQM has highest impact on OPP and IP of the organization. This is quite intuitive since effective SCQM has become a potentially valuable way of securing competitive advantage and improving OP. Furthermore, in today's competitive markets, supply chain strategies are equally crucial for service companies as they are for manufacturing firms. Therefore, we suggest managers to recognize the importance of QM practices all through the life cycle of a service, starting right from the conceptualization through design and delivery of a service. This would streamline all their activities and would eventually boost the economic share of each stakeholder in the service supply chain.

These results validate the dependency of the telecom firms and their allied sub-contractors on innovation management to sustain their very existence in a fast-moving and ever-changing industry. The recent blast in information technology has forced service industry to be even more responsive to the evolving demand and requirements of their customers. The cutting-edge technologies have given rise to a recent trend in which more and more fast followers are taking away big chunks of market share from well-known first movers in the respective service industry.

It has been found that CS has highest regression weight on OP. The literature has established the fact that customer satisfaction is of fundamental importance and potentially offers a broad range of benefits for organizations. Satisfied customers are always expected to play a positive role in increasing sales and market share. In today's ever-changing telecom market, end-user demands are increasing and customers are becoming extremely

conscious of the quality of service they get from their service providers. Further, the adaption of just-in-time, personalized services and mass customization strategies can play an important role in today's competitive market. Customer's feedback and integration can better help the organization in their efforts towards continuous improvement, differentiation and sustainability. This is evident particularly in telecom/cellular industry. Study results also show that relationship between SCQM and OP is dependent on moderating role of service provider. In other words, financial, consultants, support and maintenance, legal and other service providers can greatly affect the relationship between SCQM and OP.

6.1 Study implications

This study is beneficial for service managers in the following manner:

- evaluating the comprehensiveness of their current practices;
- assessing the role of QM in conceptualization, design and delivery of their services;
- weighing innovation capabilities in order to grab and maintain their competitive advantage;
- learning to coordinate innovation to foster activities pertaining to creation and development of new services; and
- recognizing the significance of recent trends such as using sim card for payment, renting technological assets, etc.

6.2 Study limitations

There are some limitations in this research. The findings of this study are relevant to both researchers and managers in the field of service supply chain, but empirical data were collected from respondents of Telecom industry of UAE. Therefore, findings cannot be generalized across other service supply chains, for example supply chains of airlines, banks, hospitals, etc. Also, more empirical data and analysis are required to establish a valid comparison of service supply chains of different countries. In future research, an analysis of SCQM practices applied by service supply chains of different Asian countries may provide a broader spectrum. Furthermore, application of both qualitative and quantitative research methods may provide interesting and innovative results.

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(The Appendix follows overleaf.)

Appendix

A. General Information			
1	**Basic Information:**	(A)-Name:(Optional) (C)-Email:	(B)-Gender: M___ F____ (D)-Organization Name:
2	**Qualification:**	(A)-Diploma/Higher Graduate diploma level, (C)- Master degree,	(B)-Bachelor degree (D)- Others (Please specify)
3	**Age (years):**	(A) - 20-30, (B)-30-40, (C)- 40-50, (D)- 50-60, (E)- Above 60	
4	**Department:**	(A)- Accounting/Finance/Audit/Taxation, (B)- IT/Software development, (C)- Sales & Marketing/ Customer Services, (D)- Procurement, (E)- Technical / Engineering, (F)- Other	
5	**Designation:**	(A)- Strategic /Top,	(B)- Tactical /Middle (C)- Operational /Lower
6	**Experience (years):**	(A)- 1-5	(B)- 6-10 (C)- Above 10

*Please select **"one"** response to each of the following questions*:

		Strongly Disagree						Strongly Agree
B. Supply Chain Quality Management (SCQM)		1	2	3	4	5	6	7
B.1. Management support & System (MSC)								
7	Management takes the responsibility for quality performance.							
8	Management views improvements in quality as a way to increase the profits.							
9	Management offers incentives to achieve quality goals.							
10	Management uses quality performance as an incentive to recruit and retain staff							
11	Supervisors try to obtain the trust of employees.							
12	Supervisors promote the customer satisfaction.							
B.2. Supplier Participation(SP)								
13	Suppliers communicate and work with the enterprise on new product/service designs.							
14	Suppliers communicate and work with the enterprise on continuous improvement projects.							
B.3. Supplier Selection (SS)								
15	Suppliers are selected on the basis of their capacity to meet the needs of the enterprise.							
16	Suppliers are selected on the basis of cost effectiveness.							
B.4. Customer Focus (CF)								
17	There is a process of collecting customer complaints and suggestions.							
18	Customers are encouraged to submit proposals and complaints.							
19	The company evaluates the degree of customer satisfaction.							
C. Innovation Performance (IP)								
C.1. Product Innovation(PDI)								
20	The level of newness (novelty) of our new features/packages is high.							
21	We use latest technological innovations in new product/services development.							
22	Our speed of new product/service development is fast.							
23	There are wide number of new services that we introduce to the market							
C.3.Process innovation(PCI)								
24	We have technological competitiveness in our processes							
25	The up-datedness or novelty of technology used in our processes is high							
26	The speed of adoption of the latest technological innovations in our processes is fast							
27	We have a high rate of change in our processes, techniques and technology							
D. Operations Performance (OPP)								
D.1.Flexibility (FL)								
28	Our organization is flexible to change product mix							
29	Our organization is flexible to change volume							
D.2.Turn-around-time (TAT)								
30	Reduced turn-around time in production / provisioning of services							
31	Quick delivery as compared to competitors							
D.3. Cost Saving(CS)								
32	Our inventory expenses are less.							
33	Our operating expenses are less.							
D.4. Inventory Level (IL)								
34	Our inventory levels are low							
35	Our company's turnover in inventory is high							

Table AI.
Questionaire

(*continued*)

E. Customer Satisfaction (CS) ***E.1.Improved Satisfaction)***								
36	We belief that out customer satisfaction level has been improved							
37	We establish our customers' satisfaction relative to the customers' satisfaction with the competitors							
38	We assume the major responsibility for ensuring customer satisfaction							
E.2.Reduced Complaints(RC)								
39	We belief that the customer complaints have been decreased.							
40	Customer complaints are used as an input to improve our processes.							
E.3.Customer Loyalty(CL)								
41	Our customers are loyal to our company and brand.							
42	We use various methods to build relationships with customers and to increase repeat business and positive referrals							
F. Organizational Performance (OP) ***F.1.Financial Performance (FP)***								
43	Revenue growth over the last three years.							
44	Net profits.							
45	Profit to revenue ratio.							
46	Return on total assets.							
F.2.Non-financial performance (NFP)								
47	New product/service development							
48	Productivity.							
49	Market development.							
50	Capacity to develop a unique competitive profile							
F.3.Human Resource Results (HRR)								
51	Employee turnover rate is low.							
52	Low employee absenteeism.							
53	High Employee job performance.							

Table AI.

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