TQM and Organization Performance: The Mediation and Moderation Fit

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Abstract: Total Quality Management (TQM) is a unified organizational setting to improve the quality at every function and level of organization. The objective of this study is to measure the effect of TQM practices on the performance of the telecom sector of Pakistan. Telecom sector is continuously striving to improve the quality of its services to achieve business objectives. A conceptual framework model to investigate the said relationship is developed and tested. The results are based on a survey instrument developed through an extensive literature review. To analyze the complex relationship between the variables, Structural Equation Modeling (SEM) methodology was employed. The data collected from 212 respondents was used to test the model by using AMOS 16. Analysis of the data supports a strong and positive association between the TQM practices and quality performance, innovation performance and organization performance (OP) respectively. This study found that innovation performance has partial mediating impact between TQM and OP, whereas, QP mediation impact was not established. Moreover, culture of support has a moderating role in the relationship between TQM practices and the OP.
[Tahir Iqbal, Bilal Ahmad Khan, Nadeem Talib, Nawar Khan. **TQM and Organization Performance: The Mediation and Moderation Fit.** *Life Sci J* 2012;9(4):1571-1582] (ISSN:1097-8135).
http://www.lifesciencesite.com. 239

Key Words: Total Quality Management (TQM), Quality Performance (QP), Innovation Performance (IP), Organization Performance (OP), Culture of Support (CS).

1. Introduction

With the increasing trend of globalization and quality management/improvement practices, TQM has become a global phenomenon. Its emergence is one of the core developments in the field of operations management sciences and it has been widely adopted worldwide. Japanese companies are labeled as pioneers in TQM enactment, whereas Asia-pacific, European and American companies are known as followers. Particularly in the last two decades, TQM has received a great attention worldwide (Jung & Wang, 2006). Since the TQM philosophy is more frequently practiced in the manufacturing industry (Cassidy, 1996; Joiner, 2007; Prajogo & Sohal, 2003), and a little attention has been paid on the implementation of TQM and consequently its impact on the OP, particularly for the service industry (Breiter & Bloomquist, 1998; González, González, & Ríos, 1997; Lemak & Reed, 2000; Lindahl et al., 1995; Prajogo, 2005; Prendergast, Saleh, Lynch, & Murphy, 2001). This study focus to find out the relationship of TQM practices and the OP of the telecom firms of Pakistan. Telecom firms including the Cellular Mobile Operators (CMOs) are continuously putting their efforts to improve service quality through adoption of Quality Management Systems (QMS) like TQM and ISO standards.

2. Literature Review

TQM tools and procedures may vary but the fundamental philosophy and concepts are equally germane to industries from manufacturing as well as service(Huq & Stolen, 1998), Similarly Prajogo (2005) also confirmed that TQM practices and QP are invariant between manufacturing and service industry, which infers that TQM is universal improvement initiative program and can be implemented in service industry. Further TQM and business performance were found positively correlated. (Salaheldin, 2009; Terziovski & Samson, 1999). There are several TQM practices and variables that have been underlined in the literature that can influence the OP. For instance, commitment of the management and leadership, focus on the customer, supplier relationship, design of quality, employee empowerment, benchmarking, statistical process control, employee involvement, empowerment and training (Ahire, Waller, & Golhar, 1996; Dale & Cooper, 1994). Karuppusami and Gandhinathan (2006) by using Pareto analysis technique on the literature review of Critical Success Factors (CSFs) on the implementation of TQM for the period 1989 to 2003 listed and arranged management leadership, process management, supplier management, service design, customer focus, employee relation, training, and quality of the data as the top eight CSFs of TQM.

Huarng and Chen (2002) through a survey of Taiwan's firms revealed that TQM positively influence cost containment and performance. On the other hand, Terziovski and Samson (1998) found that the

integrated strategic quality orientation involving TQM and ISO 9000 quality standards are the most effective competitive strategy for sustainable performance Similarly, Salaheldin (2009) revealed that operational as well as on the OP are significantly correlated with TQM. Moreover, Deming (1986), Joiner (2007) and Powell (1995) also confirmed the same results. On the other hand, there are also some findings about the weak rather irrelevant and negative relationship among TQM and performance (Powell, 1995; Yeung & Chan, 1998).

Some researchers, Demirbag, Tatoglu, tekinkus, and Zaim (2006) and Salaheldin (2009) have tested the impact of TQM separately on the financial and non-financial performance of organizations. Demirbag et al. (2006) found that the TQM practices indirectly effects financial performance. On the other hand Salaheldin (2009) using SEM illustrated that the CSFs of TQM (Strategic, Tactical and Operational) have a positive impact on financial as well as on the non-financial performance of Qatar based Small & Medium Enterprises (SMEs).

TQM facets can also be categorized into soft and hard TQM elements(Rahman & Bullock, 2005). The soft TQM elements include leadership, employee relation, employee involvement, focus on customer, strategic quality planning, process management, continual improvement, data and information analysis and knowledge and education. On the other hand, the hard elements include elements like quality tools and techniques, customer/supplier relation and product/process relations (Fotopoulos & Psomas, 2009; Jung & Wang, 2006).

Fotopoulos and Psomas (2009) found that quality improvement is primarily based on soft TQM elements and subsequently by the hard TQM elements. Further, in their research on the relationship of TQM factors and OP, they revealed that TQM practices like, top management role, employee participation, customer focus, quality management tools and techniques have a significant impact on the companies' performance (Fotopoulos & Psomas, 2010).

Leadership being a TQM element includes providing the vision and direction to the employees, improving the ability of information sharing and improving communication process, enhancing synergies value addition and bringing enlightenment (Zairi, 1994). Similarly, the senior management must understand the purpose and principles of TQM and should also consider the internal strategic management processes, training and development, participation of their staff, and their own role in implementing the TQM approaches in managing the OP (Taylor & Wright, 2003). Taking into account leadership as a soft TQM element, Zehir et al. (2012) in their research on management leadership provided that leadership is positively and significantly related to organizational outcomes like innovativeness, quality performance and operational performance.

TQM focus on satisfying the customer needs. Goh and Ridgway (1994) argued that that to remain competitive organizations must satisfy their customer needs at reasonable cost. Sila and Ebrahimpour (2005) concluded that TQM impact business performance entailing customer focused results. Similarly Agus and Hassan (2011) revealed that TQM has a significant relationship with customer-related performance. Lorente, Dewhurst, and Dale (1999) found that TQM dimensions like customer focus, training, teamwork and empowerment can influence in bringing more innovativeness in business activities of organizations. Likewise, Prajogo and Sohal (2003) concluded that IP is significantly associated with TQM practices in non-manufacturing and manufacturing organizations Australia. More recently, Hung et al. (2011) in their research on high-tech industry of Taiwanese companies noted that TQM positively impact IP. However, the said relationship is mediated by organizational learning. When considering the mediation effect, Kim et al. (2012) suggested that quality management practices, being mediated by the process management, have a positive linkage with innovation.

Su, Li, Zhang, Liu, and Dang (2008) delineated that the relationship between quality management practices like TQM and OP is indirect; mediated through variables like QP and Research and Development (R&D) performance. In regards to the direct effect of TQM practices on quality Performance, Zehir et al. (2012) suggested that TQM is a quality oriented approach which has a direct effect on the quality perfor7mance of manufacturing, IT and service sector companies. Sharma and Gadeene (2001) argued that TQM is a holistic management philosophy and to have the full potential of the TQM on OP a holistic approach of TQM should be applied rather than on piecemeal basis. The importance of development of work environment and TQM driven cultural change is highlighted in the literature to enhance the performance outcomes of TQM implementation (Joiner, 2007; Montes, Jover, & Fernandez, 2003; Rad, 2008). High quality culture itself is considered as a significant TQM practice (Kaluarachchi, 2010). Likewise, the national cultural values have a significant influence on the organization's quality culture (Noronha, 2002). The sustainability of TQM can also result in a failure if human element of change in quality culture are ignored (Edwards & Sohal, 2003).

The extant literature is not fully matured and has research gap in the relationship of TQM practice and OPs in the service sector, especially telecom sector. This study is conducted to fill this knowledge gap. A theoretical model is developed to assess the

relationship among the TQM, QP, IP and OP for Pakistan's telecommunication sector.

2.1 Research Model

The theoretical model has been adapted/refined from the work of (Joiner, 2007; Prajogo & Sohal, 2003; Salaheldin, 2009; Su et al., 2008). Literature review on quality management implies that most of the TQM factors and the variables on which they impact involve more than one dimension and indicator; this suggests for the use of a latent variable model. A total of five latent variables are measured in the model on the basis of extensive support from the literature. This includes TQM, QP, IP, Culture of Support and OP. The variables are enlisted in Table 1 along with respective indicators.

Table 1: Research variables of the model along with their indicators.

Latent Variables	Indicators
Total Quality Management (TQM)	Employee Relations (ER), Leadership (LS), Customer Relations (CR), Product/Process Management (PPM)
Culture of Support (CS)	Co-worker Support (CS), Organizational Support (OS), National Culture Support (NCS)
Quality Performance (QP)	Service quality (SQ), Service Design (SD), Perceived Quality (PQ), Serviceability (SER)
Innovation Performance (IP)	Product Innovation (PdI), Process Innovation (PrI), Innovation and Continuous Improvement (ICI)
Organizational Performance (OP)	Human Resources Results (HRR), Financial Performance (FM), Non-Financial Performance (NFM),

Figure 1 represents the research model and the hypotheses. The one-headed arrows therein show the hypothesized impact of one variable on another.

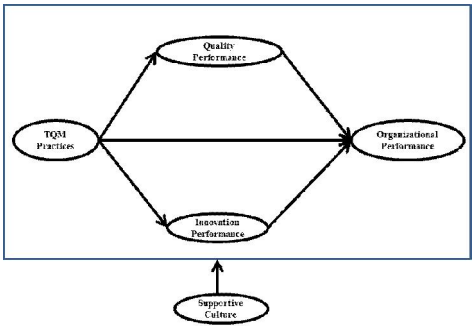

Figure 1: Research Model

2.2 Research Hypotheses

Reviewing the literature, it's quite evident that manufacturing and service industries business performances are impacted by TQM. TQM significantly impacts the business performance of both For instance, Powell (1995); Terziovski and Samson (1999) and Salaheldin (2009) revealed that the implementation of TQM has a significant positive impact on the OP (both financial and non-financial). Hence, the first hypothesis developed is;

H_1. TQM practices leads to a better OP.

Referring to the TQM literatures, studies have found that TQM has a positive and significant relationship with QP (Arumugam, Ooi, & Fong, 2008; Fotopoulos & Psomas, 2010). Likewise, Innovation in the business activities of an organization is positively and significantly influenced by TQM practices (Lorente et al., 1999; Pinho, 2008). Based on foregoing the second and third hypotheses are;

H_2. TQM practices leads to a better QP

H_3. TQM practices leads to a better IP.

Innovation relation with OP has been confirmed by (Huang & Liu, 2005; Lin & Chen, 2007; Pinho, 2008). Likewise, quality improvement has a positive impact on OP (Agus, 2005; Fotopoulos & Psomas, 2010). Su et al. (2008) found that the relationship of TQM practices and OP is indirect; mediated through variables like, QP and IP. The said relationships are investigated by testing the fourth, fifth, sixth and seventh hypothesis a;

H_4. QP leads to a better OP.

H_5. IP leads to a better OP.

H_6. QP mediates the relationship between TQM practices and OP.

H_7. IP mediates the relationship between TQM practices and OP.

The element of culture cannot be ignored while gauging the impact of TQM on OP. The culture of support moderates the relationship between TQM and OP (Joiner, 2007). This is tested in the last hypothesis:

H_8. CS moderates the relationship between TQM and OP.

3. Study Design and Methodology

3.1 Measurement Instrument

The instrument has been developed through literature review. Most of the items were adopted from different studies, such as (Curkovic, Vickery, & Droge, 2000; Demirbag et al., 2006; Joiner, 2007; NIST, 2002; Noronha, 2002; Prajogo & Sohal, 2003; Sila & Ebrahimpour, 2005) and augmented by the broad quality management literature. The content validity was established through interviews with the senior managers of quality assurance department (QAD) and project managers. The instrument was edited, items were added and deleted from the questionnaire. The questionnaire was then reviewed by the three academic scholars for comprehensibility and accuracy. To measure the items other than performance a 1-7 Likert scale was used (where 7 = strongly agree, 4 = about the

same and 1 = strongly disagree) and for performance items a 1-7 items scale was used (where 7 = above average, 4 = about the same and 1 = below average). A 7-point scale as compared to 5-point was used to achieve better consistency (Inman et al., 2011, p. 347). . (See Appendix 1 for the details of all the items of the instrument and their corresponding literature). After the necessary amendments the questionnaire so formed was subjected for pilot testing.

Initially the reliability was checked from the data collected from a sample of 15 respondents (Three samples from each of the major telecom firm i.e. Telenor, Zong Ufone, Warid and Mobilink). Cronbach's alpha was calculated to analyze the reliability of the constructs. Alpha values from 0.70 or more are considered as good indicators of the reliability. The Cronbach's alpha values for all the constructs were from 0.76 to 0.94, therefore suggesting good reliability. A total of seventy nine items were the part of the questionnaire.

3.2 Sample

Pakistan telecom sector is the most growing service sector in the country having more than 10 billion US$ Foreign Development Investment (FDI) and generating revenue at an average of more than 300 billion rupees annually. Moreover, this sector is benefiting Government by contributing in GDP and society by providing employment and reliable communication services. Telecom industry of Pakistan and the associated suppliers were selected for this study.

Table 2: Respondent's Descriptive Statistics.

Category	Frequency	Percent
Gender		
Male	167	78.8
Female	45	21.2
Age		
20-30	127	59.9
31-40	57	26.9
41-50	21	9.9
51-60	5	2.4
Above 60	2	0.9
Department		
IT/Software Development	18	8.5
Marketing/Sales & Distribution/Customer Services	32	15.1
Administration/HR/ PM	38	17.9
Technical/Quality Assurance	64	30.2
Finance	48	22.6
Others	12	5.7
Experience		
0 – 5	108	50.9
6 – 10	92	43.4
above 10	12	5.7
Job Title		
Top	34	16
Middle	98	46.2
Lower	80	37.7
Employment status		
Permanent	142	67
Contract	70	33

Five CMOs, i.e, Telenor, Zong Ufone, Warid and Mobilink, and 22 suppliers were randomly selected for the collection of data. The questionnaire was sent to a total of 350 employees and different stakeholders of telecom industry. Out of the 350 questionnaires, a total of 233 were returned with a response rate of 66.5%, 21 were excluded from the analysis due to missing data. The remaining sample hence consisted of 212(60.5%) respondents. Simple convenient sampling was used for the purpose of data collection. Out of 212 usable respondents used in final analysis, 18(8.5%) respondents held the titles of IT/Software Development, 32(15.1%) Marketing/Sales & Distribution/Customer Services, 38(17.9%) Administration / HR / PM, 64(30.2%) Technical / Quality Assurance, 48(22.6%) and 12(5.7%) others. Descriptive summary of the respondents is depicted in Table 2.

To test nonresponse bias, early and late response bias was checked by splitting the data into two groups, early received (153) and late received (59) the data. Thereafter, t-tests were performed on the mean responses of two groups on five randomly selected questions it was found that no significant difference exists among the two groups. Hence, data was free from potential no response bias (Armstrong & Overton, 1977). Moreover, Harman's one-factor test was also applied to examine the potential existence of common method variance and the analysis proposed the incidence of multi factors and the data was free from significant bias between variables(Podsakoff & Organ, 1986).

4. Data Analysis and Results

4.1 Data Preparation

The questionnaire prepared to measure the five constructs in the study comprised of a total of 79 items. To measure each construct at least three indicators were used. These items were wrapped to a manageable size and to meet the multiple group analysis (Hall, Snell, & Foust, 1999). Items are wrapped just by taking average of items in respective indicator.

4.2 Scale Reliability and Validity

The constructs of latent variables were subjected to the validity and reliability analysis prior to their deployment in the model. Validity tests were performed in four steps: unidimensionality and reliability, convergent validity, discriminant validity and criterion-related validity (Sila & Ebrahimpour, 2005).

4.2.1 Unidimensionality and Reliability

Unidimensionality measures the extent to which the different items in a construct measures the same construct (Jackson, Denzee, Douglas, & Shimeall, 2005).

Table 3: Unidimensionality, Convergent Validity and Reliability

Factor	Indicator	CFI	Factor Loading	Cronbach's alpha
TQM		0.998		0.873
	ER		0.752	
	LS		0.809	
	CR		0.793	
	PPM		0.833	
QP		0.973		0.948
	SQ		0.912	
	SD		0.961	
	PQ		0.862	
	SER		0.886	
IP		1		0.779
	Pdl		0.728	
	Prl		0.652	
	ICI		0.831	
OP		1		0.832
	HRR		0.678	
	FP		0.855	
	NFP		0.842	
CS		1		0.877
	CS		0.835	
	OS		0.948	
	NCS		0.741	

Unidimensionality in this study was measured through Confrimatory Factory Analysis (CFA) and Comparative Fit Index (CFI). Significant factor loadings, which are good indicators of CFA (Demirbag et al., 2006) were calculated through standardized regression weights and it was noted that almost all the standardized regression weights were above 0.7 (or at least 0.96), and were satisfactorily high and statistically significant (Table 3). Similarly, CFI value of more than 0.90 for a construct shows an satisfactory unidimensionality of the data (Hatcher, 1994). Analysis of Table 3 shows that CFI values ranged from 0.973 to 1.00. CFI compares the proposed and null model with the assumption that no relationship exists among the measures. CFI values range from 0.973 to 1, indicating considerably good fit to the data. The reliability of the scales was measured by calculating the Cronbach's alpha value for each of the construct. The results as reported in Table 3 shows that the Cronbach's alpha value of all five constructs is more than the recommended value of 0.70 (Hair, Black, Babin, Anderson, & Tatham, 2005), thus showing considerable internal-consistency and reliability of the constructs.

4.2.2 Convergent Validity

The convergent validity of the scales can be assessed through CFA, i.e., the significant factor loadings of the indicators of the constructs show convergent validity of the constructs (Bagozzi & Yi, 1991). As shown in Table 3, all the factor loadings are significant while ranging from 0.652 to 0.961, thus indicating a strong convergent validity.

4.2.3 Discriminant Validity

Discriminate validity is the extent to which the different latent constructs in an instrument and their corresponding indicators/items are unique enough to be differentiated from the other constructs and their indicators/items (Hatcher, 1994). This type of validity can be confirmed if the square root of Average Variance Extracted (AVE) of a latent variable is greater than its correlation with other latent variables(Fornell & Larcker, 1981). Moreover, if AVE is greater than 0.50 it also shows good convergent validity. The square root of AVE are shown diagonally in Table 4 and value of all the constructs are greater than the absolute value of its correlation with other latent variables hence confirm discriminant validity. A CFA was also performed to assess the convergent as well as the discriminant validity of the multi-item construct. The results CFA show that the measurement model fits the data (x^2= 177.539; p < 0.001; df = 70; x^2/df = 2.536; RMSEA = 0.079; RMR = 0.019; TLI = 0.94; CFI = 0.95; IFI = 0.96; NNFI = 0.79).

Table 4: Discriminant validity

	CR	AVE	IP	TQM	QP	OP
IP	0.79	0.55	**(0.74)**			
TQM	0.88	0.66	0.71	**(0.81)**		
QP	0.94	0.80	0.33	0.22	**(0.89)**	
OP	0.83	0.62	0.59	0.56	0.225	**(0.79)**

*AVE of each latent variable is shown in diagonal in parentheses. ^CR is composite reliability.

4.2.4 Criterion-related validity

This type of validity entails the correlation among the predictor variables and their pertinent criterion variable (Büttner, 1997). In this study, the three latent predictor variables of the model as reported in Table 1 have this validity if they have a high and positive correlation with the outcome variable, i.e., the OP. The latent variable of support of culture is not accounted for the criterion-related validity because it does not have a direct impact on the OP. The bivariate correlations between each of the three predictor variables and the OP are significant (Sila & Ebrahimpour, 2005), and thus indicates considerable criterion-related validity as shown in Table 5.

4.3 Assessment of Model Fit

The hypothesized model was tested using Amos 16 for analyzing the relationships between the latent constructs under the study.

Table 5: Correlations between latent variables

	TQM	QP	IP	OP
TQM	1			
QP	.867**	1		
IP	.233**	.184**	1	
OP	.633**	.509**	.170*	1

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed)

Table 6: Summary Statistics of The Model Fitness Indices

Fit Index	Recommended Value	Observed Value
x^2/df	≤3.00	1.946
GFI	≥0.90	0.913
AGFI	≥0.80	0.872
NFI	≥0.90	0.928
CFI	≥0.90	0.963
RMSEA	≤0.080	0.067

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.

Six model fit indices (x^2/df, GFI, AGFI, NFI, CFI and RMSEA) were employed to test the fitness of the model (Fotopoulos & Psomas, 2010; Jung, Wang, & Wu, 2009; Prajogo, McDermott, & Goh, 2008; Su et al., 2008). These indexes of the model fitness, on the basis of the structural model analysis, are summarized in Table 6. In practice, Chi-square / degrees of freedom should be less than 3, GFI, NFI, CFI should be greater than or equal to 0.9, AGFI should be more than 0.8, and RMSEA should be less than or equal to 0.08 are considered as indicators of good fit (Teo & Khine, 2009; Jackson et al., 2005). As shown in Table 6, all goodness-of-fit indices are in the acceptable range.

4.4 Hypothesis Testing

The model was tested by employing the data received from the 212 respondents. SEM path analysis was used to test the hypothesis therein. Figure 2 depicts the standardized regression coefficients of hypothesized paths and also the loadings of latent variable's indicators. H_1 postulated that TQM positively influences organizational performance. The level, with b = 0.33, hence H_1 is supported. Similarly H_2 and H_3 with a path coefficient of b = 0.35 and b = 0.75 are accepted. The standard path coefficient estimate from quality performance towards organizational performance b=0.09 (p=0.189) is not significant, hence, H_4 is not supported. On the other hand H_5 has significant path coefficient b=0.31 (p<0.05) and is accepted. H_6 and H_7 were tested by using sobel test and innovation performance significantly at (p<.001) partially mediates the path between TQM and organizational performance whereas quality performance does not mediate the link among the TQM and OP (Sobel, 1982; Venkatraman, 1989), primarily may be due to insignificant relationship between quality performance and organizational performance.

Finally, to verify H_8 regarding the moderating effect of support of culture, a two-group analysis was conducted. Concerning support of culture the sample was split as close as possible on the basis of means into two groups, the 'low culture of support' group consists of (89) and the 'high culture of support' group consists of (123) respondents(Bryde & Robinson, 2007). This technique to divide the data into two subgroups was used by for group analysis of the data. A t-tests for mean differences to detect if these thresholds statistically discriminate the sub-samples. The t-test for OP is, t = -16.001(p < 0.01). First the paths were calculated to be unconstraint across the two groups and then these paths were estimated to be constrained and unchanging across the groups. If the change in the chi-square value between the constrained and unconstrained multi-group SEM is statistically significant, it shows that the path loadings in different groups are significantly changed (Su et al., 2008). That is, the culture of support significantly moderates the relationships between TQM and OP. Table 7 shows the results of Multi-group SEM analysis. It is evident that both of the two models fitness is good, and the chi-square change of 18.1 with five degree of freedom is statistically significant at (p<0.01). Hence H_8 is accepted. standardized regression coefficient from TQM to OP is statistically significant at five percent significance

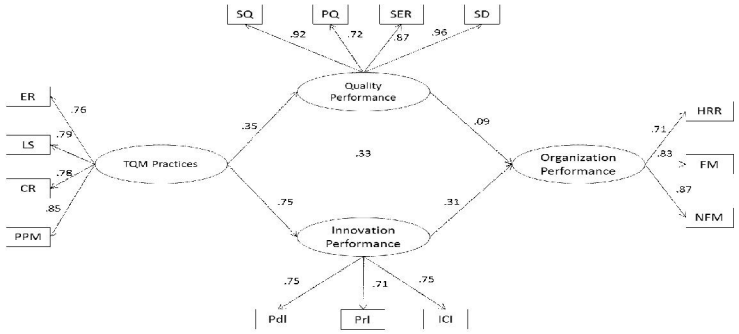

Figure 2: Results of Structural Model

Table 7: Results of Multi-Group Structural Model for Moderation Effect of Support of Culture

Model Description	X^2	df	X^2/df	CFI	RMSEA
Constrained	341.7	149	2.29	0.867	0.078
Unconstrained	323.6	144	2.24	0.876	0.077

5. Discussions

Existing literature supports the findings of this study. An analysis of the model provides that the TQM practices positively impacts the primary QP and IP and the OP. This provides an insight that the adoption and encouragement of TQM practices surely improves the performance of Telecom firms. The path diagram shows that TQM has a strong impact on IP of the organization as compared to the QP. This also confirms the old literature on quality management and its relationship with innovation (Anderson, Rungtusanatham, Schroeder, & Devaraj, 1995. Notwithstanding the QP and the IP are different from each other, the results shows that there exists a significant correlation among the two and they are interrelated with each other. This finding further endorses the theory that the exploration of new and state of the art technologies improves the product quality (Benner & Tushman, 2003). Similarly, the improvements in the product/service quality are also deemed effective in the development of new products (Prajogo et al., 2008). For example, the enhancement of new features in a product may require change and improvement in the technology. However there is a need for effective integration among the two in order to obtain the optimal business results. The relationship of QP and OP, though positive but not significant, suggests that there may exists a more complex relationship among the QP and OP. Therefore QP alone cannot significantly influence the organizational performance in the telecom sector. It might include other variables like marketing, sales and distribution, etc. IP has a strong and positive significant relationship with the OP showing the importance of innovation in improving the OP. Further, the maximum factor loading of the indicator product innovation among the other indicators of the latent construct of IP suggests that fostering innovation in the products in the form of new features and services significantly contributes in IP, which ultimately explains the OP of telecommunication firms and their suppliers. Despite the contrast between the QP and the IP as discussed earlier, both of these together are the intermediate performance outcomes of TQM. Together they positively and significantly mediate the relationship between the TQM practices and OP. This elucidates that the enhancement in the QP, IP is essential to have the expected outcome of implementing TQM practices (Su et al., 2008).

This study also suggests that the environment of culture support moderates the relationship between TQM practices and the OP. This confirms the suitability of the contingency theory approach to the successful implementation of TQM (Joiner, 2007). The culture of support can promote the team work and creates a synergistic effect on the TQM/organizational performance relationship. In addition to the co-workers and the organizational culture of support, the role of national cultural also shows the importance of national cultural values and support for improvement of the quality and performance of organizations.

5.1 Implications

The investigation of this research arises several interesting implications for business, research and education. Four conceptual frameworks Salaheldin (2009), Prajogo and Sohal (2003), Su et al. (2008) and Joiner (2007) were adapted and modified with the addition and deletion of new indicators to develop a new model for measuring the TQM/organizational performance relationship. The model includes both the mediating and the moderating impact that influences the TQM/organizational performance relationship; both of these were not tested before in a single framework. Another major contribution of the study is the development of a research instrument, being validated by the experts of the area. The instrument comprehensively covers the concepts of the latent variables under the study and is also statistically validated. The findings show that TQM practice improves the quality performance, innovation performance and the organizational performance. Therefore the practice of TQM philosophy should be promoted in the Telecom industry.

Innovation performance can alone positively influence the organizational performance. This indicates to the managerial implications of promoting innovation and creativity in the products/services and processes that can ultimately improve the organization performance. The study also suggests that improvement in the product alone is not adequate for improved organizational performance, so other, variables along with the quality performance, should also be considered by the telecom sector for the improved organizational performance.

The study signifies the need to integrate the relationship among the quality and the innovation performance that can result in improved quality of the services and may bring more innovation in the products. Since the primary measures under this study mediate the TQM/organizational performance relationship, the telecom firms need to focus on the immediate impact of TQM practices to ensure its

secondary impact in the form of improved organizational performance, particularly on the innovation performance due to its direct and strong positive effect on the organizational performance. Culture of support, that moderates the TQM/organizational performance relationship, should also be encouraged at organizational and national level. This can help in the promotion of the quality culture, whilst bringing synergies and teamwork that ultimately shall affect the performance measures.

5.2 Limitations

We so acknowledge several limitations of the study. First, the present study is only limited to the telecom industry of Pakistan and hence it has less generalization. More significant results could have been achieved from the study by the comparison of different industries. Secondly, the sample size was limited due to time and financial constraints. Although the response rate was satisfactorily good, so it is believed that the non-response bias has not unsubstantiated the results of this study. Thirdly, the cross-sectional data was used, though the causal relationships have been achieved, but a longitudinal research could add strength to causality.

5.3 Future Recommendation and Conclusion

The proposed model has not been tested for its relevance and significance in different sectors. This can be explored in future research. The study can further be enriched by focusing on different geographic regions. The same size can also be increased to further improve the generalizability of the results. Further research can include other contextual and environmental factors to see how they can play a moderating or intervening role in the relationship of the TQM practices and the OP. This study concludes that the TQM practices (leadership, employee relation, customer relations and product/process management) positively and significantly influences the quality performance, innovation performance and the organizational performance. The positive correlation among the quality and innovation performance shows that these two aspects should be integrated and balanced to support and improve each other.

The insignificant impact of quality performance on organizational performance shows that quality performance alone is not sufficient to improve the overall organizational performance of telecom firms. On the other side, innovation performance in the telecom sector can itself positively and significantly impacts the organizational performance. Further, the immediate impact of TQM practices significantly mediates the secondary outcomes of TQM practices. Culture of support also moderates the TQM/organizational performance relationship.

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Appendix 1: Measurement scale

TQM

Employee Relations ((Jung et al., 2009)

1. We are authorized to inspect our own work (Ahire et al., 1996).
2. We are encouraged to find out and fix the problems/issues (Ahire et al., 1996).
3. Technical assistance is provided to us for solving the problems (Ahire et al., 1996).
4. We are recognized and rewarded for superior quality performance (Saraph et al., 1989; Sila and Ebrahimpour, 2005).
5. We are encouraged to give suggestions (Ahire et al., 1996).
6. There are no communication barriers between the departments (Teriziovski and Samson, 1999)
7. The communication processes are not only "top-down" but "bottom-up" as well (Terziovski and Samson, 1999).
8. We are provided with the quality-related training (Saraph et al., 1989; Sila and Ebrahimpour, 2005).

Leadership (Jung et al., 2009)

1. Management takes the responsibility for quality performance (Saraph et al., 1989; Sila and Ebrahimpour, 2005)
2. Management views improvements in quality as a way to increase the profits (Saraph et al., 1989; Sila and Ebrahimpour, 2005).
3. Management offers incentives to achieve quality goals (Tabak and Jain, 1999).
4. Management ensures that each new product and service meets customer expectations (NIST, 2002).
5. Management uses quality performance as an incentive to recruit and retain staff (NIST, 2002).
6. Supervisors try to obtain the trust of employees (Tamimi and Gershon, 1995).
7. Supervisors promote the customer satisfaction (Stock and Hoyer, 2002).
8. Our top leaders stress the impacts that our organization has on the society (Kuei and Madu, 1995).

Customer Relations (Jung et al., 2009)

1. We assume that ensuring customer satisfaction is our major responsibility (Ross and Georgoff, 1991).

2. We determine our customers' satisfaction relative to the customers' satisfaction by the competitors (Black and Porter, 1996).
3. We link customer satisfaction with our internal performance indicators (Black and Porter, 1996).
4. We use Customer complaints as an input to improve our processes (Terziovski and Samson, 1999).
5. Customer requirements are communicated to us (Terziovski and Samson, 1999).
6. We use various methods to build relationships with customers and to increase repeat business and positive referrals (NIST, 2002).
7. We follow up with customers on products/services and transactions to receive prompt and actionable feedback (NIST, 2002).
8. We reset our standards whenever customer needs and expectations change (NIST, 2002).
9. We ensure that the data and information we provide to our customers on the internet are: reliable; accurate; timely; and secure (NIST, 2002).

Product/Process Management (Jung et al., 2009)

1. We emphasize the continuous improvement of quality in all work processes (Anderson et al., 1995).
2. We use statistical techniques to control processes (Saraph et al., 1989; Sila and Ebrahimpour, 2005).
3. Our product/service specifications are clear (Saraph et al., 1989; Sila and Ebrahimpour, 2005).
4. Systematic recording and analysis of the company's performance data is in place (Fotopoulos and Psomas, 2010).
5. Determination of areas and points for improvement are practiced (Fotopoulos and Psomas, 2010).
6. Standardized and clear work or process instructions are given to all of us. (Anderson et al., 1995).
7. We effort to prevent errors during the phase of process planning. (Fotopoulos and Psomas, 2010)
8. Our product/service specifications are clear (Saraph et al., 1989; Sila & Ebrahimpour, 2005).

Culture of Support

Co-worker Support(Joiner, 2007)

1. We willingly share our expertise with each other (Zhou and George, 2001).
2. We help out each other if someone falls behind in his/her work (Zhou and George, 2001).
3. We encourage each other when someone is down (Zhou and George, 2001).
4. We try to act like peacemakers when there are disagreements (Zhou and George, 2001).

Organizational Support (Joiner, 2007)

1. Creativity is encouraged at the company (Zhou and George, 2001).
2. Our ability to function creatively is respected by the leadership (Zhou and George, 2001).
3. The reward system here encourages innovation (Zhou and George, 2001).
4. Company publicly recognizes those who are innovative (Zhou and George, 2001).

National Cultural Support(Noronha, 2002)

1. Our national culture promotes honor and dignity (Noronha, 2003)
2. We experience harmony and piece in our nation (Noronha, 2003)
3. We have international harmony and integrity (Noronha, 2003)
4. Our cultural values encourage interdependence, support and affiliation (Noronha, 2003)
5. People are oriented to respect authority (Noronha, 2003)

Quality Performance

Service Quality (Curkovic et al., 2000)

1. Our services are reliable (Curkvoic et al., 2000; Su et al., 2008)
2. Our services conform to the specifications that we offer for that service (Ahire et al., 1996, Curkvoic et al., 2000)

Service Design (Curkovic et al., 2000)

1. Our services perform as per their intended use (Ahire et al., 1996; Curkvoic et al., 2000).
2. Our service features are up-dated and attractive (Garvin, 1987; Curkvoic et al., 2000).

Perceived Quality (Arumugam et al., 2008; Curkovic et al., 2000)

1. The quality of our services is superior as compared to the competitors (Flynn et al., 1995; Arumugam et al., 2008).
2. In general, our company's level of quality performance has been high as compared to the industry norms (Arumugam et al., 2008).
3. Our customers have been well satisfied with the quality of our services (Arumugam et al., 2008).
4. Our customer relations are superior as compared to the competitors (Flynn et al., 1995; Arumugam et al., 2008).

Serviceability (Curkovic et al., 2000)

1. We immediately solve our customer complaints/issues (Garvin, 1987, Curkvoic et al., 2000).
2. We are courteous in provision of customer services (Garvin, 1987, Churkvoic et al., 2000).
3. We are responsive in identifying potential customer needs (Churkvoic et al., 2000).

Innovation Performance

Product Innovation (Prajogo & Sohal, 2003)

1. The level of newness (novelty) of our new features/packages is high (Prajogo and Sohal, 2003).

2. We use latest technological innovations in new product/services development (Prajogo and Sohal, 2003).
3. Our speed of new product/service development is fast (Prajogo and Sohal, 2003).
4. There are wide number of new services that we introduce to the market (Prajogo and Sohal, 2003).
5. There are a number of new services that we introduce first in the market (Prajogo and Sohal, 2003).

Process innovation (Prajogo & Sohal, 2003)

1. We have technological competitiveness in our processes (Prajogo and Sohal, 2003).
2. The up-datedness or novelty of technology used in our processes is high (Prajogo and Sohal, 2003).
3. The speed of adoption of the latest technological innovations in our processes is fast (Prajogo and Sohal, 2003).
4. We have a high rate of change in our processes, techniques and technology (Prajogo and Sohal, 2003).

Innovation and Continuous Improvement (Sila & Ebrahimpour, 2005)

1. We emphasize the continuous improvement of quality in all aspects of work (NIST, 2002).
2. We observe continuous improvement in our job performance (Jung et al., 2009).

Organizational Performance

Human Resource Results (Sila & Ebrahimpour, 2005)

1. Employee turnover rate is low (Adam et al., 1997).
2. Low employee absenteeism (Mc Adam and Bannister, 2001).
3. High Employee job performance (NIST, 2002).

Financial Performance (Demirbag et al., 2006)

1. Revenue growth over the last three years (Demirbag et al., 2006).
2. Net profits (Hendricks and Singhal, 1997; Das et al., 2000).
3. Profit to revenue ratio (Demirbag et al., 2006).
4. Return on total assets (Sankar, 1995, Demirbag et al., 2006).

Non-financial Performance (Demirbag et al., 2006)

1. Capacity to develop a unique competitive profile (Kim et al., 2002).
2. New product/service development (Demirbag et al., 2006).
3. Productivity (NIST, 2002).
4. Market development (Demirbag et al., 2006).

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10/5/2012