# Measuring the Impact of TQM Practices on the Organizational Performance: Mediation and Moderation Effects

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**Abstract:** Total Quality Management (TQM) is a unified organizational setting to improve the quality at every function and level of organisation. 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 and business objectives. A conceptual framework model to investigate the said impact 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. Moreover, culture of support has a moderating role in the relationship between TQM practices and the OP.

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**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. TQM emerged from Japanese companies and later it was adopted by the European, US and Asia-Pacific once. 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 applicable to both the manufacturing and service industries (Huq & Stolen, 1998), Similarly Prajogo (2005) also confirmed that there is no significant difference in the relationship of most TQM practices and QP between the manufacturing and service industry. This implies that TQM is generic improvement initiative program and the elements that are being implemented in the manufacturing sector can be taken into account for finding out the relationship between the TQM and OP in the service industry.

TQM has a significant and positive impact on the business performance (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, supplier management, process management, customer

focus, training, employee relation, service design 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 implementation of TQM has a significant and positive impact on the operational as well as on the OP. Moreover, Deming (1986), Joiner (2007) and Powell (1995) also found that there is a strong positive relation between TQM practices and organizational performance. 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 indirect effect of the CSFs of TQM on the financial performance (being mediated by the non-financial performance) has a strong impact as compared to the direct impact of the CSFs of TQM on the 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 if an organization is to remain competitive in the market then it must fully satisfy its customer wants and these wants must be met at the lowest possible operating cost. Sila and Ebrahimpour (2005) in their study on TQM and business results based on US manufacturing companies and using SEM found that the process management in TQM has a significant impact on the business results, 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, the study of Prajogo and Sohal (2003) revealed that the TQM practices positively contribute in IP (product and process) of Australian manufacturing and non-manufacturing organizations. More recently, Hung et al. (2011) in their research on high-tech industry of Taiwanese companies noted that TQM has a significant and positive impact on the innovation performance. However, organizational learning positively mediates the said relationship. 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 performance 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 conceptual framework is developed to evaluate the relationship among the TQM, QP, IP and OP for telecom sector of Pakistan.

### 2.1 Research framework

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), |

The conceptual framework of this research has been adapted and refined from the research 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 their respective indicators.

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

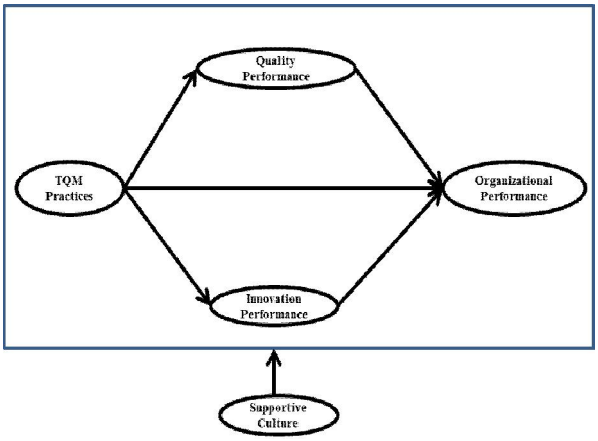


Figure 1: Research framework

### 2.2 Research Hypothesis

Reviewing the literature, it's quite evident that TQM significantly impacts the business performance of both manufacturing and service industries. 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 hypothesis are;

**$H_2$.** TQM practices leads to a better QP.

**$H_3$.** TQM practices leads to a better IP.

The direct relationship of Innovation on OP has also been tested by Huang and Liu (2005) Lin and Chen (2007) and found a significant positive impact on the OP (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 measuring 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 first version of the instrument was tested for the content validity through interviews with the senior managers of quality assurance department (QAD) and project managers of the telecom firms. On the basis of their review, the instrument was edited, items were added and deleted from the questionnaire. The questionnaire was then reviewed by the three academic scholars and modified further 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 modifications the questionnaire was subjected for pilot testing. For examining the reliability, sample from 15 respondents was collected (Three from each major telecom firm i.e. Ufone, Mobilink, Telenor, Warid and Zong). Cronbach's alpha was calculated to analyze the reliability of the constructs. Alpha values of 0.70 or greater are considered to be good indicators of the reliability. The cronbach's alpha for the five constructs ranged from 0.76 to 0.94, suggesting good reliability. A total of seventy nine items are 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$ FDI and generating revenue at an average of more than 300 billion rupees annually.

Table 2: A Profile of the Respondents.

| 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 | 16.0 |
| Middle | 98 | 46.2 |
| Lower | 80 | 37.7 |
| **Employment status** | | |
| Permanent | 142 | 67.0 |
| Contract | 70 | 33.0 |

Moreover, this sector is benefiting Government by contributing in GDP and society by providing employment and reliable communication services. Telecom sector of Pakistan and its allied sub-contractors were selected for this study. Five CMOs naming Ufone, Mobilink, Telenor, Warid and Zong, and 22 sub-contractors were randomly selected for the purpose of data collection. The instrument was sent to a total of 350 employees and different stake holders of telecom sector. Out of the 350 questionnaires, a total of 233 were returned with a response rate of 66.5% and 21 were not usable due to missing data and therefore were excluded from the analysis. Hence, the sample of the study 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 there is no significant difference between 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 check for 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 were subjected to the validity and reliability tests before they were used for the SEM analysis. Validity was tested in four steps: unidimensionality and reliability, convergent validity, discriminant validity and criterion-related validity (Sila & Ebrahimpour, 2005).

#### 4.2.1 Unidimensionality and Reliability

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

Unidimensionality in this study was measured through Confrimatory Factory Analysis (CFA) and Comparative Fit Index (CFI). Significant factor loadings in the form of standardized regression weights that are good indicators of CFA (Demirbag et al., 2006) were calculated 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 greater than 0.90 for a construct indicates an acceptable 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 model with the null model with the assumption that there are no relationships among the measures. These values range from 0.973 to 1, indicating considerably good fit to the data.

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 | | 1.000 | | 0.779 |
| | Pdl | | 0.728 | |
| | Prl | | 0.652 | |
| | ICI | | 0.831 | |
| OP | | 1.000 | | 0.832 |
| | HRR | | 0.678 | |
| | FP | | 0.855 | |
| | NFP | | 0.842 | |
| CS | | 1.000 | | 0.877 |
| | CS | | 0.835 | |
| | OS | | 0.948 | |
| | NCS | | 0.741 | |

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 exceeds the threshold of 0.70 (Hair, Black, Babin, Anderson, & Tatham, 2005), thus indicating good internal-consistency and reliability.

#### 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 different latent constructs and their respective indicators are unique enough to be distinguished from other constructs and their indicators (Hatcher, 1994). Discriminant 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 and discriminant validity of the multi-item construct. The results of the 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

Criterion-related validity entails the correlation between the predictor variables of a survey instrument and a relevant criterion variable (Büttner, 1997). In this study, the three latent predictor variables of the model as reported in Table 1 have the criterion-related 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.

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 0.01 level (2-tailed).

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

### 4.3 Assessment of Model Fit

The hypothesized model was tested using Amos 16 for analyzing the relationships among the latent variables.

Six model fit indexes ($x^2$/df, GFI, AGFI, NFI, CFI and RMSEA), commonly used in the literature were employed to test the model fitness (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 greater than or equal to 0.9, AGFI greater than 0.8, and RMSEA less than or equal to 0.08 are considered to be the indicators of a good fit (Jackson et al., 2005; Teo & Khine, 2009). As shown in Table 6, all goodness-of-fit indices are in the acceptable range.

Table 6: Summary statistics of the model fitness indexes

| 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.

### 4.4 Hypothesis Testing

The model was tested by using the data obtained from 212 respondents. Hypothesis testing was performed through SEM path analysis. Figure 2 shows the results of standardized regression weights of these paths and the loadings of the indicators on their latent variables. $H_1$ postulated that TQM positively influences organizational performance. The standardized path coefficient estimate from TQM to organizational performance is statistically significant at five percent level of significance 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 relationship between TQM and organizational performance (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.

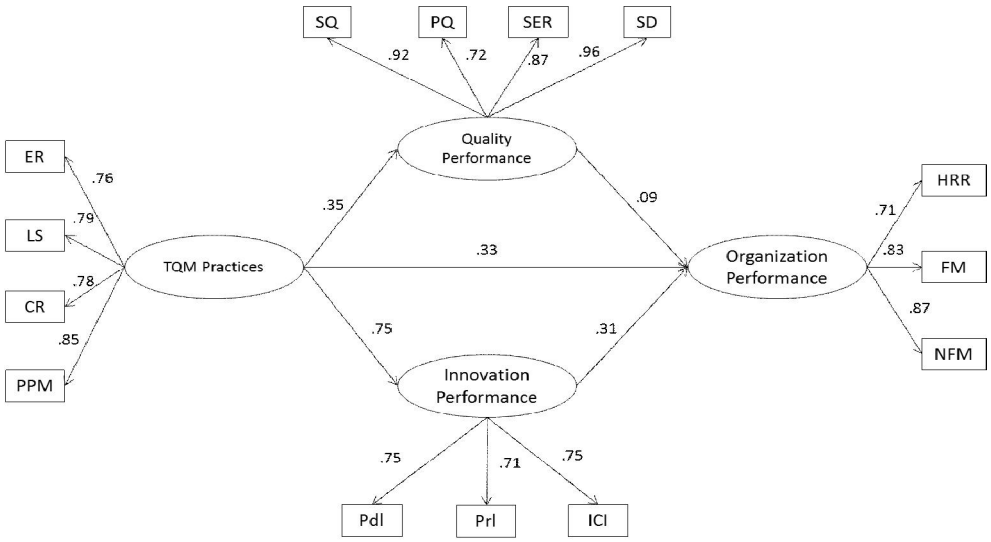


Figure 2: Results of structural model

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

All of the findings of this study are consistent with the literature. A brief literature support of the findings is listed in Table 8. The SEM analysis shows that the TQM practices positively influences 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 the IP of the organization as compared to the QP. This also confirms the classical literature of quality management and its impact on innovation and continuous improvement (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 exhibits strong significant positive association with the OP showing the importance and contribution of innovation in the OP. Moreover, the highest factor loading of product innovation in the construct of IP implies that bringing innovation in products in the form of new features and services significantly accounts for the IP, which eventually explains the OP of telecom firms and their allied sub-contractors. 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.

Table 8: Literature support of the findings

| Hypothesis and Literature Support | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Findings | $H_1$ | $H_2$ | $H_3$ | $H_4$ | $H_5$ | $H_6$ | $H_7$ | $H_8$ |
| Present study | Supported | Supported | Supported | Not Supported | Supported | Not Supported | Supported | Supported |
| Salaheldin (2009) | Supported | | | | | | | |
| Arumugam *et al.*(2008) | | Supported | | | | | | |
| Lorente *et al.*(1999) | | | Supported | | | | | |
| Arawati (2005) | | | | Not Supported | | | | |
| Pinho, 2008 | | | | | Supported | | | |
| Su et al. (2008) | | | | | | Supported | | |
| Su *et al.* (2008) | | | | | | | Supported | |
| Joiner, 2007 | | | | | | | | Supported |

**5.1 Implications and Contribution to the Research**

The investigation of this study arises many 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 according to the scope and significance of the study 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 is the development of a research instrument; validated by the experts, comprehensively covers the concepts and implications and is statistically supported for reliability and validity. The findings show that the implementation and practice of TQM philosophy improves the quality performance, innovation performance and the organizational performance. Therefore the practice of TQM philosophy should be promoted in the organizational settings of the Telecom sector.

Innovation performance can alone positively influence the organizational performance. This leads to the managerial implication of brining innovation and newness in the products/services and processes that can eventually result in the improved organizational performance. The improvement in the product itself is not sufficient for progress in 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 acknowledge several limitations herein. First, the present study is limited to the telecom sector of Pakistan and therefore cannot be generalized on the other sectors. More meaningful conclusions could

have been derived from the study by the comparison of different industries such as banking, Health care, manufacturing, etc. 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 survey data was cross-sectional, though the causal relationships have been derived from the data, but the longitudinal research would be required to test the strength of causality.

**5.3 Future research prospects and conclusion**

The model as proposed by the present study has not been tested for its validity and significance in different sectors, which can be the area of future research. The study can be enhanced by targeting different geographical regions and by increasing the same size to improve the generalizability of the study. Further research can be conducted to find out what other contextual factors can play a moderating role in the relationship of the TQM practices and the organizational performance. This study concludes that the TQM, practices in the form of 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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