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The Relationship between Quality Culture and Core Practices of Quality Management System and their Direct and Indirect Effects on Organizational Performance

Abstract

This research work empirically assesses the relationship between the Quality Culture (QC) practices and core practices of Quality Management System (QMS) and investigates their direct and indirect influences on organizational performance. Data for this research work is collected from 80 Technical Services Organizations of Pakistan through mail survey and the proposed framework and hypotheses have been examined through Structural Equation Modelling. The results of hypotheses show that synergies among QC-Practices have a positive impact on QMS-Core practices as well as organizational performance. Moreover, QMS-Core practices mediate the relationship between QC-Practices and organizational performance. This empirically validated model can be used as a benchmark by future researchers for further examinations in other industries sectors, especially in manufacturing.

Key Words: Quality Culture, Quality Management Core Practices, Organizational Performance

Introduction

The gradual advancement of QMS and its significant impacts on the firm's performance has gained extensive interest from researchers as well as industry over the last few decades. Inspired by the business excellence achieved by firms like Toyota and various other quality-oriented organizations all over the globe, an increasing number of firms have implemented QMS methodology to enhance product quality, cost-effectiveness, timeliness and customer satisfaction. However, despite QMS in place, several organizations failed to attain enhanced performance through QMS. Operations management (OM) experts and researchers have discussed numerous causes of this failure: (1) intricacy of QMS adoption (Rehmani et al.; [Sohail & Akhtar, 2020](#)) (2) presence of exigency elements restraining its positive effect (Abreu-Ledón et al., 2018), keeping the prime emphasis on QM hard-core elements without taking into account the aspect of QC and its nature of the relationship with QM Core Practices ([Abbas, 2020](#)) (3) negligence towards Human Capital factor. Jimoh et al. (2018) argue that it is imperative for an organization to foster a strong Quality Culture (QC) with a perfect horizontal and vertical fit with QM core practices, to remain alive and effective in competition with other organizations. Two critical aspects have been focused in this research work for a successful QMS implementation: (1) to examine the significance of QC and its link with QM Core practices (2) to analytically examine the direct and/or indirect impacts of "QC" and "QM core practices" constructs on organizational outcomes. There are several compelling reasons to focus on this particular area of research: (1) various theoretical and analytical frameworks of QMS have been developed to examine inter-relationships within QMS construct and their potential link with organizational performance. However, in most of these studies, QMS is usually been studied as a single/multidimensional construct (Rehmani et.al, 2020). Moreover, these studies remained confined to the study of relationship *within* the QMS individual practices, and/or their link with organizational outcomes e.g. [Kaynak \(2003\)](#) (2) in QMS literature, a scarcity of research is observed focusing the relationship between QC and QM Core Practices (3) measurement studies

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involved in the examination of direct and/or indirect relationship of QC and QM Core Practices with organizational effectiveness fail to address following queries.

- What is the nature of the relationship between QC and QM Core Practices?
- Whether QC and QM Core Practices are mutually exclusive or supportive?
- Are QC and QM Core Practices antecedent to organizational performance?

The current study is aimed to empirically examine the link between QC and QM Core Practices and their potential impact on organizational outcomes. The rest of the study is structured as follows. An inclusive literature review is done in section-2. Section-3 presents the theoretical framework and proposed research model with related hypotheses of the study. Section-4 is related to the methodology used in this research including, data collection, construction of survey questionnaire along the reliability/validity testing. In section-5, the outcomes of the structural model are discussed. Lastly, section 6, encompasses the implications, major findings and limitations. Section-7 makes the conclusion.

Theoretical Background

QMS is one of the leading management paradigms comprising of several synergistic configurations, assisted through numerous methodologies and procedures to acquire and withstand improved organizational performance ([Flynn et al., 1994](#)). Multiple definitions of QMS are present with the following commonalities: (1) the completion of tasks in line with the specific customer requirements (2) absence of faults and (3) superior organisational performance ([Abbas, 2020](#)). Numerous practices related to QMS have been recognized and empirically tested in a number of measurement studies; however, enormous variation can be seen in the analytical frameworks of QMS established to investigate the link between QMS and firm performance. Some researchers like [Sila \(2018\)](#) also investigated the role of QC in QMS and argued that a strong QC increases the acknowledgment of quality thinking throughout the firm. Likewise, the absence of QC creates impediments in problem-solving and consequently obstructs the firm's outcomes (Shafiq et al., 2017). However, these studies are either fragmented or have substantial shortcomings. First, these studies are generally confined to a limited QC scope, QMS elements, and firm's outcomes. Whereas, the role of QC in the successful implementation of QMS requires an inclusive assessment of the scenario representing a complete model including all critical elements of QC, QM Core Practices, and organizational performance. Previous studies while providing a comprehensive analysis have mostly relied upon the case histories about Toyota, without establishing comprehensive QC models (Thou, 2016). More recently, researchers like [Abbas, \(2020\)](#), [Jimoh et al. \(2018\)](#), [Sila, \(2018\)](#), [Shafiq et al. \(2017\)](#), and [O'Neill et al. \(2016\)](#) have used QMS as a '*Multidimensional Second Order Construct*' to examine its link with OP, while few others like [Busu, \(2019\)](#), [Obeidat et al., \(2018\)](#) and [Thou \(2016\)](#) have tested the impact of quality management on organizational effectiveness using a '*First Order Construct*' consisting various factors representing groups of QM practices. However, the majority of these studies have failed to investigate the QMS construct at multiple levels of abstraction with its potential longitudinal link with QC.

Development of Theoretical Framework and Research Constructs

Based on the literature, we have proposed a theoretical framework and hypothesize that the organizational performance of TSO can significantly be improved through the application of the proposed QMS framework as shown in Fig. 1 (on the Next Page)

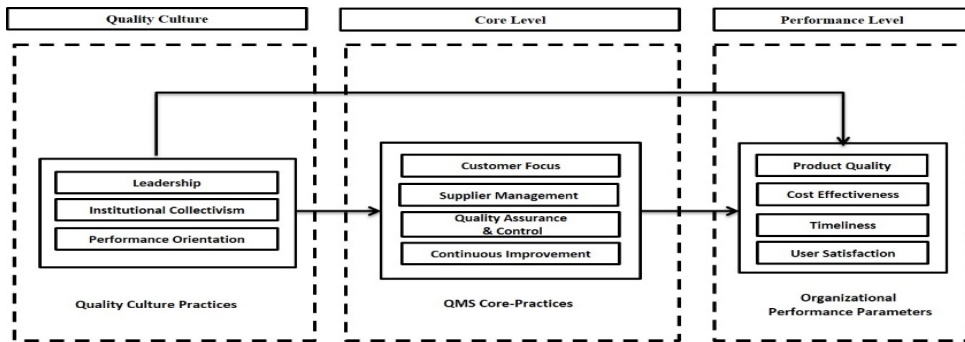


Figure 1: Theoretical Framework

Quality Culture

Three strategic practices, considered as a pivotal force for the successful execution of QMS core practices are scrutinised as QC-Practices in this study.

Leadership

Strongly acknowledged by experts like [Deming \(1986\)](#), [Juran \(1986\)](#) and numerous measurement studies, leadership is surely the fundamental element in a successful QMS application because it improves organizational outcomes by driving core QMS elements (Ahire & O’Shaughnessy, 1998). It is the leadership that is directly responsible to develop a clear organizational mission, policies, and objectives to attain coherence, cooperation, and collaboration among the human capital that results in nurturing a QC within the firms ([Ali & Shafiq, 2019](#)). In any organization, an effective and permanent change can only be achieved through extensive efforts by top leadership, developing a conducive working atmosphere where employees are encouraged to perform well and have reasonable prospects to freely present their ideas which can enhance the effectiveness of the firm.

Institutional Collectivism (IC)

Organising the institutions into work teams and enhancing the outcomes through collective efforts is one of the prime objectives of QMS’s doctrines. Cultivating a culture of coordination and trust within an organization is hard to achieve through orthodox hierarchical setups. Organizations have to adopt different schemes with a higher degree of simultaneous adaptation. Thou (2016) argued that all those firms which are in constant pursuit of improving teamwork methodology must consider applying a synergetic and congruent partnership across all levels of the workforce.

Performance Orientation (PO)

High PO organizations are focused on goal-directed behaviour where employees are rewarded for their contribution towards organizational performance, while low PO organizations being less incentive-focused do not reward the workforce for obtaining improved results ([Obeidat et al., 2018](#)). Jimoh et al. (2018) gave emphasised Toyota’s methodology to fix organizational goals before initiation of upgrading projects. Such that, the effort of employees working as a team is anticipated to congregate to a shared objective, restraining disparities and enhancing the effectiveness of collective work.

Based on the reviewed literature related to QC, subsequent hypotheses are offered.

- H1.** QC-Practices are positively (significantly) linked with organizational performance.
- H2.** QC-Practices are positively (significantly) linked with QMS- Core Practices.

QMS-Core Practices

QMS-Core practices investigated in the current study are Customer Focus, Supplier Management, Quality Assurance and Control and Continuous Improvement.

Customer Focus (CF)

is linked with the extent of efforts by an organization to evaluate the present and upcoming requirements of its customer. Likewise, CF is directed towards forming of better customer relations and frequent assessment of customer satisfaction index (Flynn et al., 1994). CF organizations are always prepared to adjust and improve their processes as per the feedback of their customers to achieve enhanced outcomes. A positive link between CF and the firm's outcomes is established in various studies (Lee et al., 2003)

Supplier Management (SM)

Various measurement studies have documented the strategic significance of the combination of internal processes and external suppliers. Such integrations have often led to improved performance, needed to remain effective in a competitive environment. Quality has to be ensured at all levels until completion of the task. The first requirement of effective supplier management is the procurement of quality parts (Busu, 2019). Better relationship with suppliers improves the level of trust and enhances quality performance.

Quality Assurance and Control (QA&C)

An independent and well-knitted QA&C department is an essential requirement of every organization to ensure product quality, timeliness and improved outcome. For the QA&C department to be effective is required to have direct access to top leadership and a strong coordination/working relationship with other departments (Busu, 2019). Divulging quality ideas in the QA&C team and encouraging them to learn the use of multiple quality techniques, enables the respective staff to comprehend and resolve quality issues which resultantly improves the product's quality (Tari et al., 2007).

Continuous Improvement (CI)

It is to probe boundless improvement areas and device superior practices to ensure improved organizational outcomes. An organization must improve its work processes and consistently seek better methodologies to safeguard communal efforts towards a common quality objective (Flynn et al., 1994). Better efficiency and high-quality products can only be achieved through decreased variations, minimum rework load, fewer errors and depletion of materials (Thou, 2016).

Accordingly, the following hypotheses are offered.

H3. *QMS-Core Practices are positively (significantly) linked with organizational performance.*

H4. *The positive relation between QC-Practices and organizational performance is mediated by QMS-Core Practices.*

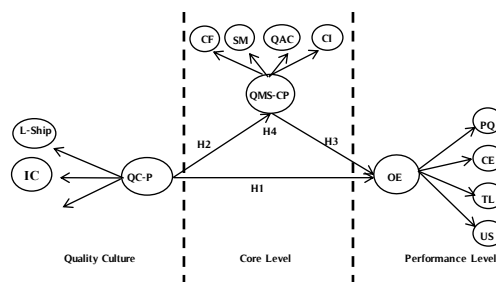


Figure 2: Structural model and respective hypotheses

Research Methodology

Measurement Instrument and Sample

Our target population was 400 from 80 Engineering Organizations of Pakistan. Five questionnaires were served to each organization, however, we received a total of 240 valid responses (response rate: 60%) and 36 responses with incomplete data were excluded.

The questionnaire constitutes reliable and valid measures which have already been developed, however, some partial modifications were carried out without changing their basic essence. The aptness of the survey instrument was then assessed by five top-level TSOs specialists. Their feedback was incorporated into the instrument accordingly. Finally, the questionnaire was evaluated by four senior academic authorities (PhDs), and six PhD scholars. Common Method Variance (CMV) check is done through CFA using AMOS-20 with a Common Latent Factor (CLF). Results confirm the absence of CMB.

Reliability Analysis and Construct Validity results

Each scale is tested for Construct Reliability (CR) by assessing the value of Cronbach's " α " ([Cronbach, 1951](#)). After the elimination of one item about 'Leadership' and one item from 'Supplier Management' with low " α " values, all remaining items fall within the acceptable limits i.e. $\alpha \geq 0.70$ ([Nunnally and Bernstein, 1994](#)). The *uni-dimensionality* of studied factors has been established through Exploratory Factor Analysis (EFA) using "Principal Component Extraction with a varimax rotation. (See Table-2). The EFA results indicate that all the communalities' values are above 0.7 as recommended by. Moreover, the Eigen value of all the factors is greater than "1" (minimum 1.23 to maximum 11.45) whereas the factor loadings values fall within the range of 0.71 to 0.95. CFA using AMOS-20 with the Maximum Likelihood (ML) Approach is carried out for all 1- order constructs to further refine the resulting scale and to assess the convergent/discriminant validity. The fit statistics of the model are, (χ^2/df) = 1.631, (CFI) = 0.973, (PNFI) = 0.812, (PGFI)= 0.700, (RMSEA) = 0.051, (RMR)=.027. (See Table-3)

Quality Culture Practices (QC-P) and Quality Management System-Core Practices (QMS-CP) are operationalized as 2- order constructs/factors. Initially, eight composite measures also known as "summated scales" are formed through the combination of various separate items on their respective composite measure. Out of these eight, three composite measures/first-order constructs; *Leadership (L-Ship)*, *Institutional Collectivism (IC)* and *Performance Orientation (PO)* are summated as Quality Culture-Practices (QC-P). Similarly, four composite measures/first order constructs; *Customer Focus (CF)*, *Supplier Management (SM)*, *Quality Assurance and Control (QAC)* and *Continuous Improvement (CI)* are summated as QMS-Core Practices (QMS-CP).

Whereas Organizational Performance (OP) remains as first order construct with four distinct items: *Product Quality (PQ)*, *Cost Effectiveness (CE)*, *Timeliness (TL)* and *User Satisfaction (US)*.

Table 2. EFA Results

	1	2	3	4	5	6	7	8
TMC1	.900	.072	.187	.053	.080	.132	.126	.186
TMC2	.924	.057	.151	.053	.108	.115	.124	.183
TMC3	.910	.074	.191	.039	.108	.118	.141	.199
TMC4	.878	.078	.215	.059	.112	.157	.106	.171
SVP1	.210	.075	.281	.011	.076	.003	.114	.872
SVP2	.240	.033	.269	.025	.021	-.010	.092	.894
SVP3	.289	.056	.272	.015	.032	.004	.158	.832
QCU1	.224	.084	.855	.069	.126	.064	.103	.248
QCU2	.182	.090	.894	.077	.106	.056	.097	.182
QCU3	.181	.057	.884	.071	.064	.073	.198	.181

QCU4	.147	.055	.899	.100	.057	.059	.115	.201
PM1	.038	.197	.068	.887	.195	.162	.122	.012
PM2	.057	.228	.070	.901	.166	.183	.126	.005
PM3	.051	.238	.114	.893	.186	.184	.110	-.012
PM4	.059	.231	.078	.827	.222	.204	.091	.062
CF1	.045	.871	.064	.259	.185	.183	.080	.058
CF2	.051	.917	.075	.232	.163	.138	.038	.008
CF3	.102	.882	.066	.190	.197	.208	.060	.026
CF4	.094	.843	.096	.217	.212	.271	.046	.104
QAC1	.147	.189	.016	.210	.232	.839	.139	-.019
QAC2	.120	.159	.042	.175	.235	.851	.084	.020
QAC3	.148	.199	.116	.180	.112	.872	.101	.002
QAC4	.115	.229	.079	.165	.210	.842	.089	.005
CI1	.109	.216	.089	.187	.874	.200	.136	.054
CI2	.109	.212	.100	.199	.880	.210	.138	.053
CI3	.100	.151	.123	.216	.855	.200	.119	-.012
CI4	.109	.194	.062	.185	.878	.194	.137	.063
PQ	.071	.086	.045	.083	.078	.095	.834	.083
CE	.134	.007	.079	.089	.116	.148	.807	.071
TL	.097	.034	.168	.114	.153	.055	.788	.112
US	.119	.058	.155	.082	.077	.039	.846	.052

Table 3. Convergent/Discriminant validity and CR results (1-Order Constructs)

9	CR	AVE	MSV	OP	L-Ship	IC	CF	SM	CI	QA C	PO
Criteria	> 0.7	> 0.5	MSV < AVE	$\sqrt{AVE} > \gamma$							
OP	0.876	0.639	0.135	0.800							
L-Ship	0.977	0.913	0.250	0.343	0.956						
IC	0.953	0.835	0.283	0.368	0.432	0.914					
CF	0.969	0.888	0.279	0.209	0.224	0.213	0.942				
SM	0.966	0.878	0.279	0.308	0.189	0.227	0.528	0.937			
CI	0.970	0.889	0.274	0.354	0.305	0.257	0.493	0.481	0.943		
QAC	0.949	0.823	0.274	0.305	0.337	0.221	0.499	0.479	0.523	0.907	
PO	0.950	0.864	0.283	0.294	0.500	0.532	0.145	0.095	0.169	0.091	0.929

· Hair et al. (2010) · Bagozziet al. (1991)
 γ = Inter construct correlation (SQRT-AVE)
 Square Root of Average Variance Extracted is on the diagonal

Finally, the second-order constructs are also assessed for reliability as well as convergence/discriminant validity. It can be seen that 1- order constructs clearly converge on pertinent 2- order constructs. All the observed values are above the threshold criteria. Table-4 below illustrates the results of the convergent and discriminant values.

Table 4. Convergent/Discriminant Validity and CR results (2- Order Constructs)

Construct	CR	AVE	MSV	QC-P	QMS-CP
Criteria	> 0.7	> 0.5	MSV < AVE	$\sqrt{AVE} > \gamma$	
QC-P	0.753	0.504	0.208	0.710	

QMS-CP	0.800	0.500	0.179	0.423	0.707
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γ = Inter construct correlation, (SQRT-AVE) Square Root of Average Variance Extracted is on the diagonal

Structural Model results

Test values about our structural model are shown in Table-5. Outcomes of structural model (goodness-of-fit indices) are consistent with the recommended values of fit indices and indicate a good model fit.

Table 5. Global model fit Results

Direct Effects in the model								
	Hypotheses		Standardized parameter estimates		Outcome			
			Estimate	C.R				
QC-P	→	OP	H1	0.189**	2.221	Accepted		
QC-P	→	QMS-CP	H2	0.412***	4.315	Accepted		
QMS-CP	→	OP	H3	0.179**	2.421	Accepted		
Indirect Effect§ in the model								
QC-P	→	QMS-CP	→	OP	H4	0.092**	1.542	Accepted (Partial mediation)
*** $P < 0.01$, ** $P < 0.05$								
§ For indirect link in the model: Bootstrap samples- 2000; Bias corrected Confidence Interval (CI)- 95%								
Goodness-of-fit Statistics		Observed Values		Model fit Criteria				
χ^2/df		684.481/ 422 =1.622		< 3.00				
CFI		0.972		> 0.95				
PNFI		0.845		> 0.5				
PGFI		0.727		> 0.5				
RMR		0.042		< 0.05				
RMSEA		0.051		< 0.08				
CAIC (Default model)		1164.048		<Saturated model and independence model				
CAIC (Saturated model)		3214.397						
CAIC (Independence model)		10192.363						
Bollen (1989), Jaccard and Wan (1996) Mulaik et al. (1989) Byrne (1998, 2010)								

Table 6. Hypotheses Test Outcomes

Results of our complete SEM are illustrated in Table-6 below.

Results Discussion and Implication

It is quite evident from the outcomes of this study that Quality Culture practices act as a motive power and stimulus to core QMS practices and consequently both of these constructs influence organizational performance significantly. The finding of a positive link between QC and OP established as (H1) is in line with the outcomes of some other studies like Ahire and O’Shaughnessy (1998), [Curkovic \(2000\)](#), Sadikoglu and Zehir (2010) etc. Fulfilment of organizational objectives and achievement of sustainable success is primarily dependent upon the quality culture from the highest to the lowest level of organization established through dynamic leadership and teamwork. The outcome of the hypothesis (H2) shows that collaborations and congruence among QC-Practices influence QMS-Core Practices in a significant way. As argued by Ahire and O’Shaughnessy (1998) and Rehmani et al. (2020), Quality Culture is deeply rooted within QMS practices at multiple levels and drives its core components. (H3)

establishes a positive link between QMS-CP and OP. Some other studies, like Escrig-Tena et al. (2018) and [Abbas \(2019\)](#) have also revealed that synergetic relations within core practices are more likely to impacts organizational performance through various means. Finally, the finding of hypothesis (H4) supports a mediating effect of core QM elements, indicating that once QC-Practices are well in placed within an organization, it will surely boost the operational performance and the same impact will run through the core practices. Thus, it can be established that both these practices are *mutually supportive* of each other.

This empirically validated model is expected to be useful for researchers involved in the development of the integrated framework to explore the nature of QMS elements at multiple levels and applicable in different industries, especially manufacturing sectors.

Conclusion

This study contributes to organizational research in the following ways: (1) Based on the literature, a multilevel framework is established to explore the potential links and empirically establish the nature of relationships among QC practices, QMS-Coe practices and OP. (2) The notion of QC is explained and its significance within a QMS is established, based on empirical evidence and theoretical support. (3) The role of QMS-Core practices within QMS is redefined under the direct influence of QC.

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