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ORIGINAL ARTICLE

Effect of mediation using critical success factors in the TQM for organizational performance evaluation

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Abstract

The article examines the role and importance of the success factors which were critical to achieve TQM goal were as one of the main for effective TQM. The present study is to present mediation effect of TQM CSFs as a method that builds a new model of performance measurement in the various industrial spheres. Critical success factors (CSFs) mean of sustaining performance have great practical application, which stems from goal and the need for the organizational system, through the organizational authorities, to improve performance. Based on the Structural Equation Modeling (SEM), conclusions and summaries are made regarding the application of the TQM. In order to achieve the set aim, the author examines the legal framework of TQM performance, the application of CSFs mediation in TQM system.

1. Introduction

The changes in the dynamics of the organizational system in industries are increasingly evident creating a growing need to perform excellently. However, few researchers developed this type of work resorting to a solid theoretical and technical background like Barros, S. et al. (2014), Demirbag, M. et al. (2006), Holland & Light, 2003), Yusuf,Y. et al. (2007), G. Muruganantham et al. (2018), Wilson & Collier (2000), Santos et al. (2007). These needs led to the alignment of the goal, critical success factors and performance, in the organizational systems. This research aims to identify TQM CSFs which can establish a relationship between TQM goal and its performance by using SEM effective in organizational system that combine different but corresponding factors such as human resource management, top management commitment, process management, customer focus, supplier partnership, training and education, quality information, strategic quality planning, culture and communication benchmarking, innovation etc. After establishing the relation among the various TQM CSFs, it is important to reflect on the several factors that influence the effectiveness of TQM and what is its contribution to TQM performance. Total quality management (TQM) is a structured approach to overall organizational system. The focus of the process is to improve the quality of an organization's outputs, including goods and services, through continual improvement of internal practices. The standards set as part of the TQM approach can reflect both internal priorities and any industry standards currently in place. TQM is basically a strategy (towards continuous change), as well as an operationalized process, and can be also described as a holistic approach which seeks, through the improvement of quality, productivity and competitiveness (Pfau, 1989), to integrate all organizational functions and organizational objectives in a focus on meeting

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customer needs (Kumar et al., 2008). Total Quality Management (TQM) is an integrative management concept for continuously improving the quality of goods and services delivered through the participation of all levels and functions of the organization stated Tata et al. (1999).

The effective TQM improves the performance of companies in several areas such as eliminating product defects, enhancing attractiveness of product design, speeding service delivery, higher productivity and reducing cost. However, for an organization to be really effective, quality must span all functions, all people, all departments and all activities and be a common language for improvement. Above and all endorsed by Steven E. Brigham (1993) of reports survey by A. T. Kearney, TQM: A Business Process Perspective that TQM is an integrated management strategy that uses a collection of strategies to achieve corporate goals. Critical Success Factors (CSFs) are predictors of performance effectiveness of organizational system or subsystems. There has been widespread interest in association between system's goal and its performance in context of organization. In a combination of financial, non-financial and operational performance, the organization gets outcome such as effectiveness, efficiency, development. Performance measurement can facilitate the alignment of the goals of all individuals, teams, departments and processes with the strategic aims of the organization and incorporate the voice of the stakeholders in all planning and management activities, Oakland (2003). Performance of a company reflects to what degree the company accomplishes the corporate strategy and goals stated Öztayşi&Kutlu (2011). The General Accounting Office (GAO) study was one of the first studies trying to establish a link between TQM practices and the performance of companies, see GAO (1991). TQM is most effective when it is a central, planned component of an organization's forward drive, one that necessitates top-level leadership, is based on a strong commitment to customers, and stresses significant improvements in "core" processes.

The development of operational strategies in alignment to firm's competitive strategy can serve to improve and tailor the product offering for customers as well as improve the internal efficiency and effectiveness of manufacturing plants (Robson et al., 2013). Therefore, an operational strategy is a subset of a firm's competitive strategy, Sahoo, (2020). Matching the dots, it can anticipate that the TQM drivers and enablers (CSFs) will positively affect the overall performance of the organization through positively affecting TQM performance shown in the fig.1. The TQM CSFs will enable the organization to perform better for its targeted goal.

The study involves formulation of hypotheses related to CSFs of TQM and its performance. Hypotheses are tested using the information and responses gathered from the experts of FMCGs industry. The study intends to investigate the relation between TQM CSFs and its performance in the Indian FMCGs industry. The main construct outlines the effects of TQM CSFs in FMCGs industry. The latent variables of all constructs have reflective type of observed variables. The intent is to understand the association of effect of TQM CSFs with sub factors on performance of TQM. The measurements models of the constructs developed were tested for fitness of data for further modelling.

The critically examined factors which were responsible for success to achieve the intended goal is critical success factors of that system. Marais et al. (2017) states that CSFs are those aspects that must be well managed in order to achieve success. CSFs are combinations of activities and processes which are designed to support the achievement of the goals (Brotherton & Shaw, 1996, p. 114). Claver and Tari (2003) advocated that Critical factors of TQM allow to develop a scale for measuring TQM performance. Brotherton & Shaw (1996, p. 114) suggestion about CSFs is that they must be actionable, controllable by management to a variable extent, and potentially measurable. Walsh et al. (2002) emphasizes that a link existed between the source of the TQM initiative and driving force behind the TQM initiative in many organizations. Many organizations' TQM efforts originated in the quality department and also driven by the need for improved quality. Dixon et al. (1990) introduce two concepts, first, the link between strategies, actions and measures; and second, the acceptance of changing performance measures. Performance measurement provides the feedback required to control and improve actions, which are themselves taken as a result of decision taken on strategies the organization is to follow, stated Sinclair and Zairi (2000). Odiorne (1987) states that the things for which we can devise indicators can be managed and the things for which we have no indicator can be out of control before realizing it. Performance measures derived from organization strategy with the purpose to implement the strategy, evaluate business performance, provide feedback and ensure communication, help in creating learning environment and continuously improving the organization. Zairi (1994) identifies that performance measurement has been the systematic assignment of number of activities. He further suggested that the function of measurement is to develop a method for generating a class of information that will be useful in a wide variety of problems and situations. Wilson & Collier (2000) states that manufacturing system influence their performance variables through its mediating variables (leadership, information and analysis, strategic planning, human resource management, process management, business results and customer focus and satisfaction), but quality model, as he considered MBNQA model, directly influences company performance.

The performance solely depends on critical success factors is challengeable, for this some justification required, which need hypothesis development. The postulates were developed by the researchers for the estimation in this context which were under consideration for the study. The developed hypothesis needs further testing for whether that fits or unfits for the considered study, then acceptance or rejection of that hypothesis is decided. The testing of hypothesis is fundamental in statistics, and it could be considered as a "method" of making statistical decisions using experimental data.

The hypotheses are developed to test whether the TQM CSFs

are positively related with financial, non-financial and operational performance of TQM. The responses were gathered through the questionnaire developed, based on the theoretical background of hypothesis. The hypotheses developed are as follows.

H_1: Human Resource Management factors (a) employee involvement (b) empowerment (c)recognition and reward (d) teamwork are positively related with Performance of TQM

H_2: Top management commitment factors (a) Top management support(b) Executive commitment (c) Leadership are positively related with Performance of TQM

H_3: Process management factors (a) Tools and techniques (b) Continuous improvement (c)Process design are positively related with Performance of TQM

H_4: Customer focus/ Customer Centricity factors (a) Customer and market focus (b) Customer satisfaction (c)Customer relationship are positively related with Performance of TQM

H_5: Supplier partnership/ Supplier's management factors (a) Cooperation with suppliers (b)Supplier quality management (c) Supplier relationship are positively related with performance of TQM

H_6: Training and education factors (a) Learning (b) Knowledge and (c) Education & training are positively related with Performance of TQM

H_7: Quality Information/Information Quality factors (a) Quality data and reporting (b) Internal quality information usage are positively related with Performance of TQM

H_8: Strategic quality planning factors (a) Quality policy (b) Quality planning (c) Vision &Plan statement are positively related with Performance of TQM

H_9: Culture and communication factors (a) Trust (b) Cultural change are positively related with Performance of TQM

H_{10}: Benchmarking factor (a) Competitors is positively related with Performance of TQM

H_{11}: Social and environmental responsibility factors (a) Wider community (b) Quality citizenship are positively related with performance of TQM

H_{12}: Innovation factor (a) Product innovation is positively related with Performance of TQM

Thus, framed within the theoretical context of TQM system, the aim of the present study is to determine the extent to which TQM of organizational system, through both TQM goal and performance, influences organizational performance, and the role of TQM CSFs in this relationship. It was hypothesized that positive associations would be observed among variables of TQM system, connectedness to goal, CSFs, and performance. It was further predicted that TQM CSFs would mediate the relationship between TQM goal and performance (Fig. 2).

2. Conceptual Development and Research variables

Mediation analysis has become a prevalent method to identify causal pathway(s) between an independent variable and a dependent variable through intermediate variable(s). However, little work has been done when the intermediate variables (mediators) are high-dimensional cross-functional and the outcome is a survival endpoint. The present study attempts to (a) model a complex structure of TQM system and (b) Link the TQM CSFs with its performance for validly support the hypotheses of interest.

Questionnaire is designed for research purpose to conduct a survey and collect data for studying the effect of TQM CSFs on TQM performance by using AMOS 22. Most of the questions are adapted from peer reviewed works of Nguyen et al. (2016), Sadikoglu and Zehir (2010), Lakhal et al. (2006), Kaynak (2003), Saraph et al. (1989).

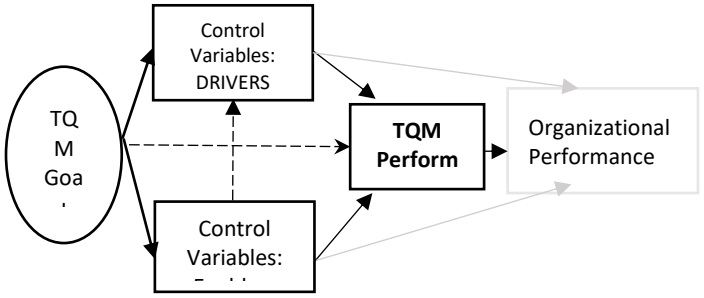

Figure 1: The basic usage of structural equation modelling (SEM) in path analysis with mediation.

The questionnaire sent to 500 quality experts, managers of quality departments of India based FMCGs industries to collect data from companies using TQM. A total of 395 respondents came back; of 395 responses, 30 responses are removed because of incomplete answers. As a consequence, the sample size of this research is 365, with the rate of response is 73%. Primary data (quantitative) was collected through a questionnaire comprising of structured questions and secondary data was collected from existing sources such as books, articles, journals, reports, and websites. Secondary data was found quick, easily accessible and inexpensive way of collecting data to better define the problem. Reliability analysis for the questionnaire as a whole, it is concluded that the questionnaire of the whole Cronbach's α value is 0.792, close to 0.8, so that the questionnaire has good reliability. In general, if the $\alpha > 0.9$, the questionnaire reliability is very good, if $0.8<\alpha< 0.9$, the questionnaire reliability is good, it is generally believed the questionnaire reliability is greater than 0.5 is reasonable. At the same time, the Cronbach's magnitude of each influencing factor is greater than 0.6, indicating that the reliability of each influencing factor is also better and credible.

The aim of this research is to develop links between different sets of variables. Through questionnaire data is collected on TQM performance in three Indian FMCGs industry. Responses are expressed in five-point Likert scale. We gathered data on TQM drivers and enablers, combined called critical success factors: (Human Resource Management (HRM); Top management commitment (TMC); Process management (PM); Customer focus and satisfaction (CFS); Supplier partnership (SP); Training and learning (TL);

Information/analysis/data (INF); Strategic quality planning (SQP); Culture and communication (CC); Benchmarking (BHM); Social and environmental responsibility (SER); Innovation (INV)). To conduct multiple regression analysis on each independent variable with all of the TQM CSFs, we applied SEM for the connection between e.g. HRM factors (employee involvement, employee empowerment, recognition & reward and teamwork) on TQM performance. So, after determining that TQM performance is affected by HRM factors, we use data from the questionnaire survey to interpret the reasons for such connection. Through SEM, we dabbling into canonical correlation among the variables (dependent/independent). Kenneth and Judea (2013) regarded SEM as an inference engine that takes in two inputs, qualitative causal assumptions and empirical data, and derives two logical consequences of these inputs: quantitative causal conclusions and statistical measures of fit for the implications of the assumptions.

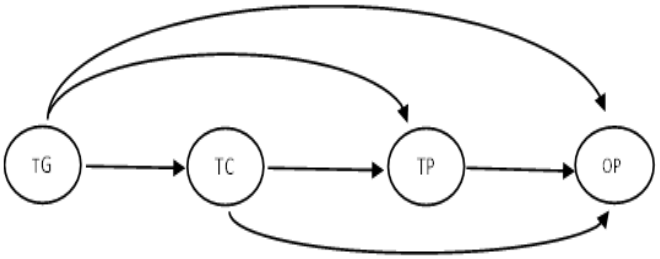

Figure 2: Relations between TQM Goal (TG), TQM CSFs (TC), TQM Performance (TP) and Organizational Performance (OP)

Graphically, one might picture the relations as in Fig.1. These three assumptions-relation between TC-OP, TP-OP, and TC-TP confounding—essentially amount to controlling for the variables TQM Goal in Fig. 1, corresponding with TC-OP variables, TP-OP variables, and TC-TP variables, respectively. In practice, some of the covariates may affect all the TG, TC and TP, and the covariates may also affect each other. None of this is problematic and the covariate groups TGs need not be distinguished from one another. What is important is that the covariates included in the regression models above suffice to control for TC-OP, TP-OP, and TC-TP confounding.

We adopt Structural Equation Modeling (SEM) procedure to test the relationships between TQM CSFs (Dependent and Independent variables) and TQM performance (unobserved) variables when testing high-dimensional mediation hypotheses. Amos, a structural equation modeling (SEM) software is used to accomplish this part of work. SEM can quickly create models to test hypotheses and confirm relationships among observed and latent variables--moving beyond regression to gain additional insight. This method is preferred by the researcher because it estimates the multiple and interrelated dependence in a single analysis. Every post-hoc analysis in CFA is guided not only with a statistical argument but also with conceptual appropriateness. After all, the CFA is meant to test a hypothesized model that is based on established theory.

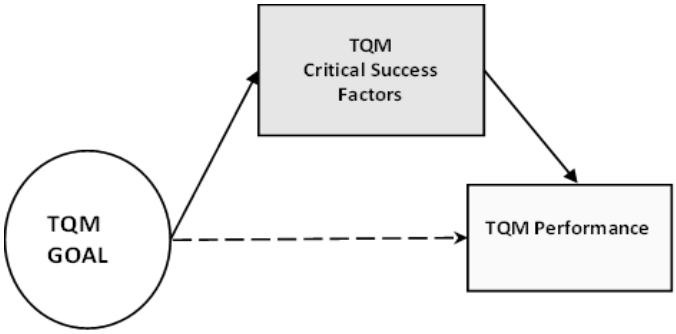

Figure 3: Proposed Research Model

There's much to be discussed and described about what factor analysis is and what structural equation modelling is, and what the relation between them. Factor analysis is a method (or, more accurate, class of methods) of reducing the observed data into more compact "constructs". This is the "official" or "mainstream" definition. There are various ways (methods) of reducing data, and factor analysis becomes a little complicated in this regard. Using SEM to understand a domain, if not even the causal relationships between different variables, many specific approaches have been developed but most of them involve much more stringent rules on the data generation, variability and observability of all relevant information than is usually the case anyway. In fact - the field of observational methods (i.e. SEM and other robust estimators) for estimating causal impact really do not care much about the interpretability of a model - because the causal interpretation is derived from the model predictions, not its structure. SEM is potentially one such methodology, as it allows for modelling complexities in behaviour (e.g., model loops, cross-lagged effects, autocorrelation structures, etc.), given adequate sample sizes. One of the strengths of SEM is its flexibility, which permits examination of complex associations, use of various types of data (e.g., categorical, dimensional, censored, count variables), and comparisons across alternative models. However, these features of SEM also make it difficult to develop generalized guidelines regarding sample size requirements (MacCallum et al. 1999). Considering the TQM system of the firm as a theoretical foundation, this study builds and tests an integrated model that comprises constructs related to TQM goal, TQM CSFs, and TQM performance. This study investigates: (1) whether TQM goal has a significant impact on organizational performance; and (2) whether TQM CSFs has a significant effect on TQM performance.

2.1 TQM Goal

Performance measurement determines the success of any system or rather, of any organization with respect to goal. Performance measurement is a process-focused approach that aligns the performance of critical processes to strategic goals by measuring and improving what is most important to an

organization. Measurement is all about the keep tracking and about establishing dimensions. Oakland (2003) suggests that if true measures of the effectiveness of TQM are to be obtained then the three components of TQM must be examined - the human, technical and business components. Effects of TQM can be monitored by evaluating various dimensions of performance with the help of critical success factors which decided on the basis of the TQM goal. CSFs of TQM can be transpired keeping in view the goal of TQM, but CSF of TQM implementation will be identified on the basis of organizational structure. It may be the text of the label or factors may appear same, but functionalities differ, because goal differs. As the goal of TQM is customer satisfaction, zero defect, waste elimination etc., in that manner now the quality manager will decide that what to do to achieve the goal, and what are the critical to success factors of TQM goal. As the activities accomplished by the employees to achieve TQM goal is important one so the human chain is important one of TQM system.

2.2 TQM CSFs

Total Quality Management (TQM) is a tame dynamic system Pirsig (1991) and its dynamism is governed and controlled by its key success factors or critical success factors (CSFs) which attributed as combination of their drivers and enablers. The drivers and enablers of TQM vary organization to organization as per the desired goal. The drivers are the constructs which will determine the performance level of the TQM and organization as well. The empirical drivers as like as Top-level management, employee involvement, supplier's management, customer focus, employee awareness, training and education, etc. and accordingly TQM drivers were enabled by enablers. The enablers are for reinforcing the system's drivers to be remain dynamic for continuous improvement. Enablers are considered to be variable which gives the ability to maintain consistency. The critically examined factors which were responsible for success to achieve the intended goal is critical success factors of that system. Marais et al. (2017) states that CSFs are those aspects that must be well managed in order to achieve success. CSFs are combinations of activities and processes which are designed to support the achievement of the goals (Brotherton & Shaw, 1996, p. 114). Furthermore, CSFs are actionable, controllable by management to a variable extent, and potentially measurable (Brotherton & Shaw, 1996, p. 114).

2.3 TQM Performance

Lakhe& Mohanty (1994) define TQM effectiveness as the extent to which the implementation of TQM can meet the desired objective. It can be perceived as dependent variable which may be affected by set of independent variables. The effectiveness of TQM shows its performance. Motwani (2001) offers a set of critical factors/dimensions and more than 45 supporting performance measures of TQM, and concludes that an integrated TQM can be viewed as a composite of the following seven constructs: Top management commitment, Quality measurement and benchmarking, Process management, Product design, Employee training and development, Supplier quality management and Customer involvement and satisfaction. Mohanty et al. (1996) presented study in health care system with argument that TQM, when implemented, requires an understanding of the particular nature of the sector, which influences the parameters of quality relating to patient care and their subsequent measurement. Self-administered questionnaire is used for evaluation of effectiveness of TQM.

3. Model and Research Hypothesis

Fig. 1 presents the proposed model depicting a mediating effect of TQM CSFs on the relationship between TQM goal and its performance. Specific research hypotheses explore the relationships among factors in the research model. Very few studies have directly addressed the connection between goal, critical success factors and performance of TQM. Researchers however, have investigated the individual factors with TQM like role of HRM and process management on TQM by author (Zhang et al (2000), top management commitment and Supplier partnership on TQM by Flynn et al. (1995), Customer and market focus (Lau et al. 2004), training and learning and Benchmarking (Das et al. (2008).

3.1 TQM goal and TQM performance

TQM performance heavily depends on how well the TQM system is designed for the organization. Jun et al. (2004) recommended that it is widely accepted that strong managerial commitment and leadership are drivers for effective and successful TQM, and further mentioning about Maquiladoras and US companies stated that relatively few appear to link their compensation to achieving quality goals, which is essential for the success of quality initiatives. Continuous improvement, Quality assurance, Cycle time reduction and zero defect are the central requirements for efficient and effective aspect of TQM.

3.2 TQM Goal and TQM CSFs

The connection between the CSFs and total quality management (TQM) goal is essential for effective TQM. Many authors suggest that the CSFs for any objective should be SMART, which stands for Specific, Measurable, Attainable, Realistic and Timely. Stating or defining CSFs are top management's responsibility and the quality of their statement reflects the quality of their strategic planning. It will be quite difficult to improve overall TQM performance if decisions criteria (attributes, i.e critical success factors) are not embedded or considered at the phase of TQM system design.

3.3 Goal, CSFs and Performance

Performance determines the success of any system or rather, of any organization with respect to the goal. Kaplan and Norton (1992) stated that If organizations cannot measure performance, they cannot manage their business. Bolwijn and Kumpe (1990) argued, in a competitive environment today organizations need to pursue more complex dimensions of performance. A book authored by Daft, R. I., and Marcic, D., (2009), Understanding management, business performance defined as the measurable result of the level of achievement of the organization's goals or the measurable outcome of the organization's management of its aspects (ISO 1999). TQM is an approach to improving the competitiveness, effectiveness and flexibility of a whole organisation (Sila&Ebrahimpour, 2002). It is essentially a way of planning, organising and understanding each activity and depends on each individual at each level. For an organisation to be truly effective, each part of it must work properly together towards the same goals, recognising that each person and each activity affects and in turn is affected by others (Sureshchandar, Chandrasekharan, &Anantharaman, 2001).

Consequently, TQM system will display significant relationships between TQM goal and its CSFs and performance. Based on these arguments, this study examines the following hypotheses.

H_1: Human Resource Management factors significantly effect TQM performance?

H_2: Top management commitment factors significantly effect TQM performance?

H_3: Process management factors significantly effect TQM performance?

H_4: Customer focus/ Customer Centricityfactors significantly effect TQM performance?

H_5: Supplier partnership/ Supplier's management factors significantly effect TQM performance?

H_6: Training and education factors significantly effect TQM performance?

H_7: Quality Information/Information Quality factors significantly effect TQM performance?

H_8: Strategic quality planning factors significantly effect TQM performance?

H_9: Culture and communication factors significantly effect TQM performance?

H_{10}: Benchmarking factor significantly effect TQM performance?

H_{11}: Social and environmental responsibility factors significantly effect TQM performance?

H_{12}: Innovation factor significantly effect TQM performance?

4. Method

This section presents a brief description of the sample and an overview of the survey procedure used in this study, followed by an explanation of how the research variables were operationalized and measured. A survey was chosen as the method for data collection. Data collection was conducted in two phases: first the interested and TQM aware employees were shorten-out phase then questionnaire survey phase. The survey is conducted in three Indian Fast Moving Consumer Goods (FMCGs) industry. Based on TQM awareness from these three FMCGs industries, employees were shortened for the questionnaire for the next phase of data collection. Responses from these three firms were included in the final sample.

Table 1: characteristics of the responding firms.

Industry	Employee participated in survey
(a) Food/ beverage	185
(b) stationery industry	235
(c) Textile industry	180
Position of the respondent	
(a) Manager and above	165
(b)Supervisor and above	275
(c) workers	160

Table: 2 Questionnaire Items used to measure research constructs

As TQM Drivers	In the considered FMCGs industry the factors identified
Human Resource Management (HRM) D_{11} D_{12} D_{13} D_{14}	• Employee involvement • Empowerment • Recognition and reward *Teamwork*
Top management commitment (TMC) D_{21} D_{22} D_{23}	• Top management support • Executive commitment • Leadership
Process management (PM) D_{31} D_{32} D_{33}	• Tools and techniques • Continuous improvement • Process design
Customer focus and satisfaction (CFS) D_{41} D_{42} D_{43}	• Customer and market focus • Customer satisfaction • Customer relationship
Supplier partnership (SP) D_{51} D_{52} D_{53}	• Cooperation with suppliers • Supplier quality management • Supplier relationship
Training and learning (TL) D_{61} D_{62} D_{63}	• Learning • Knowledge and • Education & training
Information/analysis/data (INF) D_{71} D_{72}	• Quality data and reporting • Internal quality information usage

In the questionnaire survey phase, a package was mailed to the employees including top, middle and low level of 600 of the three FMCGs manufacturing firms. The first-round mailing yielded 196 responses. The second mailing yielded an additional 169 responses, raising the total response to 386 and producing a final response rate of 64.33%. However, 21 out of 386 respondents were excluded from the final sample because their questionnaires were incomplete, leaving 365 valid

questionnaires. Table 1 presents the characteristics of the responding firms.

As TQM Enablers	
Strategic quality planning (SQP) E_{11} E_{12} E_{13}	• Quality policy • Quality planning • Vision & Plan statement
Culture and communication (CC) E_{21} E_{22}	• Trust • Cultural change
Benchmarking (BHM) E_{31}	• Competitors
Social and environmental responsibility (SER) E_{41} E_{42}	• Wider community • Quality citizenship
Innovation (INV) E_{51}	• Product innovation

5. Results and discussions

5.1 Confirmatory Factor Analysis (CFA)

CFA can be accomplished with SEM (some say that CFA is a form of SEM, I happen to conceive it the other way around; we're probably both partly wrong). Anyway, once you have your conceptual model (a simple sketch on a piece of paper with arrows pointing between variables, showing how and who influences/predicts who), you may proceed to the 'testing'. And now, you have to deal with the type of SEM that's suited for testing (in this case, you'd need to use covariance based SEM — for instance, use a software package like IBM(TM)'s AMOS).

Another way to look at this question is to start from the types of modeling. Basically, we could use PLS modeling or covariance-based modeling. The first is more suited for exploratory analyses of relations between latent variables, whereas the second is more adequate for measuring the adequacy of the models (how well the model fits the observed data). Once you grasp the common points and the differences between the two methods, you may proceed to make analogies with factor analysis (exploratory versus confirmatory).

EFA (exploratory factor analysis) can be used to identify (hypothesize) latent constructs (which underlie a group of (co)related measured variables) and based on this 'mathematical argument' the case can be made that several latent constructs are inter-related in a specific way (such as a model specifies). Of course, would not proceed testing/building models just because EFA suggests some underlying constructs. Rather, some dogmatic (theoretical) reasons should first guide your EFA.

The symbols in this diagram are the same as defined earlier. The new representations are the functions which provide a general way to represent the connections between the variables within the parentheses to those on the left-hand side of each node.

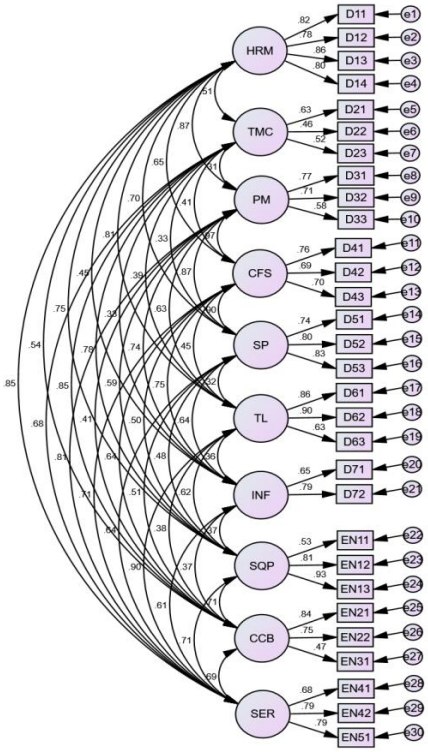

Figure 4: CFA Model

Table 3: CFA results of Identified Constructs

Constructs	Items	Factor Loadings	Composite Reliability (CR)	AVERAGE
HRM (D_1)	D_{11}	0.82	0.887	0.663
	D_{12}	0.78		
	D_{13}	0.86		
	D_{14}	0.80		
TMC (D_2)	D_{21}	0.72	0.785	0.549
	D_{22}	0.79		
	D_{23}	0.71		
PM (D_3)	D_{31}	0.77	0.732	0.507
	D_{32}	0.71		
	D_{33}	0.65		
CFS (D_4)	D_{41}	0.76	0.760	0.515
	D_{42}	0.69		
	D_{43}	0.70		
SP (D_5)	D_{51}	0.74	0.833	0.626
	D_{52}	0.80		
	D_{53}	0.83		
TL (D_6)	D_{61}	0.86	0.871	0.694
	D_{62}	0.90		
	D_{63}	0.73		
INF(D_7)	D_{71}	0.70	0.715	0.557
	D_{72}	0.79		
SQP (E_1)	E_{11}	0.69	0.855	0.666

	E_{12}	0.81		
	E_{13}	0.93		
CC (E_2)	E_{21}	0.84	0.821	0.605
	E_{22}	0.75		
BHM (E_3)	E_{31}	0.74	---	
SER (E_4)	E_{41}	0.88	0.861	0.674
	E_{42}	0.79		
INV (E_5)	E_{51}	0.79		

Composite reliability that achieved 0.70 or above means the scale has good reliability. In general, composite reliability is greater than 0.6 and average variance extracted (AVE) is greater than 0.5, indicating that the reliability of this model is good. Composite reliability (sometimes called construct reliability) is a measure of internal consistency in scale items, much like Cronbach's alpha.

Table 4: Model fit Results

Goodness of Fit Indices	Results	Recommended Standard Value
CMIN/DF- degree of freedom	2.657	< 3
NFI (normed fit index)	0.90	≥ 0.90
NNFI (non-normed fit index)	0.92	≥ 0.90
CFI (comparative fit index)	0.92	≥ 0.90
GFI (goodness fit index)	0.91	≥ 0.90
AGFI (Adjusted goodness of fit index)	0.85	≥ 0.80
RMSEA (root mean square error of approximation)	0.06	<0.10

6. Discussion and Implications

According to the study, we hypothesized twelve paths including seven TQM drivers and five enablers (TQM critical success factors) and thirty sub-factors. Using the SEM investigated that impact of drivers, enablers and firm performance. Results exhibits all the paths are significant ($p < 0.05$). A SEM model divulges the critical success factors of TQM is directly and positively affects the TQM performance which further affect operational, financial and non-financial performances of TQM. Sideridis et al. (2014) advocated that SEM is potentially one such methodology, as it allows for modeling complexities in behavior (e.g., model loops, cross-lagged effects, autocorrelation structures, etc.), given adequate sample sizes. SEM models without measurement models are called path models.

Prior to fitting our SEM, table 3 consist the TQM CSFs as drivers and enablers. The first diagonal element of TQM drivers (D_1) represents the variance of the TQM CSFs which are (arbitrarily) ordered first, the second diagonal element represents those ordered second, and so on. Further, the first off-diagonal element of TQM CSFs (i.e., *D*21) represent the covariance of TQM CSFs for the factors which are ordered second with those which are ordered first, and so on.

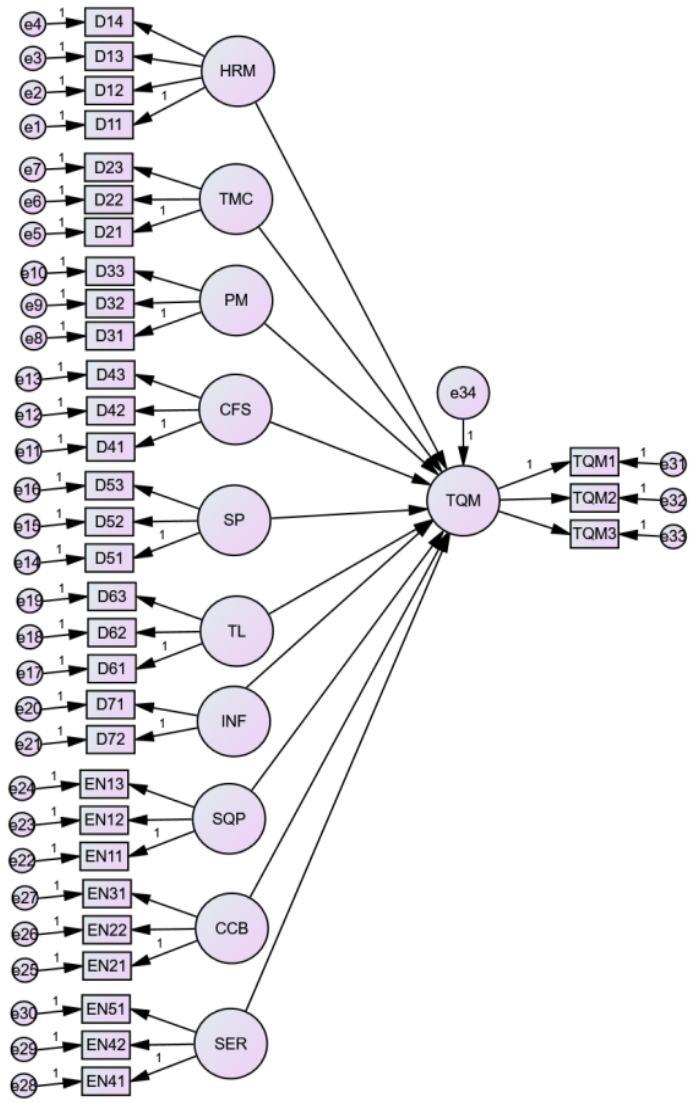

Figure 5: Path Diagram of Structural equation with twelve (two variables E_2, E_3 and E_4, E_5 are combined) explanatory variables Assessment of model and hypotheses testing procedures

Table: 5 Bivariate correlations between variables.

TQM CSFs		D_1	D_2	D_3	D_4	D_5	D_6	D_7	E_1	E_2 & 3	E 4 & 5
TQM DRIVERS	D_1	--									
	D_2	0.51	-								
	D_3	0.87	0.31	-							
	D_4	0.65	0.41	0.97	-						
	D_5	0.70	0.33	0.87	0.90	-					
	D_6	0.81	0.39	0.63	0.45	0.32	-				

	D_7	0.45	0.33	0.74	0.75	0.64	0.36	-			
TQM ENABLERS	E_1	0.75	0.78	0.59	0.50	0.48	0.62	0.37	-		
	E_2 & E_3	0.54	0.85	0.41	0.64	0.51	0.38	0.37	0.71	-	
	E_4 & E_5	0.85	0.68	0.81	0.71	0.64	0.90	0.61	0.71	0.69	-

When the goodness of the model has been confirmed, the next is to test the hypothesized relationships among the variables (TQM CSFs). Through the running of PLS Algorithm using Smart PLS, the hypothesized model is tested. Therefore, the path coefficients were generated as illustrated in the Fig 2.

Table 6: Hypotheses results and estimate

				Estimate	p value	Result
H_1	TQM	<---	HRM	.427	***	Fail to reject
H_2	TQM	<---	TMC	.740	***	Fail to reject
H_3	TQM	<---	PM	.571	***	Fail to reject
H_4	TQM	<---	CFS	.314	***	Fail to reject
H_5	TQM	<---	SP	.657	***	Fail to reject
H_6	TQM	<---	TL	.532	***	Fail to reject
H_7	TQM	<---	INF	.475	***	Fail to reject
H_8	TQM	<---	SQP	.560	***	Fail to reject
H_9, H_{10}	TQM	<---	CC & BHM	.454	***	Fail to reject
H_{11},H_{12}	TQM	<---	SER & INV	.642	***	Fail to reject

***** Significant at 5% level of significance

Note: *All pathways represent the influence of a factor independent from other influences in the model.*

The p values in hypothesis testing are used to classify the data into two groups being 'significant' or 'insignificant' depending upon whether it 'rejects' or 'fails to reject' the null hypothesis. A level of significance (α level) is set between 0 and 1 as an arbitrary cut off value to determine statistical significance. Analysis of the linkage between the TQM critical success factors and the effectiveness of TQM provides an insight into the prevailing TQM system conditions that could improve/prohibit TQM effectiveness.

7. Conclusion and future research

Methods have begun to be developed for handling questions of mediation for TQM performance and mediators (30), but more work remains to be done in this area. Results of this study show the relationships between TQM goal, Critical Success Factors, and TQM performance. Practitioners and Quality managers who understand these relationships can use this method to effectively increase TQM performance and identify the barriers. Additionally, Effective TQM can enable managers to better understand how various CSFs can fit the performance. Organizations thus emphasize the capability of TQM in dealing with CSFs and its impact on the organization performance. The findings provide support for the fact that TQM CSFs plays a mediating role in certain TQM system and organizational attributes. A couple of limitations of this study should be noted. First, because the research was conducted in Indian FMCGs industries, the quality culture observed in the study may not hold true in other industries with different cultures. Thus, investigating cross-cultural differences in organizational mechanisms designed for coping with TQM should also be a valuable future research direction. Second, while the research model is theorized to be causal, this study only adopts a cross-sectional approach in which cause and effect data are captured at the same time. Thus, the ability to draw definitive causal implications from this study is limited. Future research is encouraged to adopt a longitudinal approach for better causality testing. Future research can also build on and extend the proposed integrated model of TQM by including other potential variables such as organizational performance from the different contexts. More research needs to clarify the impact of strategic orientation or top managers' intention on the deployment of TQM and organizational structures.

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