Benchmarking: An International Journal

The mediating effect of human resource on successful total quality management implementation: An empirical study on SMEs in manufacturing sectors

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The mediating effect of human resource on successful total quality management implementation

An empirical study on SMEs in manufacturing sectors

Received 23 August 2013
Revised 12 January 2014
Accepted 12 January 2014

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Abstract

Purpose – The purpose of this paper is to study the mediating effect of human resource (HR) between independent variables (i.e. leadership and quality culture (QC)) and successful total quality management (TQM) implementation for firm performance as dependent variable.

Design/methodology/approach – In this paper, the authors have used exploratory factor analysis output as input for mediation statistics. The mediating regression analysis has been performed using exploratory factor analysis based on four steps technique proposed by Baron and Keene in the year 1986 to test the theoretical model.

Findings – The mediation statistics output suggests that HR is a complete mediation between independent variables (i.e. leadership) and successful TQM implementation for firm performance and QC is having direct impact on firm performance without any mediation effect of HR.

Research limitations/implications – Mediation regression has its own limitations. Satisfying four steps does not, however, conclusively establish that mediation has occurred and also there persists a measurement problem. The cross-ectional data is one of the present limitation of our present study. While this study was able to provide additional insight into leadership and QC of TQM and its relationship with firm performance, it also revealed areas that would benefit from further research.

Originality/value – This study provides an insight into leadership together with right QC mediates with HR practices to help successful TQM implementation for firm performance on the basis of survey conducted among Indian manufacturing sector is unique contribution.

Keywords Quality culture, HR, Leadership, TQM, Mediation statistics

Paper type Research paper

The authors are grateful to the anonymous referees of the journal for their extremely useful suggestions to improve the quality of the paper. The authors are also very grateful to Editor-in-Chief, Managing Editor and Emerald editorial team members for their support.

Benchmarking: An International Journal
Vol. 22 No. 7, 2015
pp. 1463-1480

1463-5771
DOI 10.1108/BIJ-08-2013-0083

1. Introduction

Quality concerns defined organisational systems, processes, products, services and have finally accorded a status and value to its customers (Bitner *et al.*, 1997). Quality management (QM) is not specific only to managing people, but rather is related to improving the quality of goods and services that are produced in order to satisfy customer demands (Potocki and Brocato, 1995). QM permeates the entire organisation as it is being implemented. QM evolves from many different management practices and improvement processes (Dahlgaard *et al.*, 1998). The paper investigates the impact of leadership and quality culture (QC) on successful total quality management (TQM) implementation in the presence of the mediating variable "human resource" (HR).

Most of the studies in past recent years have encountered both, a shift in emphasis to HR issues within the quality area and the growing interest of personnel specialists. The former reflects two factors, first: a shift from quality assurance to TQM with a consequent greater emphasis being placed on issues such as employee involvement and commitment, second: growing evidence which suggests that TQM has major problems in the so-called soft areas (Kearney, 1992; Cruise O'Brien and Voss, 1992), particularly culture, involvement and communication. New and innovative HR policies were reported by managers in a number of organisations, but these were not often related to quality. Separation of HRs from quality, except in name, could seriously retard the spread of quality through the firm. However, in present study researchers primarily focus on leadership ability, QC and HR policies of Indian manufacturing firms, TQM implementation and its impact on firm performance.

2. Literature review

The central interest of mainstream research is whether TQM can authentically provide better firm performance and the significance of the relationship that exists between TQM and successful TQM implementation for firm performance.

According to many researchers (Wood and Peccei, 1995; Juran, 1964; Ishikawa, 1985; Deming, 1986; Dale and Plunkett, 1990; Cruickshank, 2000; Powell, 1995), TQM practices can help company to enhance successful TQM implementation for firm performance (Gadenne and Sharma, 2009; Koh and Low, 2010). This research area had drawn attention of many scholars since 1964s (Juran, 1964) till present (Shahin and Dabestani, 2011). The section delves with various researchers' contribution in the field of leadership, QC, HR and successful TQM implementation for firm performance.

2.1 Leadership

Considered as a major driver, leadership has significant influence on implementation of TQM (Karaszewski, 2010; Rui *et al.*, 2010; Lakshman, 2006; Yusof and Aspinwall, 1999). Leadership refers to how leadership guides, supervises and controls personnel of a firm in an appropriate manner to achieve the objectives of TQM. It draws the quality vision and mission and its long term objectives. It provides the necessary resources for training employees to meet the new requirements and/or changes that result from TQM implementation and consequently, create a QC which is conductive for employees' involvement. Leadership directly or indirectly affects the customer satisfaction and business performance result. One of the study in which researchers study the impact of leadership on quality practices of Thailand enterprises (Laohavichien *et al.*, 2011).

2.2 HR function

An organisation's competitive advantage lies in the skills and abilities of its employees (Wickramasinghe and Gamage, 2011; Yusof and Aspinwall, 1999). Change efforts directed at HRs include: work and job redesigning, investment in training and development; new values and norms; new definition of reward and promotion system; improving organisational learning and decision making. Training and Education for Quality programmes, reduces resistance and provides positive motivation to work for quality goals (Haffer and Kristensen, 2010; Mahour and Lester, 2007).

2.3 QC

QC is designed to empower members of an organisation to take decisions and to solve problems related to their level in the organisation. The logic is that the people closest to a problem or opportunity are in the best position to take decisions for improvement, if they have a control of the improvement process quality. If the organisation's quality strategy is to be successful, all the employees should be engaged in the work of satisfying the customer, by continuously improving the quality (Yusuf *et al.*, 2007). Everybody's commitment means that the continuous improvement should be practised everywhere in the processes and the involvement of all people (employees) at every level should be facilitated. HR philosophy and systems must focus on sticking to quality core values, excellence, integrity, teamwork and innovation. There must be shared beliefs, values and attitudes. The work is based on the skills and participation of every employee and his or her understanding of requirements.

Within this perspective, people management can follow three stages, i.e. identification by people as being consistent with explicit characteristics of the organisation and the willingness to accept values since "it is the right thing to do", adoption and internalisation of the values by people and motivation to become involved in achieving the set objectives. The first stage forms attitudes, the second stage forms behaviour, and the third stage forms loyalty in terms of willingness to participate, involve and cooperate with little or no supervision. To achieve these conditions, an organisation needs to create a supportive climate as an essential part of people management (Gunasekaran, 1999; Yusuf *et al.*, 2007). Effective communication is for the development of awareness and building commitment of quality in an organisations environment. It is considered, very vital for creating high motivation towards successful implementation of TQM (Thiagarajan and Zairi, 1997; Wilkinson *et al.*, 1992).

2.4 TQM implementation and firm performance

TQM has been widely implemented in various firms around the world. TQM is now considered by virtually all leading firms and quality practitioners as the way forward, to gain a competitive edge (Goh and Ridgway, 1994). There are many discussions about the benefits of implementing TQM. Many firms have arrived at the conclusion that effective QM can improve their competitive abilities and provide strategic advantages in the marketplace (Anderson *et al.*, 1994). Researchers compile the various studies in a tabulated form in Table I which focuses on the impact of successful TQM implementation for firm performance.

3. Theoretical model and research design

The purpose of this section is to present theoretical model on the role of leadership and QC on successful TQM implementation for firm performance. The conceptual model is

Table I.
List of benefits of TQM as reported in the literature

Benefits	Authors
Better quality	Holloway *et al.* (1995), Oakland (1989), James (1996), Mohanty and Lakhe (1998) and Reed *et al.* (1996)
Promoting continuous improvement	Spencer (1994), Reed *et al.* (1996), Waldman (1994) and James (1996)
Enhances firm's profitability/productivity	James (1996), Ahire and Kiran, Banerjee and Ramesh (1993), Waldman (1994), Oakland (1989), Mohanty and Lakhe (1998) and Psomas and Fotopoulos (2009)
Improvement in market share	Reed *et al.* (1996), Mohanty and Lakhe (1998) and Buzzell and Gale (1987)
Increases flexibility	James (1996), Reed *et al.* (1996) and Oakland (1989)
Customer satisfaction	Jarrod and Chester (2008)

based on the findings of literature review. As concluded from literature review, related to selection of leadership, HR focus, QC and firm performance measurement variables and the theory on model classification, the approach adopted for the model is as follows.

Of the two structure of models namely, direct linkage model (between soft TQM dimension and firm performance, Singh and Dubey, 2013) and the moderating linkage model (which adopts HR focus as a mediating constructs, Laohavichien *et al.*, 2011), the mediating linkage model has been duly considered. A mediating linkage has been adopted between independent variables and dependent variable with HR practice as a mediating variable between the two.

There are many researchers which have emphasised the importance of an integrative perspective (Hitt *et al.*, 1982; Droge *et al.*, 1994; Li, 2000). The desired level of performance cannot be achieved in the firm, which fails to respond effectively to the relevant environmental demand (e.g. Ansoff, 1980; Hitt *et al.*, 1982). Since environmental demands vary across firms, different firms may have to emphasise on the development of different mixes (or combinations) of key TQM variables (Hitt *et al.*, 1982; Li, 2000). Therefore, such study integrates several variables to examine the relationship between TQM variables and successful TQM implementation for firm performance, as there is a dire need for such integrated mediating linkage framework for Indian manufacturing firms so that these firms.

3.1 Theoretical model

The present study integrates leadership and QC mediating through HR practice and impacts of variables on successful implementation of TQM in Indian manufacturing sector. On the basis of the preceding discussion and the synthesis of the existing literature, a proposed theoretical framework for the current research is designed as shown in Figure 1. The three main components that constitute the conceptual framework include the variables of TQM, mediating variable and successful implementation of TQM which will be measured in terms of firm performance.

The relative importance of TQM variables to various measures of company performance has been specified previously (e.g. Snow and Hrebiniak, 1980; Hitt *et al.*, 1982; Hitt and Ireland, 1985; Vickery *et al.*, 1994; Powell, 1995; Li, 2000; Yusuf *et al.*, 2007; Hokoma *et al.*, 2008; Shahin and Dabestani, 2011; Talib *et al.*, 2011). To measure the performance both financial and non-financial will be used. Financial indicators are ROI, EBIDTA, improvement in quality of goods, overstocks and defects control. These measures have been widely used in published literature (Clark, 1982; Nobel, 1995; Hill and Jones, 2001).

The research model has been adapted from researchers (Powell, 1995; Shahin and Dabestani, 2011) who pioneered the conceptual framework for empirical studies in dimensions in TQM. A comprehensive review of literature on the subjects relating to four constructs of the framework was done. However, there were only a limited number of relevant researches conducted in developing country, like India against a number of works on developed countries. The novelty of the model lies in integrating TQM dimensions and firm performance. Till now most of the TQM frameworks which are available are either combination of hard and dimensions or single variable framework mediating through HRM (Laohavichien *et al.*, 2011) leading to firm performance. This research aims to study impact of multiple TQM dimension on firm performance. The approach to adopt multiple dimensions and their effect on TQM implementation will be an important contribution of the study.

3.2 Research hypotheses

From literature survey, it has been observed that, leadership is one of the major driver which has significant influence on implementation of TQM (Karaszewski, 2010; Rui *et al.*, 2010; Lakshman, 2006). In a recent work by Valmohammadi (2011) in context to Iranian SMEs, leadership is one of the key drivers in successful TQM implementation and organisational performance. We therefore hypothesise it as:

H1. There is a positive relationship between the leadership and successful TQM implementation for firm performance.

If the organisation, quality strategy is to be successful, all the employees should be engaged in the work of satisfying the customer by continuously improving the quality (Gore, 1999; Yusuf *et al.*, 2007). Everybody's commitment means that the continuous improvement should be practised everywhere in the processes and the involvement of all people (employees) at every level should be facilitated. The work is based on the skills and participation of every employee and his or her understanding of what are required. Within this perspective, people management can follow three stages, i.e., identification by people as being consistent with explicit characteristics of the organisation and the willingness to accept values since "it is the right thing to do", adoption and internalisation of the values by people and motivation to become involved in achieving the set objectives. The first stage forms attitudes, the second stage forms behaviour, and the third stage forms loyalty in terms of willingness to participate, involve and cooperate with little or no supervision. Therefore, we hypothesise it as:

H2. There is a positive relationship between the QC and successful TQM implementation for firm performance.

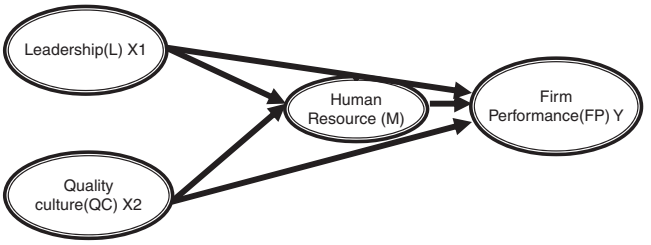

Figure 1.
A theoretical model of the relationship between leadership, quality culture and successful implementation of TQM for firm performance

Firm competitive advantage lies in the skills and abilities of its employees (Wickramasinghe and Gamage, 2011). It is also seen in many authors recent work that how effective HR strategy can help a firm in successful implementation of TQM and organisational performance. It is observed in recent works that "Training and Education" for quality programmes reduces resistance and provides positive motivation to work for quality goals (Wickramasinghe and Gamage, 2011; Haffer and Kristensen, 2010; Mellat-Parast and Digman, 2007). Therefore, we hypothesise it as:

H3. There is a positive relationship between the HR function and successful TQM implementation for firm performance.

In a similar study carried out in context to Thai firms, it is observed that leadership mediating through HR practice has positive impact on quality practices which further influence firm performance (Laohavichien *et al.*, 2011). There is need to understand the mediation effect of HR on QC and firm performance. Therefore, we hypothesise it as:

H4. Leadership and QC mediate through HR function to impact successful TQM implementation for firm performance.

3.3 Questionnaire design

To do survey research, a survey instrument for this study is to be scientifically developed. Following approaches were adopted for questionnaire developments are:

- literature review; and
- pretest which consisted of expert opinion and pilot survey.

To begin with, a review of the extensive literature is done to identify the key issues. The various dimensions and their items were identified. A pragmatic integration and grouping of the dimensions is done. Various questionnaire instruments in the area are also identified. These included, for example, Blauw and During (1990), Saraph *et al.* (1989), Flynn *et al.* (1994), Podsakoff *et al.* (1990), Zu *et al.*, Das *et al.* (2008) and Laohavichian *et al.* (2011). All of these researchers have developed their questionnaires for data collection, based on their own research objectives, thus their questionnaires differed from each other. However, the questionnaires developed by these researchers gave some useful insights into developing the questionnaire required for the identified research objectives. In fact, the design of the research questionnaire was highly dependent on the concepts of theoretical constructs and the operationalisation of the theoretical constructs. In our present research we have used multi-item measures of constructs for our theoretical model in order to improve reliability, reduce measurement error, ensure greater validity among survey individuals, and improve validity (Churchill, 1979). In this case we have adopted perceptual performance measures in the absence of objective measures (Dess and Robinson, 1984). Each constructs was operationalised using at least three items for effective measurement and analysis. All the items included in the questionnaire were pretested. The pretest deals with how much the measurement instrument is accurate in measuring the variables which is supposed to measure and how precise it is in doing so.

Expert interviews are performed to develop a valid survey instrument for the research. In order to test the reliability and validity of the measurement instrument, an expert opinion needs to be conducted with the final draft of the questionnaire. It helps in deciding which items from among those adopted from previous studies were most suitable for the survey questionnaire. The purpose of doing it here is to assess the

validity of questions for each concept included in the questionnaire. Total 12 experts were invited to refine and validate measures for each concept. Four experts from the industry and eight senior academicians with experience in teaching, research and consultancy in TQM implementation and manufacturing sector identified. After incorporating expert opinion, we have retained 20 items out of which 15 items representing the dimensions of TQM (i.e. HR function, QC and motivational leadership) and five items related firm-level performance measures. The constructs and their measures are presented in Table II.

The constructs representing a theoretical framework were captured using five-point Likert scale from strongly disagree to strongly agree. Performance were captured using perceptual performance measures using a five-point Likert scale, from strongly disagree to strongly agree as the previous studies have shown that perceptual performance measure and objective measures have strong correlation.

The pilot test seeks to answer the question; does the questionnaire consistently measure whatever it measures? In this case, researcher conducted survey with 55 sample size (randomly selected) from manufacturing plants to check the reliability of the instrument. On the basis of pilot survey, researcher carried out reliability test using SPSS 20. The Cronbach's α value was found to be greater than 0.8 for each construct items which indicates that questionnaire is reliable and is suitable for further survey.

3.4 Data collection

Data were collected through an electronic survey, which was split into two parts. The first part covered specific questions related to TQM dimensions like HR function, QC and leadership. Second part covered specific questions related to performance measures. The complete survey was sent to targeted individuals in QM department to respond to first part of the questionnaire and second part of the questionnaire to their colleagues from financial or marketing or materials management department to

Constructs	Items
F1 (HR work systems)	Actively participate in meetings and workshops
	Jobs and work are clearly defined
	Flexible system exist there
	Effective communication exist there
	Employees are recognised
	Partners and associates take the responsibility of managing system
	Partners involved in cost reduction
F2 (quality culture for effective communication)	Organisation formal information are shared in the form of regular newsletter and hand outs
	Quality performance, goal and initiatives are communicated regularly
	Information technology (ware/hardware) is effectively used for communicating information
F3 (motivational leadership)	Quality management
	Support and motivate peoples
	Education and training are provided
F4 (firm performance)	Return on investment
	Quality of product
	Waste reduction due to defects management
	Waste reduction due to overstocks management

Table II.
Constructs and their measures

respond to performance measures related questions. In this way, the response bias was reduced to a greater extent (Podsakoff *et al.*, 2003).

The initial sample frame consisted of 760 firms which were compiled from database provided by Confederation of Indian Industries (CII), has been taken for study purpose. Owing to the limitation of resources and difficulty in getting permission from all other firms, sample was finally selected at disposal of the researcher. We have targeted manufacturing firms which falls into SMEs category from Maharashtra. Keeping the research objectives in mind, the respondents were identified based on the experience criteria of respondents in the manufacturing firms and who had an orientation on TQM practices in their organisation. Senior managers with more than 15 years of experience were identified for study purpose who is pioneer in their organisation nominated by their respective plant head. Data collection was conducted following a modified version of Dillman's (2007) total design method. Overall, we received 200 usable responses for the first part of questionnaire and 175 for responses for the second part. The split ratio is $175/200 = 87.5$ per cent and response ratio is $200/760 = 26.32$ (approx.), which are decent but we have further followed up after four weeks through e-mail, call and mail. We received 125 usable responses for the first part and 100 usable responses for the second part. The split ratio in the second time is $100/125 = 80$ per cent and response ratio as $125/760 = 16.44$ per cent. In total, we had 275 usable responses using equation (min(200,175) + min(125,100)). Out of 760 firms, 275 responded the questionnaire which represents (36.18 per cent) response rate that is fairly decent in comparison to recent research in operations management-related areas (e.g. Schoenherr and Mabert, 2008; Braunsceidel and Suresh, 2009).

3.5 Non- response bias test

Non-response bias is the measure of the difference between the response of the respondents and late respondents (Lambert and Harrington, 1990). To provide support for non-response bias, we compared the responses of the early and late waves of returned surveys (Armstrong and Overton, 1977; Lambert and Harrington, 1990). We have picked 30 samples from first wave (early-wave group) and 30 samples from second wave (late-wave group). Comparison analysis was based on 15 randomly selected variables; independent samples *t*-tests were performed on two groups yielded no statistically significant differences ($p < 0.05$). These results suggest that non-response bias is not an issue in our data set.

4. Data analysis and findings

4.1 Data validity and reliability assessment

Before evaluating the reliability and validity of the measurement items, the constructs were tested for the assumption of constant variance, existence of outliers, and normality. We used plots of residuals and statistics of skewness and kurtosis. To detect multivariate outliers, we used Mahalanobis distances of predicted variables (Stevens, 1984). The maximum absolute values of skewness was found to be 1.657 and the maximum absolute value of the kurtosis was found to be +5.057 (univariate skewness < 2, kurtosis < 7) (Curran *et al.*, 1996). To ensure that multicollinearity was not a problem, we calculated variance inflation factors (VIF). All VIFs are less than 2 which suggest that multicollinearity is not a major issue (Hair *et al.*, 1998). We used confirmatory factor analysis to establish construct validity, i.e., convergent validity and discriminant validity of constructs of proposed theoretical framework. The appendices

showing that our constructs possess acceptable convergent and discriminant validity as outlined by Fornell and Larcker (1981) in one of their seminal article.

4.2 Mediating regression analysis

We have carried out regression analysis according to Baron and Kenny (1986) four steps for the proposed theoretical framework. Here we carried out mediating regression for two components.

Component 1: L→HR→FP (here HR is acting as a mediating variable between leadership and firm performance for successful TQM implementation) as shown in Figure 2:

- Step 1: Leadership (L) is linked to human resource (HR);
- Step 2: Human resource (HR) is linked to firm performance (FP);
- Step 3: Leadership (L) is linked to firm performance (FP); and
- Step 4: Leadership (L) is linked to firm performance (FP) with human resource (HR) as a mediator.

For above steps we have presented regression analysis output in Table III.

We can draw conclusion from Table III that leadership (L) does not directly influence firm performance (FP). The β coefficient of the path connecting L and FP is found to be statistically insignificant. In this case leadership impact firm performance indirectly, as it completely mediates through HR function. In other words leadership can be seen as an important variable which can help to formulate HR policies such that it can help in TQM implementation, which further helps to improve firm performance. The R^2 value for the path connecting HR and FP is 0.07 which indicates that, HR explains 7 per cent of total variance in firm performance. The F-statistics is 20.674, which is much above $F_{cr}(1,273) = 3.84$. The VIF values for all linkages are found to be less than 2 which suggest that multicollinearity is not an issue with the data.

Component 2: QC→HR→FP (here HR is acting as a mediating variable between leadership and firm performance for successful TQM implementation) as shown in Figure 3:

- Step 1: Leadership (QC) is linked to human resource (HR);

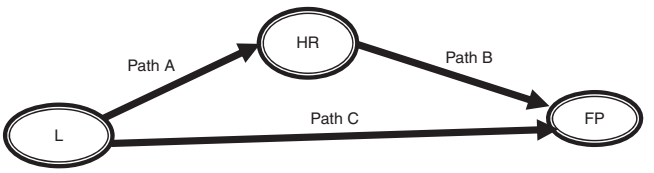

Figure 2.
L-HR-FP framework

Path	R	R^2	$F(1,273)$	β coefficient	p	Durbin-Watson	VIF
L→HR	0.182	0.033	9.346	0.297	0.002	1.045	1
HR→FP	0.265	0.070	20.674	0.247	0.000	1.847	1
L→FP	0.081	0.006	1.781	0.122	*0.183*	1.628	1
(L+HR)→FP	0.267	0.071	10.469	0.051	*0.575*	1.844	1

Table III.
Regression analysis output for L-HR-FP framework

- Step 2: Human resource (HR) is linked to firm performance (FP);
- Step 3: Leadership (QC) is linked to firm performance (FP); and
- Step 4: Leadership (QC) is linked to firm performance (FP) with human resource (HR) as a mediator.

For above steps we have presented regression analysis output in Table IV.

We can draw conclusion from Table IV that QC does not directly influence HR. The β coefficient of the path connecting QC and HR is found to be statistically insignificant. In this case, QC directly impact firm performance. It can be concluded that HR is not a mediating variable between QC and FP. The R^2 value for the path connecting QC and FP is 0.09 which indicates that, QC explains 9 per cent of total variance in firm performance. The F-statistics is 27.339, which is much above F_{cr} (1,273) = 3.84. The VIF values for all linkages are found to be less than 2 which suggest that multicollinearity is not an issue with the data.

We can further summarise mediating regression analysis in Table V.

We have further checked the significance of mediation using Sobel (1982) statistic. The mediation regression output using Baron and Kenny (1986) and Sobel (1982) statistic it can be concluded that HR is acting as a complete mediator between L and FP, however, HR is not mediating between QC and FP. This can be further explored.

4.3 Hypotheses testing summary

We can further conclude on the basis of hypothesis testing in Table VI.

5. Conclusions

This paper use Baron and Kenny (1986) and Jude and Kenny (1981) four steps mediation statistics to test whether HR practice is mediating variable in proposed theoretical model. The author has used exploratory factor analysis output (refer to

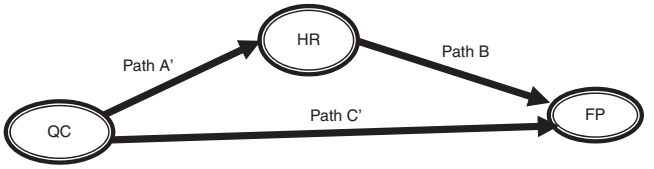

Figure 3.
QC-HR-FP framework

Table IV.
Regression analysis output for QC-HR-FP framework

Path	R	R^2	F(1,273)	β coefficient	p	Durbin-Watson	VIF
QC→HR	0.059	0.004	0.970	−0.084	0.326	1.080	1
HR→FP	0.265	0.070	20.674	0.247	0.000	1.847	1
QC→FP	0.302	0.090	27.339	0.397	0.000	1.646	1
(QC+HR)→FP	0.414	0.172	28.163	0.073	0.000	1.938	1.004

Table V.
Summary of mediating regression analysis output using Baron and Kenny (1986)

Model	Path A β1	SE[a]	Path B β2	SEb	Path C (total effect) β3	Path D (controlling for the mediator)	Mediation	Sobel p-value
L→HR→FP	0.297	0.097	0.247	0.054	Insignificant	0.051	Complete	0.0054
QC→HR→FP	Insignificant	0.085	0.247	0.054	0.397	0.073	No mediation	Insignificant

Hypothesis	Statement	Supported/not supported
H1	There is a positive relationship between the leadership and successful TQM implementation for firm performance	Not supported
H2	There is a positive relationship between the quality culture and successful TQM implementation for firm performance	Supported
H3	There is a positive relationship between the human resource function and successful TQM implementation firm performance	Supported
H4	There is a positive relationship between the leadership and quality culture and successful TQM implementation for firm performance mediating through human resource function	Supported

Table VI.
Hypotheses testing

Appendix: Table AI) as an input for multiple linear regression analysis. The finding shows that leadership and QC helps in formulating HR policies for successful implementation of TQM for firm performance.

5.1 Implications of the study

This section can be further divided into two aspects.

5.1.1 Theoretical implications. Our work has further extended Ho *et al.* (2001) study where they have assumed the core TQM practices as a mediating variable. Our study provides reasonable level of support for the positive relationship between TQM variables (leadership and QC) with HR practice as mediating variable and various indicators of successful implementation of TQM for firm performance. In the main, the evidence is supportive of a direct relationship, yet tends to be mixed in results regarding the significance of this relationship. These underline the opportunities to extend research into this yet to be exploited area. There is a methodological diversity in research examining the multiple TQM variables and successful implementation of TQM for firm performance. One of the possible sources that were responsible for this variation is the influence of contextual factors. This is illustrated by the use of different performance measures and the heterogeneity of practices of each function included in the prior studies. While financial data such ROE and ROA are more available in Western countries, they are difficult to be obtained in countries like India (Talib *et al.*, 2011) and China (Li, 2000), making it more appropriate to use subjective (perceptual) measure of firm performance. An implication is needs to tailor the methodology to the context.

5.1.2 Managerial implications. This emphasises the need for identifying the dimensions of each TQM variable in context. As result, this study adopts some key variables from the literature and then conducts an exploratory factor analysis to pinpoint precisely the dimensions of each function arising in manufacturing companies currently operating in India. Such a perspective will further support the policy of successful implementation of TQM in a firm. The undefined area can be highlighted to get maximum benefit and coverage.

Second important findings of the study is that HR mediates completely through leadership practice for successful TQM implementation for firm performance conform with the findings of Laohavichien *et al.* (2011) on Thailand firms and conform with one of the study carried out by Boon *et al.* (2005) on Malaysian firms which had established that TOP management commitment influence the employee attitude which further helps to enhance outcome from TQM implementation.

The third important finding of the study is that QC has an important role to play on successful TQM implementation for firm performance, without mediating through HR practices of the firm. This is unique contribution to the study.

Limitations of the present study are mediation statistics has its own limitations. Satisfying four steps does not, however, conclusively establish that mediation has occurred because there are other (perhaps less plausible) models that are consistent with the data. James and Brett (1984) have argued that Step 3 should be modified by not controlling for the initial variable. Their rationale is that if there were complete mediation, there would be no need to control for the initial variable. However, because complete mediation does not always occur, it would seem sensible to control for L and QC in Step 3.

Second, there could be a measurement problem as the R^2 are not more than 0.1. This could be due to inherent questionnaire design and predictability of the model can be further enhanced. While this study was able to provide additional insight into leadership and QC of TQM and their relationship with firm performance, it also revealed areas that would benefit from further research. First, this study focused only on selected leadership and QC of TQM in manufacturing sector. Future research could thus focus on the other dimensions. By doing so, a better and fuller understanding on the effects of TQM on firm performance may be achieved. Each of these dimensions can be explored further using single dimension and its effect on firm performance.

Third, there is a strong need for longitudinal research. A longitudinal analysis of companies over time would provide data to address at least three research questions: is there a time lag between investing in TQM and achieving an expected performance; is there a particular order in which these investments should be made; and the pre-TQM implementation period firm performance analysis and post-TQM implementation period firm performance analysis.

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Appendix

Components	Items	λ_i	Variance (λ_i^2)	Error	SCR	AVE
F1 (HR work systems)	Actively participate in meetings and workshops	0.773	0.597529	0.402471	0.8966007	0.622316
	Jobs and work are clearly defined	0.864	0.746496	0.253504	0.8986501	
	Flexible system exist there	0.799	0.638401	0.361599	0.8938603	
	Effective communication exist there	0.825	0.680625	0.319375	0.883774	
	Employees are recognised	0.803	0.644809	0.355191	0.8809828	
	Partners and associates take the responsibility of managing system	0.724	0.524176	0.475824	0.8851367	
	Partners involved in cost reduction	0.724	0.524176	0.475824	0.8981418	
F2 (quality culture for effective communication)	Organisation formal information are shared in the form of regular newsletter and hand outs	0.795	0.632025	0.367975	0.8125566	0.592166333
	Quality performance, goal and initiatives are communicated regularly	0.815	0.664225	0.335775	0.8135472	
	Information technology (ware/hardware) is effectively used for communicating information	0.693	0.480249	0.519751	0.8229118	
F3 (motivational leadership)	Quality management	0.798	0.636804	0.363196	0.7754688	0.543847333
	Support and motivate peoples	0.843	0.710649	0.289351	0.7362385	
	Education and training are provided	0.533	0.284089	0.715911	0.7350322	
F4 (firm performance)	Return on investment	0.69	0.4761	0.5239	0.8738796	0.6355975
	Quality of product	0.84	0.7056	0.2944	0.8689319	
	Waste reduction due to defects management	0.861	0.741321	0.258679	0.8094578	
	Waste reduction due to overstocks management	0.787	0.619369	0.380631	0.619369	

Table AI. Factors standardised factor loadings, variance, error, scale composite reliability and average variance extracted

	F1	F2	F3
F1	0.622		
F2	0.037	0.592	
F3	0.123	0.005	0.544

Table AII. Discriminant validity matrix

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