Operations Research Perspectives 5 (2018) 199–217

Contents lists available at ScienceDirect

Operations Research Perspectives

journal homepage: www.elsevier.com/locate/orp

Impact of TQM on organisational performance: The case of Indian manufacturing and service industry

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ARTICLE INFO

Keywords:
Total quality management (TQM)
Small and medium sized enterprises (SMEs)
Organizational performance
Indian manufacturing and service firms
Structural equation modelling (SEM)

ABSTRACT

This study is principally focused on the implementation of Total Quality Management (TQM) in Indian industries and to study its influence on the organizational performance. The study has been conducted in five manufacturing and three service companies in north India. The selected companies are listed in Confederation of Indian Industries (CII). The data used for this study was the combination of primary and secondary data and the focus was on examining the extent of TQM implementation in Indian industries. The hypotheses and conceptual framework were designed in accordance with Indian context. The completely useful 236 samples were collected from eight small and medium-sized Indian (SME) manufacturing and service companies. The data was classified into two categories i.e. Managers and Workers. The data collected then analyzed using SPSS-AMOS 24. All the hypotheses were positively fit with the conceptual model and hence showed the positive impact of TQM on organizational performance (OP). All the values were significant and consistent with previous studies. It was found that there is no such difference of literacy about TQM among the two groups and TQM elements are positively related to the performance factors of the Indian organizations. Finally, the findings of this study provides a valuable knowledge regarding TQM practices from Indian manufacturing and service sector perspective.

1. Introduction

Indian manufacturing sector is growing day by day and India is one of the fastest developing economies of the world. For the past 20 years, Indian industry has seen a huge growth. Indian economy used to be a close type economy but the government in early 90's changed their policy and stepped forward to open it for foreign direct investment (FDI). Indian manufacturing sector grew at a compound annual growth rate (CAGR) of 9.87% between fiscal years 2012–2017 and 9.33% in the fiscal year 2017 [44]. The Indian Manufacturing sector currently presents 16–17% to growth domestic product (GDP) and different studies have analyzed that every job generated in manufacturing has a multiplier effect in generating 2–3 jobs in the Indian services sector [19]. As a result, Indian industry sector made an astonishing progress both in its economy and technology. The government of India wants to expand the share of manufacturing sector to the GDP to 25% by 2022 [44]. Most of the industries in India have implemented TQM and gained ISO certification [55]. Therefore, a large brigade of customers necessitates manufacturers to strongly focus on quality. The Indian government is trying to increase the quality of products by implementing various programs. A company cannot maintain the quality of products without properly adopting strategic and planning instruments of quality management practices. However, Indian manufacturing and the service sector are still lacking in a clear TQM strategy [79,118].

This analytical study investigates the extent of TQM adopted by Indian manufacturing sector and its impact and relationships with business performance. For this, different TQM elements and organizational performances were investigated and their result was reviewed to find out the degree to which they are adopted. To achieve this goal, the TQM elements such as organizational leadership, customer satisfaction and relationships, human resource focus, strategic planning and development and supplier management were studied. In addition, the relationships between TQM elements and organizational performance were analyzed using structural equation modelling approach (SEM).

In the next section, this study provided the literature review and research background. This is followed by theoretical basis for hypotheses and present our conceptual research model in Section 3. Then, a brief description of our research methods is provided in Section 4.

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https://doi.org/10.1016/j.orp.2018.07.004
Received 6 August 2017; Received in revised form 17 July 2018; Accepted 17 July 2018
Available online 29 July 2018

Table 1
TQM constructs and performance measures.

TQM constructs and performance measures	Supporting literature for TQM constructs and performance measures	Description of TQM constructs and performance measures
Organizational leadership	Samson and Terziovski (1999), Sun (2000), Wilson and Collier (2000), Brah et al. (2002), Claver et al. (2003), Kaynak (2003), Lee et al. (2003), Prajogo and Sohal (2003), [99], Lau et al. (2004), Prajogo and Sohal (2004), Agus (2004), Prajogo (2005), Lin et al. (2005), Seth & Tripathi (2005), Yeung et al. (2005), Prajogo and Brown (2006), Prajogo and Sohal (2006), Lakhal et al. (2006), Feng et al. (2006), [34], Brah and Lim (2006), Hoang et al. (2006), Lin and Chang (2006), Sila (2007), Tari et al. (2007), [101], [126], Appiah Fening et al. (2008), Kaynak and Hartley (2008), [132], Pinho (2008), Bou-Llusar et al. (2009), Bou-Llusar et al. (2009), Fotopoulos and Psomas (2009), Kumar et al. (2009), Salaheldin (2009), [32], Sadikoglu and Zehir (2010), Miyagawa and Yoshida (2010), Xiang et al. (2010), Zakuan et al. (2010), Kumar et al. (2011), [43], Phan et al. (2011), Kim et al. (2012), [46], Lam et al. (2012), Sıtkı İlkay & Aslan (2012), Wang et al. (2012), Zehir et al. (2012), Hassan et al. (2013), [68], Talib et al. (2013), Akgun et al. (2014), Delic et al. (2014), [38], Sadikoglu & Olcay (2014), Sabella et al. (2014), Cetindere et al. (2015), Anil & Satish (2016), Al-Dhaafri et al. (2016), Rana & Bhola (2016), Sinha et al. (2016), Vasantharayalu & Surjit (2016), Aquilani et al. (2017), Ebrahimi & Rad (2017), Panuwatwanich & Nguyen (2017), Shafiq et al. (2017), Farish et al. (2017), Xiong et al. (2017), Mehralian et al. (2017), Pradhan (2017), Qasrawi et al. (2017), Keinan & Karugu (2018), Omar et al. (2018)	Top management communication, commitment, planning, interaction, leadership, responsibility, evaluation, and anticipation
Customer satisfaction and relationship	Dow et al. (1999), Samson and Terziovski (1999), Brah et al. (2000), Sun (2000), Agus & Abdullah (2000), Das et al. (2000), Brah et al. (2002), De Ceiro (2003), [36], Claver et al. (2003), Lai (2003), Lee et al. (2003), Prajogo and Sohal (2003), Sanchez-Rodríguez and Martínez-Lorente (2004), Lau et al. (2004), [33], Prajogo and Sohal (2004), Agus (2004), Lai and Cheng (2005), Rahman and Bullock (2005), Prajogo (2005), Lin et al. (2005), Seth & Tripathi (2005), Prajogo and Brown (2006), Prajogo and Sohal (2006), Lakhal et al. (2006), Feng et al. (2006), Fuentes-Fuentes et al. (2006), Brah and Lim (2006), Hoang et al. (2006), Lin and Chang (2006), Tari et al. (2007), Yusuf et al. (2007), Appiah Fening et al. (2008), Kaynak and Hartley (2008), Sharma and Gadenne (2008), [130], Arumugam et al. (2008), Fotopoulos and Psomas (2009), Salaheldin (2009), Fotopoulos & Psomas (2010), Sadikoglu and Zehir (2010), Miyagawa and Yoshida (2010), Xiang et al. (2010), Kumar et al. (2011), [72], [131], Koc (2011), Idris (2011), Khan (2011), Sánchez-Rodríguez and Martínez-Lorente (2011), Phan et al. (2011), Abdullah & Tari (2012), Kim et al. (2012), Jaafreh & Al-abedallat (2012), Lam et al. (2012), Sıtkı İlkay & Aslan (2012), Wang et al. (2012), Zehir et al. (2012), Abusa and Gibson (2013), Hassan et al. (2013), Laosirihongthong et al. (2013), Talib et al. (2013), Akgun et al. (2014), Delic et al. (2014), Herzallah et al. (2014), Sadikoglu & Olcay (2014), Sabella et al. (2014), Al-Ettayyem & Zu'bi (2015), del Alonso-Almeida (2015), Anil & Satish (2016), Sinha et al. (2016), Kafetzopoulos et al. (2015), Jaca & Psomas (2015), Psomas & Jaca (2016), Rana & Bhola (2016), Swies et al. (2016), Vasantharayalu & Surjit (2016), Aquilani et al. (2017), Ebrahimi & Rad (2017),Patyal et al. (2017), Xiong et al. (2017), Farish et al. (2017), Mehralian et al. (2017), Pradhan (2017), Keinan & Karugu (2018) Omar et al. (2018), Qasrawi et al. (2017),	Customer requirements, customer oriented strategies, customer relationships, customers' requirements, customer satisfaction feedbacks, customer complaints, concessions for defective parts/ products
Human resource focus	Sun (2000), Wilson and Collier (2000), Brah et al. (2002), De Ceiro (2003), Lee et al. (2003), Lau et al. (2004), Seth & Tripathi (2005), Brah and Lim (2006), Sila (2007), Tari et al. (2007), Appiah Fening et al. (2008), Kumar et al. (2009), Miyagawa and Yoshida (2010), Xiang et al. (2010), Zakuan et al. (2010), Khan (2011), Lam et al. (2012), Sıtkı İlkay & Aslan (2012), Talib et al. (2013), Sabella et al. (2014), Al-Dhaafri et al. (2016), Rana & Bhola (2016), Aquilani et al. (2017), Ebrahimi & Rad (2017), Farish et al. (2017), Mehralian et al. (2017), Pradhan (2017), Omar et al. (2018)	Recruitment procedure, proper and efficient training, health and safety practices, career development training
Strategic planning and development	Samson and Terziovski (1999), Curkovic et al. (2000), Wilson and Collier (2000), Prajogo and Sohal (2003), Lai (2003), Lee et al. (2003), Lau et al. (2004), Prajogo and Sohal (2004), Prajogo (2005), Lai and Cheng (2005), Lin et al. (2005), Seth & Tripathi (2005), Kannan and Tan (2005), Prajogo and Brown (2006), Prajogo and Sohal (2006), Feng et al. (2006), Brah and Lim (2006), Hoang et al. (2006), Sila (2007), Appiah Fening et al. (2008), Macinati (2008), Fotopoulos and Psomas (2009), Kumar et al. (2009), Fotopoulos & Psomas (2010), Xiang et al. (2010), Zakuan et al. (2010), Phan et al. (2011), Parast et al. (2011), Jaafreh & Al-abedallat (2012), Lam et al. (2012), Hassan et al. (2013), Laosirihongthong et al. (2013), Talib et al. (2013), Akgun et al. (2014), Sadikoglu & Olcay (2014), Sabella et al. (2014), Al-Dhaafri et al. (2016),	Study and planning for improvement, inspection, control and improvement of processes, data collection and improvement process

(*continued on next page*)

Table 1 (*continued*)

TQM constructs and performance measures	Supporting literature for TQM constructs and performance measures	Description of TQM constructs and performance measures
	Rana & Bhola (2016), Parvadavardini et al. (2016), Anil & Satish (2016), Vasantharayalu & Surjit (2016), Aquilani et al. (2017), Ebrahimi & Rad (2017), Farish et al. (2017), Mehralian et al. (2017), Pradhan (2017), Qasrawi et al. (2017), Omar et al. (2018)	
Supplier quality management	Brah et al. (2000), Cua et al. (2001), Hasan and Kerr (2003), Kaynak (2003), Lin and Chang (2006), Demirbag et al. (2006), Kaynak and Hartley (2008), Macinati (2008), Salaheldin (2009), Zakuan et al. (2010), Parast et al. (2011), Phan et al. (2011), Baird et al. (2011), Kumar et al. (2011), Kim et al. (2012), Jaafreh & Al-abedallat (2012), Abusa and Gibson (2013), Sadikoglu & Olcay (2014), Sinha et al. (2016), Parvadavardini et al. (2016), Ebrahimi & Rad (2017), Panuwatwanich & Nguyen (2017), Samson (2017), Xiong et al. (2017), Farish et al. (2017), Mehralian et al. (2017), Pradhan (2017), Omar et al. (2018)	Quality importance, certification to suppliers and routine audits, periodically visit to suppliers to inspect for quality improvement, supplier detailed information, suppliers feedback
Satisfaction results	[4], Das et al. (2000), Agus & Abdullah (2000), Claver et al. (2003), Agus (2004), Rahman and Bullock (2005), Lin et al. (20,050, Sila (2007), Santos- Vijande et al. (2007), Yusuf et al. (2007), Sharma and Gadenne (20,080, Macinati (2008), Bou-Llusar et al. (2009), Fotopoulos and Psomas (2009), Kumar et al. (2009), Zakuan et al. (2010), Sıtkı İlkay & Aslan (2012), Wang et al. (2012), Delic et al. (2014), Sadikoglu & Olcay (2014), Sabella et al. (2014), Jaca & Psomas (2015), Al-Dhaafri et al. (2016), Psomas & Jaca (2016), Xiong et al. (2017), Qasrawi et al. (2017),	Production percentage, employees morale and satisfaction, customer satisfaction, product quality,
Business results	Samson and Terziovski (1999), Brah et al. (2000), Curkovic et al. (2000), Sun (2000), Wilson and Collier (2000), Agus & Abdullah (2000), [27], Huarng and Chen (2002), Claver et al. (2003), Lai (2003), Sanchez-Rodríguez and Martínez-Lorente (2004), Lau et al. (2004), Fuentes-Fuentes et al. (2004), Lin et al. (2005), Yeung et al. (2005), Lakhal et al. (2006), Fuentes-Fuentes et al. (2006), Demirbag et al. (2006), Shrivastava et al. (2006), Molina et al. (2007), Sila (2007), Yusuf et al. (2007), Kaynak and Hartley (2008), Sharma and Gadenne (2008), Zu et al. (2008), Macinati (2008), Pinho (2008), Fotopoulos and Psomas (2009), Gadenne and Sharma (2009), Kumar et al. (2009), Salaheldin (2009), Zakuan et al. (2010), Koc (2011), Lam et al. (2012), Sıtkı İlkay & Aslan (2012), Wang et al. (2012), Laosirihongthong et al. (2013), Akgun et al. (2014), Herzallah et al. (2014), Sadikoglu & Olcay (2014), Sabella et al. (2014), Al-Ettayyem & Zu'bi (2015), Cetindere et al. (2015), del Alonso-Almeida (2015), Kafetzopoulos et al. (2015), Jaca & Psomas (2015), Al-Dhaafri et al. (2016), Parvadavardini et al. (2016), Psomas & Jaca (2016), Shafiq et al. (2017), Xiong et al. (2017), Farish et al. (2017), Qasrawi et al. (2017)	Sales volume, exports volume, profit

Note: TQM- Total Quality Management

After this, the Section 5 presented the results of our analyses and briefly discussed those results. Finally, this study has offered some conclusions, future avenues of research, and recommendations for policymakers in the Indian manufacturing and service companies.

2. Literature review and research background

The researchers have done an extensive study and empirical work on TQM since last 30 years. They have tried to find out each question related to the TQM implementation. An extensive literature review TQM literature have revealed what comprises TQM and what are the critical measures for the success of TQM. The review of TQM literature identified various TQM measures. However, as shown in Table 1, a number of these measures could be measured by five general categories of measures including organizational leadership, customer satisfaction and relationship, human resource focus, strategic planning and development, and supplier quality management. Explanation of these measures and the supporting literature for them are given in Table 1. In addition, the review of literature also indicated that the studies differed in terms of conceptualizing TQM practices and firm performance. Performance was also conceptualized distinctly across various researches such as quality performance [6,47,49,80,89,93,118,124,129], operational performance ([23,47,49,89,97,121]), business results [80,89,112,124], customer satisfaction [89,104,111,113,122,124,127], and overall organisational performance [52,77,87,90,91,116].

In general, researchers have investigated a direct relationship

Table 2
Respondent's profile (Sample description; $N = 236$).

Characteristic	Count	Approximate percentage (%)
1. Industry type		
manufacturing	6	75
service	2	25
2. Designation		
Manager's (Senior, middle, low)	116	50.8
Worker's (Technicians)	120	49.15
3. Education level		
Diploma and equivalent	137	58
Degree and equivalent	99	42
4. Working experience level (years)		
0–5	90	38
6–10	85	36
11 and above	61	26
5. ISO Certification		
ISO 9001	28	12
ISO 9002	21	9
ISO 9001:2000	35	15
ISO 9001:2008	36	15
ISO 9001:2015	31	13
ISO/TS-16,949	66	28
6. Company's current capital		
10 Million and less	0	0
20–500 Million	90	38
.51–1 Billion	90	38
1.01 Billion and above	56	24

between TQM practices and performance ([6,17,23,47,77,80,91,97,112,116], Hung et al. 2011, [59,65,86]). At the same time, there is also evidence of indirect relations among TQM practices and performance in extant literature [9,21,50,90,111]. Some of the researchers ([8,40,70,98,104], Arumugam et al. 2008, [1,48,49,94,118,125,129]) have considered combined (direct and indirect) relationships among them. In addition, researchers [6,39,51,95,100,122] have analyzed the mediating effects of some TQM practices on performance. Several research studies [2,49,123,127] have analyzed the presence of contextual variables in the relationship between TQM practices and performance. However, based on these direct and indirect relations among TQM practices and performance lack generalized compatibility among researchers.

Table 1 shows the reviewed literature of TQM practices and organisation performance (OP). However, the researches on TQM and OP in Indian context have not addressed the key issue of relationship between implementation factors and performance. Seth & Tripathi [103] analysed the relationship between the TQM practices, total productive maintenance and organisational performance. However, in this study some of the performance measures such as business results and customer satisfaction were not considered. Kumar et al. [58] have identified the TQM success factors in North Indian manufacturing and service industries. This study has not found any relationships between TQM success factors and performance measures. Sinha et al. [105] analysed the effect of TQM principles on performance of Indian small and medium enterprises (SMEs). This study has considered only three indicators such as customer results, process results, and employee results. Farish et al. [29] investigated the effect of TQM practices on financial performance. This study has neglected the non-financial outcomes of performance. Sahoo and Yadav [96] examined the relationships between TQM dimensions and organisational performance in Indian manufacturing SMEs. This study has not considered the important TQM practices such as leadership, strategic planning and development, and human resource focus etc. In addition, studies of Shrivastava et al. [114], Talib et al. [118], Parvadavardini et al. [80], Anil & Satish [7], Rana & Bhola [91] and Patyal et al. [81] have also investigated the relationships between the TQM and OP in Indian firms. These studies have identified different sets of practices for the success of TQM implementation and performance measure in Indian context but as such, no study has identified a common set of practices for successful implementation of TQM and performance measure. Further, until recently, only a few researches could be found on TQM operationalization and performance measure in Indian context. In addition, to our best of knowledge the moderating effect between TQM and OP factors on the basis of two different group respondents has not been found in Indian context. Moreover, most of studies in Indian context have not considered both financial and non-financial measures together to analyse the effect of TQM practices and organisational performance. The purpose of this study is to empirically investigate the relationships between TQM practices and OP in Indian manufacturing and service organizations and to statistically analyse the results to finally yield an integrated model that explains the interrelationships. In addition, to examine the moderation effects of respondent type on the relationship between TQM practices and organisation performance

3. Research hypotheses and conceptual research framework

This section presents the different TQM elements considered in the study and proposed conceptual research model.

3.1. TQM elements

TQM element categorisation has always been a concept of debate as researchers find it a tedious task to classify elements for further investigation [97,104,118]. The TQM elements in this study were extracted from comprehensively reviewed literature, as shown in Table 1, and also by combining different quality awards such as Malcolm Baldrige National Quality Award, European Quality Award, The Deming Prize and Kanji Business Excellence Model. The TQM practices identified in the questionnaire were organizational leadership, customer satisfaction and relationships, human resource focus, strategic planning and development, and supplier quality management. Although not exhaustive, these TQM practices have often been considered the critical practices of TQM (e.g., [15,18,50,59,63,64,85,87,93,98,104,115,123,127], and [81]). These practices were briefly explained in the following section.

3.1.1. Organizational leadership

The review of empirical TQM studies show that organization leadership is an important TQM factor [51,82,123,124,127]. Top management leadership actively involved in communication and planning of organizational goals [51,67,87,93,98,123]. Management leadership provides significant means (resources) to improve and maintain quality [15,31,91,95,104,115]. In addition, top management views quality more important than production and they takes quality as their responsibility [24,62,67,85,87]. Furthermore, management can interact with their concerned departments to anticipate changes and make plans to accommodate it. Finally, studies analysed that top-management commitment significantly affects the organisation performance [14,28,37,50,51,53,54,56,67,71,75,76,78,81,83,85,89,91,98,104,105,118,120]. Accordingly, it is proposed that:

H1: Organizational leadership for TQM practices is positively correlated with organisational performance in Indian manufacturing and service companies.

3.1.2. Customer satisfaction and relationship

For any organization customer satisfaction and relationship is the most important factor, while in TQM it is regarded the core issue for better business results [14,53,75,76,104,113,118]. In this construct of TQM practices, the key customer requirements are identified and customer oriented strategies are built and reviewed for further improvements [13,22,26,65,88,98,104,116,127]. Customer satisfaction feedbacks are taken after a regular interval and customer complaints are properly recoded and reviewed to maintain our quality standards [28,29,51,78,104,105]. In addition, encouragement is provided to partnerships with customers to make better relations [56,71,83,120]. Furthermore, concessions are provided for defective parts/products if delivered [51]. Therefore, customer satisfaction and relationship is an important element of TQM construct and it helps in upgrading business performance. Thus the proposed research hypothesis is:

H2: Customer satisfaction and relationship for TQM practices is positively correlated with organisational performance in Indian manufacturing and service companies.

3.1.3. Human resource focus

Human resource is one of the main assets of any organization and it plays a vital role for the betterment of quality and business [10,28,60,65,87,98,127]. In addition, human resource is a critical factor of TQM construct that includes a variety of organisational development practices such as efficient training, recruitment procedure, health and safety practices, involvement, empowerment, recognition, teamwork, etc. Moreover, well-trained, satisfied, and committed human resources enhance the organizational performance. Rahman and Bullock [90], Molina et al. [74], Tari et al. [120], Zakuan et al. [127], Talib et al. [118], Farish et al. [29], Mehralian et al. [71], Pradhan [83], and Omar et al. [76] suggested that human resource focus was significantly and positively correlated with organizational performance. Accordingly, the next hypothesis relates to human resource focus and organizational performance. Therefore, the proposed hypothesis is:

H3: Human resource focus for TQM practices is positively correlated with organisational performance in Indian manufacturing and service companies.

3.1.4. Strategic planning and development

In TQM, strategic planning and development element also has a major role in achieving a satisfied quality and increased performance as suggested by researchers [6,21,30,75,83,93,115,123]. It includes the quality policy, mission statements, improvement processes, use of quality control and other management tools. Strategic planning and development is essential to examine how a firm evolves, executes and refines its strategy and policy to achieve better performance [88,118]. The studies of Lai [60], Prajogo and Sohal [88], Lin et al. [67], Prajogo and Brown [85], Feng et al. [30], Zakuan et al. [127], Phan et al. [82], Lam et al. [63], Talib et al. [118], Sabella et al. [93], Sadikoglu & Olcay [94], Parvadavardini et al. [80], Al-Dhaafri et al. [6], Aquilani et al. [10], Ebrahimi & Rad [28], Farish et al. [29], Mehralian et al. [71], and Omar et al. [76] found that strategic planning and development has a significant impact on organisational performance. Therefore the proposed hypothesis for this element is:

H4: Strategic planning and development for TQM practices is positively correlated with organisational performance in Indian manufacturing and service companies.

3.1.5. Supplier quality management

Effective supplier quality management supports a cooperative and long-term relationship with suppliers [50,127], gives them an opportunity to get involved in product design and production processes to improve the quality of their materials and/or services [123,20,50,61], helps companies to attain competitive advantages [25,104], and improves organisational performance [31,50]. The findings of Brah et al. [13], Sun [115], Agus & Abdullah [3], Cua et al. [20], Tan [119], Huarng and Chen [42], Kaynak [50], Lai and Cheng [61], Lin and Chang [66], Demirbag et al. [25], Sila [104], Kaynak and Hartley [51], Macinati [70], Fotopoulos and Psomas [31], Salaheldin [45], Miyagawa and Yoshida [73], Zakuan et al. [127], Khan [54], Baird et al. [11], Kim et al. [56], Zehir et al. [128], Abusa and Gibson [2], Talib et al. [118], Delic et al. [24], Sadikoglu & Olcay [94], Rana & Bhola [91], Samson [97], Farish et al. [29], Mehralian et al. [71], Pradhan [83], Omar et al. [76] noted that effective supplier management improves organisational performance. Therefore, a hypothesis to test this relationship is as follows:

H5: Supplier quality management for TQM practices is positively correlated with organisational performance in Indian manufacturing and service companies.

3.2. TQM and OP construct

Several studies analysed the relationship between TQM in each of its forms and OP [2,13,24,50,67,88,94,98,104,105,118,127,128]. The implementation of TQM practices enhance business performance [67,104,105,127]. Kaynak [50] analysed that TQM leads to organisational quality performance and has been significantly connected to financial and non-financial performance. Bou-Llusar et al. [12] reported that improved TQM practices guides to better business results. Similar, the studies of Talib et al. [118], Akgun et al. [5], Sadikoglu & Olcay [94], Anil & Satish [7], Sinha et al. [105], Psomas & Jaca [89], Rana & Bhola [91], Patyal et al. [81], Xiong et al. [124], Pradhan [83], Shafiq et al. [112], Keinan & Karugu [53], Omar et al. [76], and Qasrawi et al. [75] have found a significant and positive relationship with OP. Therefore, the proposed hypothesis is:

H6: The TQM implementation as a set of practices has a direct and positive effect on OP.

According to Richard et al. [92], overall organizational performance includes three specific areas of firm outcomes: (a) financial performance (profits, return on assets, return on investment, etc.), (b) product market performance (sales, market share, etc.), and (c) shareholder return (total shareholder return, economic value added, etc.). A comprehensive review of past empirical studies on organisational performance revealed that there are wide ranges of performance measures, as shown in Section 2. In this study, organisational performance will be measured through two factors, which are satisfaction level, and business results following Lin et al. [67], Sharma and Gadenne [113], Fotopoulos & Psomas [31], and Zakuan et al. [127] suggestion. Satisfaction level in organisational performance included four items, namely production achieved, employee satisfaction, customer satisfaction, and product quality, while business results for organisational performance included three items: sale, export, and profitability.

3.2.1. Satisfaction results

A satisfied employee works for the betterment of the quality and increases the productivity, better quality enhances the trust and loyalty of the customers and satisfied customer increases the growth rate of a company [12,104,120]. The studies of Lin et al. [67], Sharma and Gadenne [113], Fotopoulos & Psomas [31], Miyagawa & Yoshida [73], Zakuan et al. [127], Farish et al. [29], and Qasrawi et al. [75] has found positive correlation of satisfaction results with organizational performance. Therefore, the hypothesis for this construct of OP is:

H7: Satisfaction results for TQM practices is positively correlated with organizational performance.

3.2.2. Business results

Business results are related to financial terms that are sales, exports and profit. TQM significantly increases the business performance of any firm and it is related to financial and non-financial both performances [25,95]. The studies of Dow et al. [26], Sun [115], Brah et al. [15], Lee et al. [65], Lau et al. [64], Prajogo [84], Lin et al. [67], Prajogo and Brown [85], Sila [104], Tari et al. [120], Arumugam et al. (2008), Zakuan et al. [127], Sánchez-Rodríguez and Martínez-Lorente [100], Talib et al. [118], Farish et al. [29], and Qasrawi et al. [75] has positively correlated the business results with organizational performance. Therefore, the proposed hypothesis for the performance constructs is:

H8: Business results for TQM practices is positively correlated with organizational performance.

From the above literature review and hypotheses development, this study has managed to develop our own conceptual research framework according to Indian manufacturing and service industries. This conceptual model as shown in Fig. 1 indicates the impact of TQM implementation on organizational performance.

4. Research methodology

After reviewing the research background, it was easy to choose the methodology for our research. The first part was to determine the strategies for the research. Strategies helped in building the structure of the research. Most of the ideas were chosen from the previous researches of Cua et al. [20], Claver et al. [18], Kaynak [50], Prajogo and Sohal [87], Rahman and Bullock [90], Kannan and Tan [52], Brah and Lim [14], Sila [104], Kaynak and Hartley [51], Bou-Llusar et al. [12], Zakuan et al. [127], Talib et al. [118], and Patyal et al. [81], which enabled us to define the questionnaire to survey to collect the raw data. The data was then analysed with SPSS-AMOS software. The analysis was carried out in the three phases namely, the data screening or descriptive statistics, factor analysis and the SEM. All the research methodology was based on the previous studies of Singh [106], Singh et al. (2016), and Singh & Sharma [108,109].

4.1. Questionnaire structure

The questionnaire was having two parts (See Appendix A). The first part was demographic information and the second part was survey questionnaire. The survey questionnaire was divided into two parts A and B. Part A questions were about the TQM constructs and part B questions were the about performance constructs. TQM constructs are Organizational leadership (OL), customer satisfaction and relationship (CSR), human resource focus (HRF), strategic planning & development

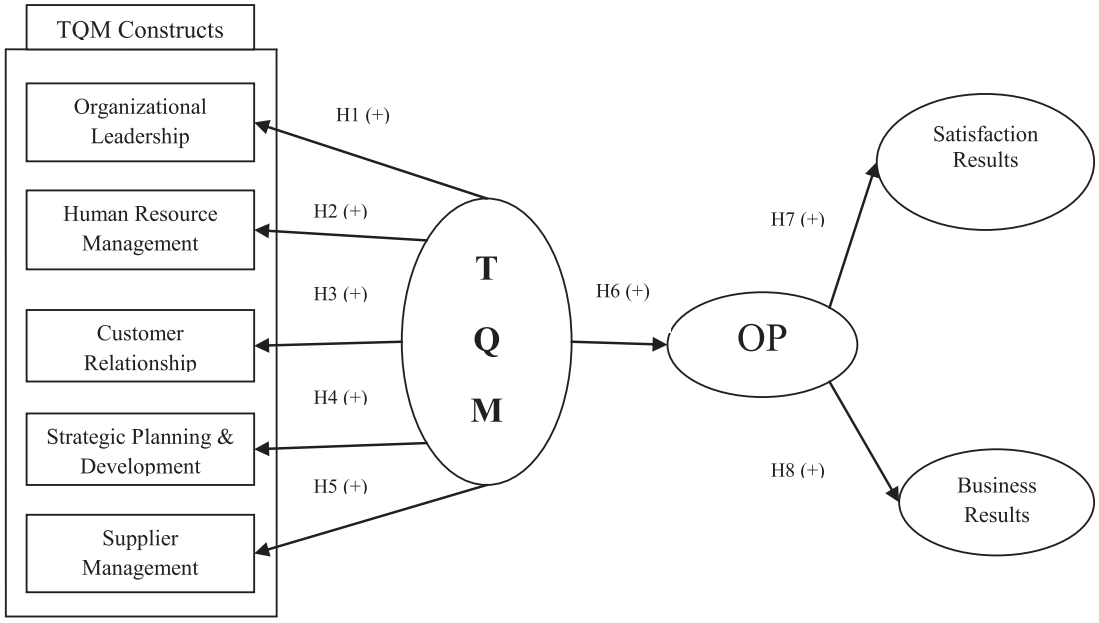

Fig. 1. Conceptual research framework linking the TQM and OP.

(SPD), supplier quality management (SQM) and OP constructs are satisfaction results (SR) and business results (BR). These constructs and their items were selected from previously tested scales by the researchers as shown in Table 1. All the questions were in five point Likert scale ranging from strongly disagree, disagree, undecided, agree and strongly agree.

4.2. Study population

The study was conducted in North Indian industries (both in manufacturing as well as service industries) from the month of January to June in 2017. This study has selected 14 industries and from which only eight have taken part in the survey with a response rate of 57%. The survey was conducted via self-administration as well as via e-mails and managed to get 256 samples from the participating workers. The questionnaire were made available in both Hindi and English. Out of 256 samples, only 236 were usable. This study has categorized the whole structure of organizations into two levels i.e., managers and workers. The manager's level has included the senior managers, middle manager, and low-level managers, while worker's level has included technicians. In addition, a stratified random sampling was used [106,118], to increase the precision in TQM and OP research and reduce the sample variation and error.

4.3. Data screening

The collected data was coded and entered in SPSS-AMOS 24 version for analysis. The data was then checked for missing values, and normality (skewness and kurtosis) as suggested by researchers Hair et al. [35] and Singh and Sharma [109]. If the absolute kurtosis and skewness is less than ± 2, the dependent variables normality is acceptable [109]. In this study, kurtosis and skewness range values were less than ± 2 as shown in Appendix B. Thus, the normality of the dependent variables is acceptable, and hence, the normality assumption is satisfied. After preparing the data, an exploratory factor analysis (EFA) was conducted, confirmatory factor analysis (CFA), and SEM analysis as discussed in the next section.

4.4. Statistical techniques

This research was carried out in three stages by using EFA, CFA and SEM techniques. In the first stage, EFA was used to provide the grouping of factors that emphasize the complete set of items based upon the strong correlation [69,108]. A hypothesized model can be developed using EFA techniques and can be further tested using CFA. In the second stage, the CFA was used to define and figure one or more hypothetical models of factor structure, each of which suggests a set of unobserved variables to account for covariance within a set of observed variables [35]. Lastly, in the third stage, the SEM technique was used and empirically tested the relationships between TQM practices and OP. SEM is a multivariate technique that allows the concurrent estimation of multiple equations [106]. Moreover, SEM is also a statistical modeling technique that can manage dependent and independent variables and, therefore, explains all relationships [35].

5. Analysis and results

The EFA, CFA, and SEM analysis were performed to investigate the relationships among TQM practices and OP. All these are given below, defining themselves with the help of Tables and Figures.

5.1. Response rate

The data for this study has been collected from the north Indian service and manufacturing industries, as discussed in the previous section. It has taken almost five months to conduct the survey in 14 industries but only 8 has taken part with a response rate of 57%. The 500 questionnaires were sent to these industries and 256 of them have responded back with a response rate of 51.2%. The data collected had some incomplete responses, therefore, they were not counted. The final sample had 236 responses and these were large enough to use it for an SEM analysis purpose.

5.2. Sample characteristics

A number of variables have been used in order to describe the sample characteristics as shown in Table 2. The demographic information was about industry type, designation of respondent, work experience with the organization, educational qualification, currently the quality system of the company, wish to implement quality system and current capital of the company.

Table 3
Exploratory Factor Analysis (EFA).

Constructs TQM Constructs	Factor Loadings	Eigen Values	% of Variance	KMO	Chronbach's Alpha
1. Organizational Leadership (OL)		4.612	65.881	.893	.913
OL-11	0.739				
OL-1	.873				
OL-2	.799				
OL-3	.822				
OL-4	.841				
OL-5	.863				
OL-6	.733				
Approx. Chi-Square-1071.376, df- 21, p- 0.000					
2. Customer Satisfaction & Relationship (CSR)		5.185	74.074	.924	.926
CSR-1	.801				
CSR-2	.889				
CSR-3	.853				
CSR-4	.879				
CSR-5	.869				
CSR-6	.854				
CSR-7	.876				
Approx. Chi-Square-1393.132, df- 21, p- 0.000					
3. Human Resource Focus		2.544	63.601	.787	.808
HRF-1	.796				
HRF-2	.833				
HRF-3	.798				
HRF-4	.761				
Approx. Chi-Square-296.298, df- 6, p- 0.000					
4. Strategic Planning & Development		3.160	79.002	.838	.909
SPD-1	.852				
SPD-2	.907				
SPD-3	.913				
SPD-4	.883				
Approx. Chi-Square-646.044, df- 6, p- 0.000					
5. Supplier Quality Management		3.070	61.404	.824	.836
SQM-1	.794				
SQM-2	.807				
SQM-3	.832				
SQM-4	.807				
SQM-5	.668				
Approx. Chi-Square-485.206, df- 10, p- 0.000					
Performance Constructs					
1. Satisfaction Results		2.837	70.925	.801	.860
SR-1	.777				
SR-2	.891				
SR-3	.904				
SR-4	.789				
Approx. Chi-Square-470.502, df- 6, p- 0.000					
2. Business Results		2.713	90.418	.768	.947
BR-1	.958				
BR-2	.941				
BR-3	.954				
Approx. Chi-Square-680.878, df- 3, p- 0.000					

5.3. Results of EFA

Exploratory factor analysis was performed using maximum likelihood of Varimax rotation to check the validity and reliability criteria of variables is satisfactory and correlated. Principle Component Analysis (PCA) is important in checking the goodness of fit test for factors. PCA also provides the correlation between factors with unique variance of items.

5.3.1. Adequacy

The suitability of questionnaire can be evaluated by performing Bartlett's test of sphericity and Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy. For good factor analysis the value of KMO should always be higher than 0.60 [117]. The items with low communality (< 0.400) were eliminated from the questionnaires. Factor loadings that are higher than 0.50 considered good and significant for the analysis [35]. The Chi-square values of each factor have been given below in the Table 3.

5.3.2. Validity

The factor structure in which convergent and discriminate validity are evident by the high loadings within factors, and no cross-loadings between factors. All the factors have loadings above 0.60 and eigen values above 1.00. The variance explained of each factor is given is between 61.404 and 90.418 (see Table 3).

5.3.3. Reliability

The reliability of the factors was measured through Chronbach's Alpha. The permissible value of Chronbach's Alpha was above 0.7 [35,110] and the values of the all seven factors were between 0.808 and 0.947 (Table 3).

5.4. Results of CFA

CFA is a way to assess the adequacy of hypothesised model and the measurement properties of all the factors and their items. The results of CFA are given below.

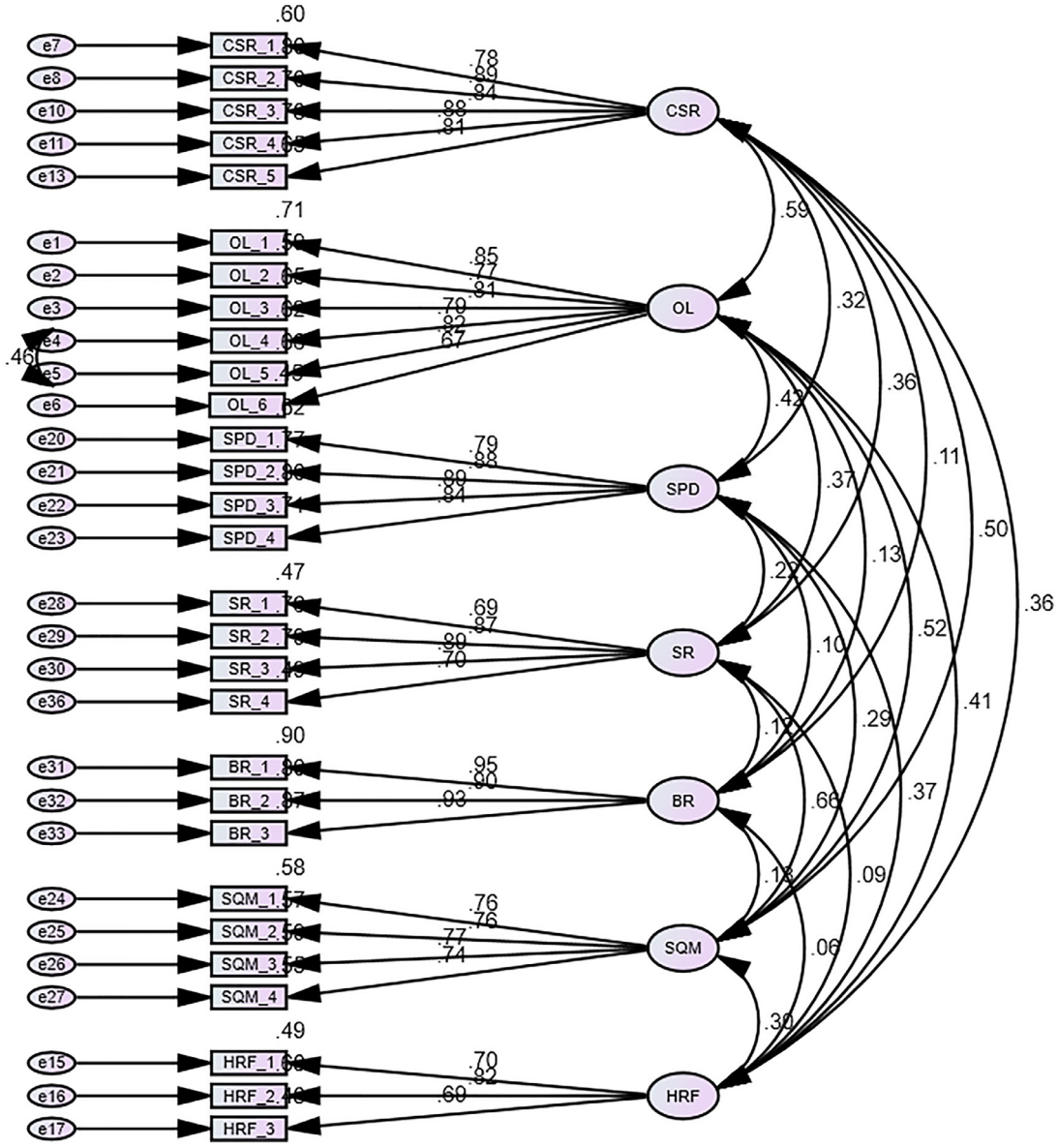

Fig. 2. Measurement model of TQM and OP.

5.4.1. Model fit

All the constructs, have significant loading above 0.50 and for the determination of improvement of model, the modification indices were consulted. Accordingly, the error terms were co varied between e4–e5, Fig. 2 shows the measurement model of TQM and OP. Table 4 shows that the goodness of fit for our measurement model is sufficient.

5.4.2. Validity and reliability

The standardised factor loadings should be at least 0.50 for construct validity [35]. In our study, the factor loadings of standardised items have exceeded the minimum value. In the AMOS, the t value is the critical ratio, which denotes the estimated parameter divided by its standard error. Values more than 1.96 or less than −1.96 implies statistical significance [16,69,102]. In this study, all the t values exceeded the minimum limit of 1.96 at the 0.000 level of significance as shown in Table 5.

The average variance extracted (AVEs) was calculated from the Table 6 and is between 0.551 and 0.857, which confirms the convergent validity (CV) is above minimum value. The maximum shared variance (MSVs) are relatively lower than AVEs, which shows the evidence of discriminate validity by the constructs of study. Composite reliability (CR) was above the minimum value (0.70) ranging from 0.785 to 0.923 in all the cases, indicating the reliability of our constructs.

5.5. SEM & testing of hypotheses

After the above analysis, the study need to confirm the validity of our proposed hypotheses and examine the structural equation model of TQM and OP. Table 7 and Fig. 3 shows the results of the hypotheses testing and SEM analysis. In H1, the relationship between OL for TQM practices with OP was proposed as positive and the results are admitting the validity of hypothesis. The value of path coefficient, $\beta = 0.77$ at a significant $p < 0.001$. The results are consistent with the previous studies of Lam et al. [63] and Vijande & Gonzalez [101]. This implies that the results are strongly supporting the hypothesis. In H2, the positive relationship of CSR for TQM practices and OP was proposed. The path coefficient (0.71) and *t*-value (4.880) at a significance of $p < 0.001$ strongly supports the hypothesis. The results are consistent with the previous studies of Zakuan et al. [127], and Sadikoglu & Zehir [95].

Table 4
Goodness of fit statistics in CFA.

Indices	Abbreviation	Observed values	Recommended criteria	References
Chi-square	χ^2	620.689 at p = 0.000	$p < 0.05$	Hair et al. (2010) Singh and Sharma (2016) [57] [41] Byrne (2013), [107]
Normed chi-square	χ^2 /df	1.5	$1 < \chi^2/df < 3$	
Goodness-of-fit index	GFI	0.85	>0.80	
Adjusted GFI	AGFI	0.82	>0.80	
Normed fit index	NFI	0.88	>0.90	
Comparative fit index	CFI	0.96	>0.95	
Tucker–Lewis index	TLI	0.96	0 < TLI < 1	
Root mean square error of approximation	RMSEA	0.04	<0.05 good fit < 0.08 acceptable fit	

Table 5
Confirmatory factor analysis of TQM and OP.

Factors and items	Standardized factor Loadings	Standard error	t -value	p value
a) Total Quality Management (TQM)				
1. Organizational Leadership (OL)				
OL_1	.845			
OL_2	.769	.066	13.742	***
OL_3	.809	.064	14.662	***
OL_4	.787	.071	13.856	***
OL_5	.815	.070	14.531	***
OL_6	.668	.072	11.117	***
2. Customer satisfaction and Relationship (CSR)				
CSR_1	.777			
CSR_2	.894	.074	15.202	***
CSR_3	.839	.073	14.200	***
CSR_4	.882	.064	14.929	***
CSR_5	.807	.077	13.319	***
3. Human Resource Focus (HRF)				
HRF_1	.703			
HRF_2	.825	.120	9.328	***
HRF_3	.692	.115	8.806	***
4. Strategic Planning and Development (SPD)				
SPD_1	.785			
SPD_2	.876	.077	15.061	***
SPD_3	.893	.066	14.971	***
SPD_4	.842	.071	14.041	***
5. Supplier Quality Management (SQM)				
SQM_1	.762			
SQM_2	.757	.090	11.455	***
SQM_3	.768	.085	11.382	***
SQM_4	.743	.099	10.480	***
b) Organizational Performance (OP)				
1. Satisfaction Results (SR)				
SR_1	.689			
SR_2	.871	.104	11.823	***
SR_3	.889	.106	11.876	***
SR_4	.698	.106	9.748	***
2. Business Results (BR)				
BR_1	.948			
BR_2	.897	.040	23.860	***
BR_3	.932	.037	26.693	***

Hence, CSR is an important aspect of TQM practices to enhance the organisation performance.

In H3, the proposed hypothesis shows the positive relation between HRF for TQM practices and OP. The values obtained after analysis are confirming the hypothesis and hence supporting it. The path coefficient $\beta = 0.47$ at significance $p < 0.001$ and is purely positive relation. The results are also consistent with previous studies Zakuan et al. [127], and Sila [104]. In H4, the positive relation between SPD for TQM practices and OP was proposed. With the path coefficient value 0.48 at significance $p < 0.001$, shows the validity of hypothesis. The results are consistent with the previous studies of Zakuan et al. [127], and Talib et al. [118]. Therefore, the results conclude that strategic planning is an important element of TQM and has a positive relationship.

In H5, this study had proposed a positive relationship between SQM for TQM practices with OP. Since values obtained after analysis are significantly supporting the hypothesis ($\beta = 0.74$ at a significance of $p < 0.001$). The results are consistent with the previous studies of Abusa & Gibson [2], and Kaynak & Hartley [51]. Therefore, it is concluded that SQM is an integral element of the TQM to enhance the business performance.

The positive relationships TQM practices and OP was proposed. For that, three hypotheses had been proposed which were H6, H7, and H8. In H6, TQM and OP are strongly supported as $\beta = 0.89$ at a significance of $p < 0.001$. In H7, the SR are strongly supported with the path coefficient value $\beta = 0.63$ at a significance of $p < 0.001$, shows the validity of hypothesis. Therefore, this construct of OP is supporting the hypothesis. In H8, the BS is another construct of OP and has $\beta = 0.19$ at a significance of $p = 0.33$. Since $p < 0.05$ [35], hence it supports the hypothesis. These results are consistent with the previous studies of Shafiq et al. [112], Cetindere et al. [17], Zakuan et al. [127], and Sila [104]. Therefore, after discussing the results of H6, H7, and H8, this is concluded that the TQM has a positive impact on the organizational performance and hence TQM implementation increases the performance of the companies significantly.

5.6. Multi-group moderation of respondent type

Multi-group moderation tests were conducted using the full model. The effects of TQM on OP between managers and workers were compared. To test respondents type differences, the critical ratio (CR) test ($> \pm 1.96$, $p < 0.05$) was used to achieve the CR statistics for the differences among regression weights of managers and workers. The CR of an estimate pair was utilized to test the hypothesis to confirm the equality of the two factors. According to the results presented in Table 8 and in Figs 4 and 5, there seems to be a significant difference in only two of the relationships between both manager and worker groups. Figs 4 and 5 shows the structural models for managers and workers respondents in manufacturing and service companies. Finally, it can be concluded that there are significant relationship among all the constructs of TQM practices and OP for the both type of respondents. However, a non-significant relationship ($p > 0.05$) between the OP and BR (Fig. 5) was observed for workers model as compared with managers' model. This implies that the workers were not well aware of the OP aspects of companies such as sales, exports, and profits as compared with the managers. Therefore, different levels of working positions of respondents can yield markedly different results. Nevertheless, when respondents are

Table 6
Validity and reliability in CFA.

	CR	AVE	MSV	ASV	SQM	CSR	OL	SPD	SR	BR	HRF
SQM	0.843	0.574	0.429	0.189	0.758						
CSR	0.923	0.707	0.350	0.162	0.498	0.841					
OL	0.905	0.615	0.350	0.186	0.520	0.592	0.784				
SPD	0.912	0.723	0.174	0.093	0.287	0.325	0.417	0.850			
SR	0.869	0.628	0.429	0.127	0.655	0.357	0.368	0.217	0.792		
BR	0.947	0.857	0.018	0.012	0.133	0.106	0.132	0.099	0.120	0.926	
HRF	0.785	0.551	0.171	0.089	0.297	0.357	0.414	0.373	0.085	0.059	0.742

Note: For Composite reliability (CR > 0.70); Convergent validity (CR > AVE > 0.50); Discriminate validity (MSV < AVE); MSV = Maximum shared variance; ASV = Average shared variance (Hair et al., 2010)

Table 7
Hypotheses testing.

Hypothesis	Path coefficient	t –value	P-value	Result
TQM→OL	.77	5.079	***	Supported
TQM→CSR	.71	4.880	***	Supported
TQM→HRF	.47	4.278	***	Supported
TQM→SPD	.48	4.319	***	Supported
TQM→SQM	.74	4.674	***	Supported
OP→SR	.63	4.095	***	Supported
OP→BR	.19	2.128	.033*	Supported
TQM→OP	.89	6.128	***	Supported

Note; ***p < 0.001, * p < 0.05

divided according to their level of position, it is necessary to consider a source of bias—those users with high level of position will have clearer attitude towards TQM practices and OP. Therefore, the model for worker's respondents is somewhat different from manager's respondents.

Table 8
Comparison of analysis of two groups (manager and employee respondents).

Path	Overall model	Respondent's type			
		Manager's	CR (Manager's)	Worker's	CR (Worker's)
TQM→OL	.77	.78	3.568	.78	3.768
TQM→CSR	.71	.77	3.524	.81	3.413
TQM→HRF	.47	.46	3.047	.56	3.221
TQM→SPD	.48	.52	3.051	.45	3.233
TQM→SQM	.74	.74	3.252	.73	3.633
OP→SR	.63	.75	3.385	.27	2.716
OP→BR	.19	.26	1.781	.08	1.197
TQM→OP	.89	.77	3.521	.69	3.152

6. Conclusions, managerial implications and future research directions

6.1. Conclusions

This study primarily focused on the implementation of TQM in SME

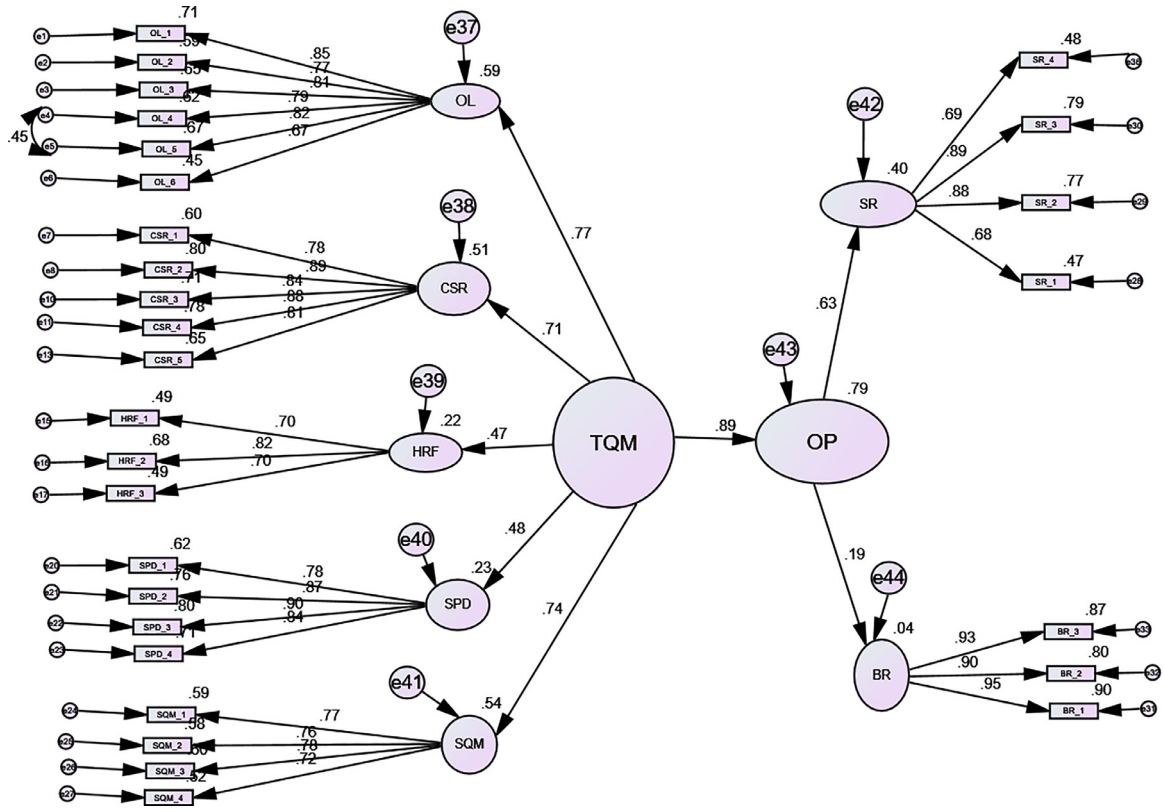

Fig. 3. Structural equation model of TQM and OP.

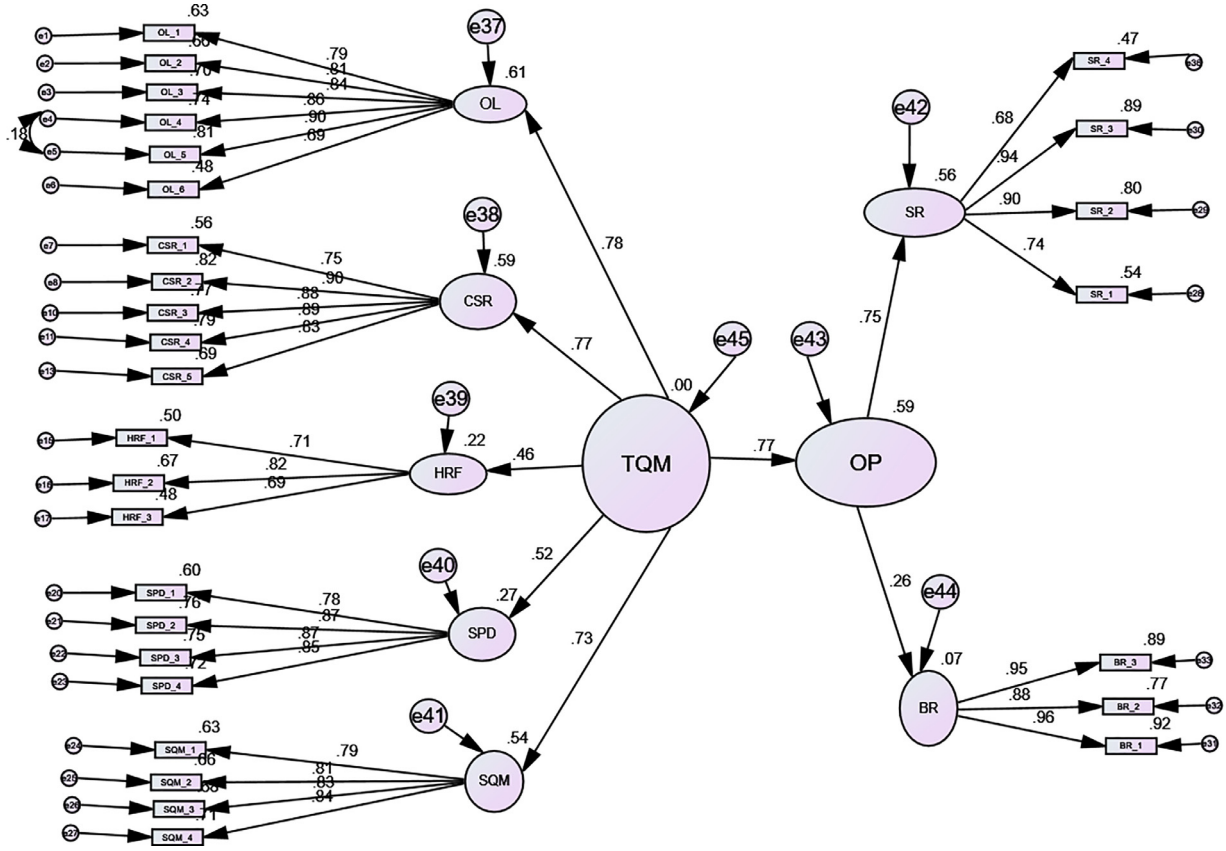

Fig. 4. TQM and OP model for manager's (N = 116).

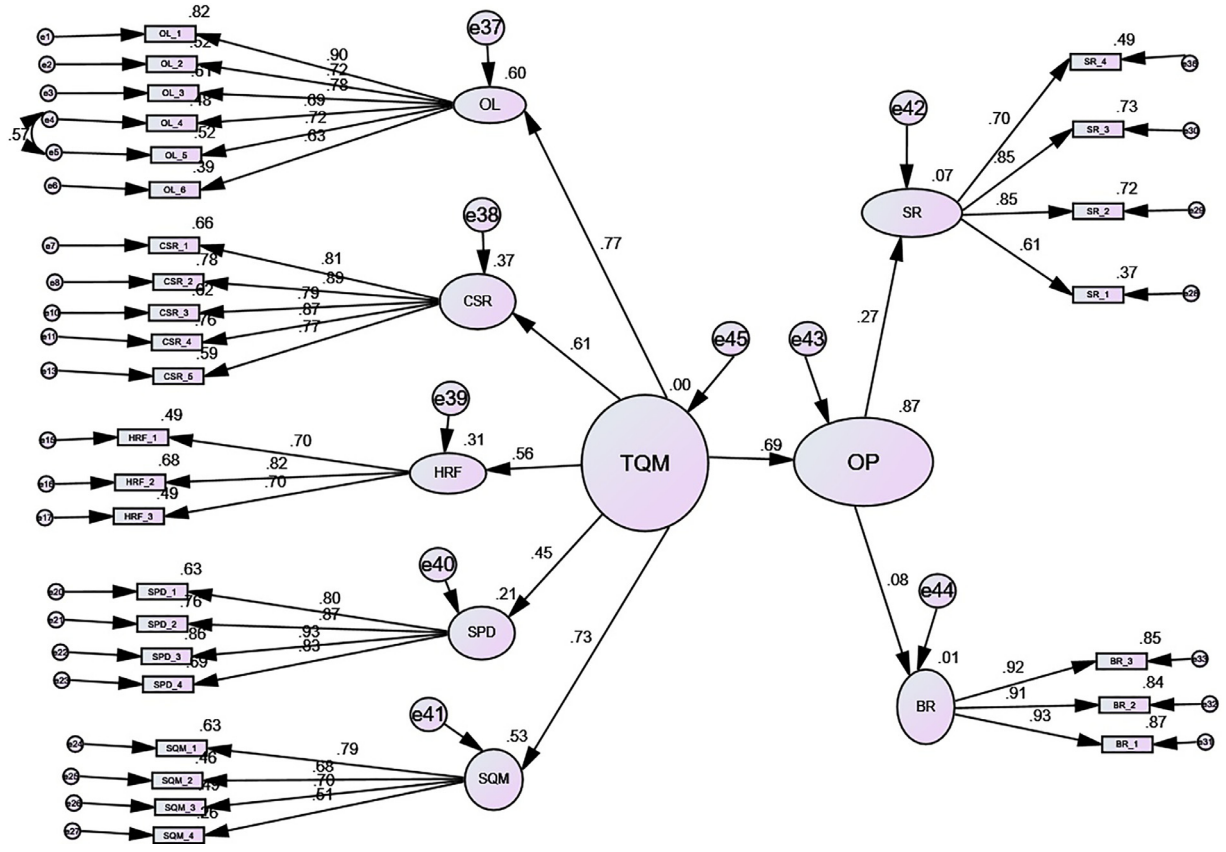

Fig. 5. TQM and OP model for worker's (N = 120).

Indian manufacturing and service industries and its impact on the OP. Overall, the results of this study indicated that the TQM practices were found to be correlated with OP. From Table 8, it is concluded that OL ($\beta = 0.77$) has the highest impact on TQM practices, SQM ($\beta = 0.74$) has the second highest impact on TQM practices, whereas CSR ($\beta = 0.71$) and supplier quality ($\beta = 0.48$) have the third and fourth highest impact on TQM practices, respectively, and finally HRF ($\beta = 0.47$) also has an impact on TQM practices. In addition, SR ($\beta = 0.63$) has the highest impact on OP than BR ($\beta = 0.19$). The results highlighted the crucial role played by OL, CSR, HRF, SPD, and SQM in the OP of the firm. Furthermore, the results also highlighted the relative significance and interlinkage of TQM practices, and OP.

The results of the study show that OL provides significant means to improve and maintain quality. Top leadership provides significant means to improve and maintain quality. In addition, top leadership can anticipate changes and make plans to accommodate it. However, quality could not be successfully implemented if there is a lack of commitment from the top management. The results also have shown that CSR is positively related to OP. Systematic analysis of customer feedback and its use in the product or process improvement, and developing customer-oriented strategies can improve SR. Furthermore, design, development and delivery of products according to the requirements of customers can also improve the OP. The findings have also been found that HRF for TQM practices positively relates to the OP. Effective training, good health and safety practices, and treating workers as a valuable resource can increases the firm performance. In has been also found that SPD for TQM practices is positively related to OP. Effective SPD is critical factor to the success of quality improvement programs. Planning for improvement of all its products and processes, frequent inspection of product quality and process, and control and improvement of processes can improve the OP. Finally, it has been also found that SQM for TQM practices is positively related to OP. Effective SQM motivates a cooperative, long-term relationship with suppliers which helps them to get involved in product or service design. The results of this study also indicate that TQM has a strong positive and significant effect on OP. These results support the argument of TQM exponents that companies can attain better results by implementing the TQM practices. The success of any TQM strategy rely on leadership style of businessman, senior managers, who should mainly focus upon designing an organizational culture that supports TQM implementation. The study confirms positive relationship between TQM and OP.

This study has compared two groups' managers and workers and examined the SEM models by comparing them. The findings have revealed that both the models were almost of equal critical ratios and path coefficients. However, a stronger and significant relationship between the TQM and HRF for workers' than managers shows that the workers respondents were more concerned about their training, recruitment procedure, career development, and health & safety benefits. While, a weaker and significant relationship between the OP and SR was observed for workers than the managers' shows that managers' were more concerned with the customer satisfaction, employee satisfaction, product quality, and production achieved. Therefore, it is concluded that in organizations different levels of working positions can yield markedly different results on the relationships between TQM and OP. Moreover, the managers had the clearer attitude towards TQM practices and OP relationship than employee respondents. The workers should be made aware about the OP aspects of companies such as sales, exports, and profits, which could result in better performance. This empirical work will help Indian and international researchers to understand the scenario of TQM implementation.

6.2. Managerial implications

The positive relationship among TQM practices and organisation performance measures indicates the importance of each of these practices to improve firm business. Managers can use this developed model periodically to analyse where their firm stands in the quality management journey. They can also analyse the effects of TQM practices on performance measures: business results and satisfaction results in order to assess the success of TQM practices.

The positive relationships between TQM practices and organization performance measures can motivate the top management of the firms to involve in the better planning of organisations goals, to arrange resources in time, effort, and capital to the implementation of TQM practices in pursuit of improved quality, employee, and firm performances. Our results show that firms can combine customer satisfaction, human resources, strategic planning, and supplier quality management to improve organization performance. In addition, survey techniques like customer feedback and complaint analysis should be tackled at regular interval to ensure the satisfaction of customer needs and expectations, which will boost the level of business performance. Finally, the results of this study provides valuable knowledge regarding TQM practices from Indian manufacturing and service sector perspective. The Indian manufacturing and service sector has to focus on the implementation of TQM practices if they really want to upgrade the quality of their products and to be competitive in the international market. The results can help academics, policy makers, managers, and firms that would like to encourage and support TQM practices in India.

6.3. Future research directions

The mediating relationships between TQM practices and various performance measures can also be analyzed in future studies. Performance measure such as innovation performance, social performance, and project performance can be included in future studies. The moderating effects of contextual factors such as firm size, firm income, firm type, scope of operations, degree of competition, managerial knowledge, and ISO certification can be studied to analyzed complex relationships among these parameters as well. The multi-group comparison can be made between service and manufacturing organization in future studies. The results, of this study were based on cross-sectional data from a relevant Indian manufacturing and service organization. Future research may emphasize on a longitudinal design of survey. In addition, the results of this study are limited to Indian manufacturing and service organizations, but the similar study may be carried out in other developing countries to analyze if the structural model fits into their systems, which in turn give further validation of the proposed model.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.orp.2018.07.004.

Appendix A

Part 1: Demographic information

Part 1: Demographic Information

1.	Industry type	Manufacturing- ☐ Service -☐		
2.	Your designation in the organization	Managers - ☐ [Senior manager-☐ Middle manager-☐ Low-level manager-☐] Employees - ☐ [Engineer-☐ Technician- ☐]		
3.	Working experience with this organization (years)	0-5 -☐	6 -10 ☐	11 and above ☐
4.	Education Level	Diploma and equivalent - ☐ Degree and equivalent- ☐		
5.	Specify the quality system of your company	ISO 9001 - ☐ ISO 9002 - ☐ ISO 9003 - ☐ ISO 9001: 2000 - ☐ ISO 9001: 2008 - ☐ ISO 9001: 2015 - ☐ ISO/TS: 16949 - ☐ None - ☐ Other, please specify.....		
6.	Is your company wishing to obtain/implement ISO quality system in near future?	1) Yes (☐) (2) No (☐)		
7.	(1) Current capital of the company	10 Million and less- ☐	20-500 Million-☐	.51-1.0 Billion-☐
		1.01 Billion and above -☐		

Part 2: Survey Questionnaire

You are requested to kindly weight these items on five point Likert scale for developing an instrument to measure the level of Total Quality Management (TQM) implementation and its influence on OP in Indian industries. Key: (1) Strongly Disagree (2) Disagree (3) Undecided (4) Agree (5) Strongly Agree	
(1) TQM Elements	
Factors/Items	Strongly Disagree ⟷ Strongly Agree
(1) (A) Organizational Leadership	
1. Top management actively involved in communication and planning of organizational goals.	(1) ☐ (2) ☐ (3) ☐ (4) ☐ (5) ☐
2. Top leadership provides significant means (resources) to improve and maintain quality.	(1) ☐ (2) ☐ (3) ☐ (4) ☐ (5) ☐
3. Top leadership views quality more important than production (means quality has more importance than production schedules)	(1) ☐ (2) ☐ (3) ☐ (4) ☐ (5) ☐
4. Management at the top takes quality as their responsibility.	(1) ☐ (2) ☐ (3) ☐ (4) ☐ (5) ☐
5. Top executives routinely interact with their concerned departments (Quality as well as other).	(1) ☐ (2) ☐ (3) ☐ (4) ☐ (5) ☐
6. Top management is evaluated on quality performance	(1) ☐ (2) ☐ (3) ☐ (4) ☐ (5) ☐
7. Top leadership anticipate changes and make plans to accommodate it.	(1) ☐ (2) ☐ (3) ☐ (4) ☐ (5) ☐
(2) (B) Customer Satisfaction and Relationships	
1. The key customer requirements are identified (product specifications detected and fulfilled).	(1) ☐ (2) ☐ (3) ☐ (4) ☐ (5) ☐
2. Customer oriented strategies are built and reviewed for further improvements.	(1) ☐ (2) ☐ (3) ☐ (4) ☐ (5) ☐
3. Encouragement provided to partnerships with customers to make relations better.	(1) ☐ (2) ☐ (3) ☐ (4) ☐ (5) ☐
4. Design, development and delivery of products is according to the requirements of Customers.	(1) ☐ (2) ☐ (3) ☐ (4) ☐ (5) ☐
5. Customer satisfaction feedbacks are taken after a regular interval.	(1) ☐ (2) ☐ (3) ☐ (4) ☐ (5) ☐
6. Customer complaints are properly recoded and reviewed to maintain our quality standards.	(1) ☐ (2) ☐ (3) ☐ (4) ☐ (5) ☐
7. Concessions are provided for defective parts/products	(1) ☐ (2) ☐ (3) ☐ (4) ☐ (5)

(if delivered).	☐
(C) Human Resource Focus	
1. Recruitment procedure is such that, "right person is selected for right job".	**(1)** ☐ **(2)** ☐ **(3)** ☐ **(4)** ☐ **(5)** ☐
2. Proper and efficient training is provided to newly selected personnel.	**(1)** ☐ **(2)** ☐ **(3)** ☐ **(4)** ☐ **(5)** ☐
3. Health and safety practices are excellent.	**(1)** ☐ **(2)** ☐ **(3)** ☐ **(4)** ☐ **(5)** ☐
4. Career development training to employees is provided by the company (both inside and outside of the company).	**(1)** ☐ **(2)** ☐ **(3)** ☐ **(4)** ☐ **(5)** ☐
(3) (D) Strategic Planning and Development	
1. The company encourages study and planning for improvement of all its products and processes.	**(1)** ☐ **(2)** ☐ **(3)** ☐ **(4)** ☐ **(5)** ☐
2. There is frequent inspection of product quality and process takes place.	**(1)** ☐ **(2)** ☐ **(3)** ☐ **(4)** ☐ **(5)** ☐
3. The company employs seven tools of quality to plan, control and improvement of processes.	**(1)** ☐ **(2)** ☐ **(3)** ☐ **(4)** ☐ **(5)** ☐
4. We collect data first and then we make decisions for the improvement of process, after reviewing it.	**(1)** ☐ **(2)** ☐ **(3)** ☐ **(4)** ☐ **(5)** ☐
(E) Supplier Quality Management	
1. The company regards quality of products more important than price for selecting a supplier.	**(1)** ☐ **(2)** ☐ **(3)** ☐ **(4)** ☐ **(5)** ☐
2. The company has provided certification to our suppliers and routine audits take place to maintain the quality standards.	**(1)** ☐ **(2)** ☐ **(3)** ☐ **(4)** ☐ **(5)** ☐
3. The company's employees periodically visit our suppliers to inspect and evaluate the products for improving quality.	**(1)** ☐ **(2)** ☐ **(3)** ☐ **(4)** ☐ **(5)** ☐
4. Our company has the detailed information about our suppliers and their performances.	**(1)** ☐ **(2)** ☐ **(3)** ☐ **(4)** ☐ **(5)** ☐
5. Our suppliers regularly take feedback from us, so as to maintain quality standards.	**(1)** ☐ **(2)** ☐ **(3)** ☐ **(4)** ☐ **(5)** ☐
2. Organizational Performance (OP)	
(A) Satisfaction Results	
1. There is an increase in production percentage (production achieved/ production planned).	**(1)** ☐ **(2)** ☐ **(3)** ☐ **(4)** ☐ **(5)** ☐

2. Employees have high morale and are fully satisfied	**(1) ☐ (2) ☐ (3) ☐ (4) ☐ (5) ☐**
3. Our customers are fully satisfied.	**(1) ☐ (2) ☐ (3) ☐ (4) ☐ (5) ☐**
4. Our product quality is very high (zero defects ensured).	**(1) ☐ (2) ☐ (3) ☐ (4) ☐ (5) ☐**
(B) Business Results	
1. There is increase in sales (in comparison to previous years).	**(1) ☐ (2) ☐ (3) ☐ (4) ☐ (5) ☐**
2. There is increase in exports (in comparison to previous years).	**(1) ☐ (2) ☐ (3) ☐ (4) ☐ (5) ☐**
3. There is increase in profit (in comparison to previous years).	**(1) ☐ (2) ☐ (3) ☐ (4) ☐ (5) ☐**

Thank you for providing your valuable time for this survey.

Appendix B. Descriptive statistics of TQM and OP (data screening)

Variables	Std. Deviation	Skewness	Kurtosis
Total Quality Management (TQM)			
(a). Organizational Leadership (OL)			
OL_11	.847	.310	−0.484
OL_1	.907	.108	−0.741
OL_2	.901	.278	−0.341
OL_3	.892	−0.226	−0.803
OL_4	.956	−0.165	−0.955
OL_5	.959	−0.169	−0.912
OL_6	.913	−0.043	−0.716
(b). Customer Satisfaction & Relationship (CSR)			
CSR_1	.955	−0.332	−0.388
CSR_2	.932	−0.458	−0.145
CSR_3	.920	−0.625	.263
CSR_4	.808	−1.008	1.458
CSR_5	.945	−0.261	−0.414
CSR_6	.857	−0.571	.067
CSR_7	.861	−0.534	.114
(c). Human Resource Focus (HRF)			
HRF_1	.989	.181	−0.985
HRF_2	.946	−0.496	−0.679
HRF_3	1.020	.377	−0.525
HRF_4	1.017	.232	−1.001
(d). Strategic Planning & Development (SPD)			
SPD_1	.945	.946	.398
SPD_2	.986	.731	.003
SPD_3	.822	.942	.996
SPD_4	.883	.816	.362
(e). Supplier Quality Management (SQM)			
SQM_1	.658	−0.917	1.948
SQM_2	.683	−0.615	.735
SQM_3	.633	−0.880	2.534
SQM_4	.698	−0.864	1.738
SQM_5	.781	−0.652	.892
Organizational Performance (OP)			
(a). Satisfaction Results (SR)			
SR_1	.771	−0.773	1.213
SR_2	.747	−0.802	1.443
SR_3	.753	−0.531	.601
SR_4	.786	−0.646	.643

(b). Business Results (BR)			
BR_1	.886	−0.149	−0.868
BR_2	.894	−0.075	−0.862
BR_3	.887	−0.069	−0.813

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