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Relationship Between Servant Leadership and Total Quality Management Practices: Mediating Effects of Interfunctional Coordination – An Empirical Study Concerning the Information Technology Industry, Hyderabad

KDV PRASAD, Sri Yogi KOTTALA, Shyamsunder CHITTA

Faculty, Symbiosis Institute of Business Management, Hyderabad; Symbiosis International (Deemed University), Pune, India

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Abstract
Although there is a growing body of evidence supporting the significance of servant leadership as a basic component in shaping the execution of TQM practices, the research has not fully examined the framework associated with servant leadership in terms of "customer focus, people management, process management, strategic planning, information and analysis" in general and in the information technology industry. Therefore, the authors conducted this empirical research examining the associations among servant leadership and the abovementioned TQM practices in the information technology industry. This empirical study also examined the mediating role of interfunctional coordination in TQM practices in the context of servant leadership. We gathered data from 335 leaders in 57 software companies in the information technology industry with at least a capability maturity model (CMM) level 3 to CMM5 companies providing software development and services. The data were collected from team leaders, project heads, project managers, lead testers, and higher-level managers of the marketing and operations management area. We investigated how servant leadership interacts with the application of these five TQM practice components and the mediating role of the interfunctional coordination construct in this interaction. To accomplish this goal, we empirically investigated a structural model and mediation models by bootstrapping and SEM with IBM AMOS (IBM, 2023). The model fit indices CMIN/DF 1.724, CFI 0.953, TLI 0.938, NFI 0.920, SRMR 0.049, RMSEA 0.049, and PCl close 0.624 indicate excellent model fit, and further investigation was carried out. The findings showed that putting TQM practices into practice was positively and directly correlated with servant leadership. Interfunctional coordination partially mediates TQM practices through servant leadership, with a positive association. The results confirm the influence of servant leadership on TQM practices in the information technology industry.

Keywords
Information Technology, Structural Equation Modeling, Servant Leadership, Mediation, TQM practices.

Introduction

Attracting and keeping top personnel has become a major priority for companies in a variety of industries in today's fiercely competitive business environment. The information technology (IT) sector, where highly trained workers are always in demand, is one of those experiencing one of the worst talent shortages. In this context, employer branding has become a vital strategic instrument for IT organizations seeking to set themselves apart and create a memorable reputation as top employers. Employer branding is the idea that an organization's culture, values, rules, and general reputation as an employer all have a role in how people perceive it as a place to work. The effect of company branding on employees' performance is especially important for information technology workers, who frequently have specialized knowledge and abilities. According to Pereira-Moliner et al. (2016) and Samson & Terziovski (1999), total quality management (TQM) is a comprehensive philosophy that encompasses several activities and principles, including the

***Corresponding author**: KDV Prasad – Symbiosis Institute of Business Management, Hyderabad; Symbiosis International (Deemed University), Pune, India, e-mail: kdv.prasad@sibmhyd.edu.in*

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components "strategic planning, people management, customer focus, process management, information and analysis". Although the dimensions of TQM are crucial for helping manufacturing and service companies become more competitive, most research in this field has examined TQM as a global construct (Fotopoulos & Psomas, 2009; Samat et al., 2006), and very few studies have specifically concentrated on the factors of TQM (Kumar & Sharma, 2018).

The authors could source very few research related to examining the primary causes of TQM practice implementation have been published. Thus, we stress the importance of examining the impact of servant leadership on TQM factors, in contrast to earlier research that looked at TQM determinants as a global construct. Additionally, the focus of TQM practice studies has been organizational outcomes, such as competitive advantage, company performance, and customer satisfaction (Fotopoulos & Psomas, 2009; Samat et al., 2006; Weng et al., 2021). However, in recent years, much research has emerged, suggesting significant directions for future development in this area, as we investigate what makes TQM practice implementation effective (Kumar & Sharma, 2018). In response to this recommendation, we investigated how interfunctional coordination and servant leadership affect the application of TQM techniques.

Dissecting how managers can affect such implementations has become increasingly crucial, given the importance of implementing these five TQM components for organizations' competitiveness and performance. According to certain arguments, leadership plays a crucial role in adopting and putting into practice specific organizational practices, such as fostering trust, upholding consistency in words and deeds, and maintaining the momentum of transformation by motivating and inspiring staff members (Gilley et al., 2009; Levene & Higgs, 2018). In this sense, academics and professionals are still interested in servant leadership. Employee development and organizational effectiveness are seen by servant leaders as mutually reinforcing outcomes of the same endeavor. By focusing on the growth and well-being of their followers, servant leaders help businesses achieve their long-term objectives (Hoch et al., 2016).

The intraorganizational and interfunctional interaction known as interfunctional coordination is what creates consistent objectives by going above and beyond to resolve conflicts between the goals and interests of different functional units of the International Journal of Organizational Leadership. The level to which organizations synchronize depends on how an organizational unit's actions align with those of other functional units (Miles et al., 1978). The management of various functional units, such as marketing, production, and product development, accounts for a substantial portion of the efficacy of the application of TQM methods (Rehman & Jajja, 2022). This study adds to the body of knowledge regarding the applicability of interfunctional coordination in explaining the ways in which servant leadership impacts the efficient application of these five components of TQM practices: information and analysis, strategic planning, people management, process management, and customer focus. Furthermore, we offer a strong theoretical basis for the multifaceted approach to total quality management (TQM), distinguishing and focusing on the intermediary function of interfunctional coordination among servant leadership and these 5 TQM practices to clarify their impacts.

Literature review

Ramdas et al. (2024) performed a comparative analysis of different types of leadership and their impact on the success of health systems in the context of servant leadership. The authors reported that servant leadership is one of the best ways to improve the quality and performance of healthcare systems. Yateda et al. (2022) investigated the mediating role of competitor orientation and interfunctional coordination between leadership styles and total quality management (TQM) implementation. A survey of 203 leaders from manufacturing and service firms in Addis Ababa was conducted. The authors reported that servant and transactional leadership had positive and direct effects on the implementation of total quality management practices. On the other hand, transformational leadership had only positive and indirect effects on implementing TQM through a competitor orientation and interfunctional coordination. Our results are consistent with the authors' findings.

Goestjahjanti et al. (2022) examined the association between servant leadership and positive learning attitudes in manufacturing industries. The population in this study included employees of the MI. The sample used comprised 400 employees from the MI, and the study was carried out via a probability sampling method. The authors reported a statistically significant impact of servant leadership on manufacturing performance. Another study by the authors investigated the role of servant leadership, job satisfaction, and quality of work life in organizational citizenship behavior (OCB) in employees. This study employed a causal research design in its research methodology. The impacts of job satisfaction, quality of work life, and servant leadership on organizational citizenship behavior (OCB) are the issues under

investigation. There are 80 workers at PT. Triple One Global, who composed the study population. The saturated sample technique, which involves sampling the entire population, was employed for sample selection in this study. Using the Smart-PLS 3.3.2 analysis tool, the structural equation model (SEM) is the analytical method used. The findings demonstrated that 1) job satisfaction had a positive and significant effect on organizational citizenship behavior (OCB); 2) servant leadership had a positive and significant effect on OCB; and 3) quality of work life had a positive and significant effect on OCB. The study's recommendations include the following: managers should be able to give staff members a sense of security and serenity while they work, as well as increase employee satisfaction and offer benefits commensurate with output so that staff members can develop empathy.

Pawar and Satini (2020) explored the theory of servant leadership by involving a sample population to evaluate and synthesize the mechanisms, results, and impacts of servant leadership. The synthesis of these empirical studies revealed that (a) there is no consensus on the definition of servant leadership; (b) the theory of servant leadership is being studied in a variety of contexts, cultures, and themes; (c) researchers use multiple measures to explore servant leadership; and (d) servant leadership is a viable theory of leadership that helps organizations and enhances us.

TQM practices in the information technology industry

Information technology (IT) resources and total quality management (TQM) have merged because of the growing demand for quality organizations. The application of information technology is expected to enhance quality management's operational activities and, as a result, produce higher-quality results (Mjema et al., 2005). The use of IT is expanding and developing throughout many industries, including quality management. IT has also been applied to improve quality control. When combined, TQM and IT guarantee the quality of goods and services for hardware and software, which are mostly computer-based information systems. Since information is one of an organization's most valuable assets and affects practically every aspect of our lives, TQM is essential for IT systems. Since the invention of computers, the information technology sector has advanced significantly.

TQM and IT have both been shown to improve industry performance by numerous academics. IT is utilized to assess, comprehend, and increase an organization's sustainable quality standards. Excellent results are the goal of both the social and the technical components when TQM and IT are integrated. Industries are making the most of the technology available to improve performance quality. One external element that affects how TQM develops inside a company is technology (McAdam & Henderson, 2004). Information technology is employed to increase industry competition, lower costs, improve quality, and increase production (Talib et al., 2013a). IT supports TQM by utilizing features and advancements in real-time data collection on business systems, customer satisfaction, and many other areas. IT support for quality management procedures could increase the sociobehavioral and organizational components of improving quality management (Gorla & Lin, 2010).

Mjema et al. (2005) analyzed the role of total quality management and reported that the integration of IT significantly improved product quality, decreased expenses associated with quality, and increased the dimensions of quality awareness. According to McAdam and Henderson (2004), technology is one of the external elements that influences an organization's growth in total quality management (TQM). Since TQM and industry performance are strongly correlated, the industry should benefit from the beneficial effects of IT on TQM dimensions. TQM is strongly dependent on IT, according to Weston (1993), which serves as a feedback mechanism, promotes communication, and aids in the adoption of cutting-edge tools, systems, and modeling methodologies. In a more recent study, Dewhurst et al. (2003) suggested that IT improves total quality management (TQM) through augmenting associations with suppliers and customers, boosting process control, promoting collaboration and interdepartmental information flow, boosting design processes and abilities, and utilizing preventative maintenance. Reed et al. (2000) reported that the effective use of IT can impact relationships and that quality management is crucial for enhancing a firm's competitive position (Willcocks et al., 2007).

Additionally, it is essential to comprehend TQM-IT in conjunction with other areas. Hsu and Su (2002) conducted research on IT and TQM with an emphasis on Taiwan's telecom output. According to Sanchez-Rodriguez et al. (2006), IT can help total quality management initiatives, and in general, these efforts improve the operational and quality performance of Spain's industrial enterprises. Several relationships between TQM and IS have been examined by Fok et al. (2001) to address the necessity of obtaining a competitive edge across the US. Additionally, Valmohmmadi (2011) created a framework for the use of IT in support of TQM in Iranian industrial enterprises.

According to Siam et al. (2001), the Sohar Industrial Estate in Oman largely uses IT to achieve TQM. Li et al. (2000) investigated how to integrate the TQM approach into the software development process and offered suggestions to prospective or current TQM participants on how to avoid pitfalls and ensure that TQM adoption is successful. The validity and reliability of the suggested metrics were confirmed by empirical testing. This approach was chosen, and the Tanzania processing sector employed it to test those quality dimensions. Brah and Lim reported that technology and TQM play significant and complimentary roles in improving performance. According to their data, high-tech companies outperform their low-technology counterparts in terms of both performance and TQM.

This paper concentrates on five components of TQM: strategic planning, people management, customer focus, process management, and information and analysis.

Strategic planning: The TQM component of strategic planning examines how an organization positions its strategic direction, determines its long-term vision and missions, develops the values necessary for long-term success and informs across the organization, and creates strategic objectives, vision and mission, and goals, incproating quality policies into these goals (Siam et al., 2012; Mosadeghrad, 2014).

People management: This component measures employee satisfaction, cares for the safety and health of employees, and handles issues such as employee autonomy and adaptability via engagement and empowerment (Mosadeghrad, 2014). People management covers "how well the human resource practices tie into and are aligned with the organization's strategic directions," according to Samson and Terziovski (1999) (p. 396). Within the framework of total quality management (TQM), people management addresses the degree to which employees integrate these issues.

Customer focus: Finding out what the requirements, preferences, and expectations of the customer are is a crucial part of customer focus. A company's commitment to identifying and meeting the requirements, preferences, and expectations of its customers is the primary focus of customer focus (Mosadeghrad, 2014).

By maintaining tight ties with their clients, businesses can determine what they need now, what they expect in the future, and how much they can fulfill to make an organization successful (Zhang et al., 2000). Systems and procedures must be in place to comprehend and satisfy the wants, preferences, and expectations of the customer while converting them into appropriate organizational requirements (Mosadeghrad, 2014). Considering the problem of how businesses build relationships with their clients is the second facet of customer focus.

Process Management: According to Mosadeghrad (2014) and Samson & Terziovski (1999), process management refers to important procedures that are planned, carried out, monitored, and assisted by the business's strategic direction and action plans to satisfy consumers consistently and achieve superior performance. Low-quality processes result in high rates of scraping and reworking, which increase the need for resources (Singh & Singh, 2014). Process management lowers process variation by integrating quality into the production or service delivery process (Singh & Singh, 2014).

Information and Analysis: To meet performance and quality targets, organizations can effectively manage the process by utilizing accurate information and analysis. The level of benchmarking the company does in every potential area influencing competitiveness is addressed by data and analysis from the TQM framework (Samson & Terziovski, 1999). It is essential to collect specific, faithful, and personal data and information from both inside and outside the organization for assessment, improvement, and evaluation to recognize customer needs, evaluate the efficiency of operations, and comprehend the root cause of TQM issues (Mosadeghrad, 2014).

According to Reinke (2004), servant leadership is defined as "one who is committed to the growth of both the individual and the organization, and who works to build community within organizations". Additionally, servant leadership was described as an "other-oriented approach" by Eva et al. (2019) on page 4, which is "manifested through one-on-one prioritizing of follower individual needs and interests, and outward reorienting of their concern for self toward concern for others within the organization, and the larger community." In addition to assisting staff members in achieving and developing, servant leadership also benefits leaders and the business as a whole.

Previous studies have examined many antecedents of TQM practices via different TQM frameworks. Organizational strategy (Prajogo & Sohal, 2010), organizational culture (Rad, 2006), information systems (Siam et al., 2012), and organizational leadership (Chan et al., 2016) are a few examples of the antecedents of TQM. The lack of research on TQM and leadership (Kumar & Sharma, 2018; Kaynak, 2003) motivated us to investigate the function of servant leadership in TQM procedures. This study provided some inspiration for our investigation. In light of these evaluations, TQM leadership needs to provide an inspiring example, communicate strategic plans with all staff members, and instill the values and culture that lead followers. As servant leaders, TQM leaders are responsible for inspiring workers, communicating all plans, and inculcating principles that support and mentor other workers to change the working culture (Siam et al., 2012).

Interfunctional coordination: The degree to which a company establishes process alignment and exchanges information and resources with other functional units is known as interfunctional coordination. To attain cost, competitive positioning, quality, delivery, and businesses should effectively coordinate functional units through knowledge exchange (Rehman & Jajja, 2023). A great deal of writing has already been written about the importance of interfunctional coordination in TQM practice implementation. Production, procurement, marketing, R&D, and other functional units are more likely to integrate when an organization uses TQM techniques in a cutthroat market (Gheysari et al., 2012). Similarly, Reed et al. (2000) argued that the adoption of TQM techniques could result from cooperation and integration between functional units. In this context, departmental collaboration is a necessary component of successfully implementing total quality management (TQM) techniques.

The information technology-enabled industry in Hyderabad is volatile and characterized by competition, enormous pressure to perform, and long working hours, which negatively affect employees' well-being. Total quality management is an essential component of the information technology industry for maintaining CMM levels, quality, timely delivery, effective people management, and efficient strategic planning to reduce costs and project overruns. There is a need to examine the TQM components that can enhance quality and effective people management in the IT industry. After a thorough literature review, the authors could source minimal literature on TQM practices in the IT industry in general and on the application of structural equation modeling in particular. Therefore, this empirical study was carried out by surveying middle-level and top-level leaders in the IT industry who reached at least the CMM-3 level and up to the CMM-5 level. The limited empirical evidence on this topic and the ability to address these research gaps will enhance the understanding of TQM practices in the information technology industry.

Objectives

- To examine the relationship between servant leadership and total quality management practices in the information technology industry
- To examine the mediating effects of interfunctional coordination on total quality management practices through servant leadership"

Hypotheses

H1: Servant leadership has a positive and statistically significant influence on TQM practices.

H2: Interfunctional coordination has a positive and statistically significant direct effect on TQM practices.

H3: Interfunctional coordination has a positive and statistically significant mediating effect on the relationship between servant leadership and TQM practices.

Theoretical framework

The development of the theoretical framework was based on Yadeta et al. (2023). Figure 1 shows the relationships among the five outcome variables (TQM practices, such as "customer focus, people management, process management, strategic planning, information, and analysis") and one mediating variable (servant leadership). Servant leadership has a direct effect on interfunctional coordination and TQM practices, whereas interfunctional coordination indirectly influences TQM practices (Figure 2).

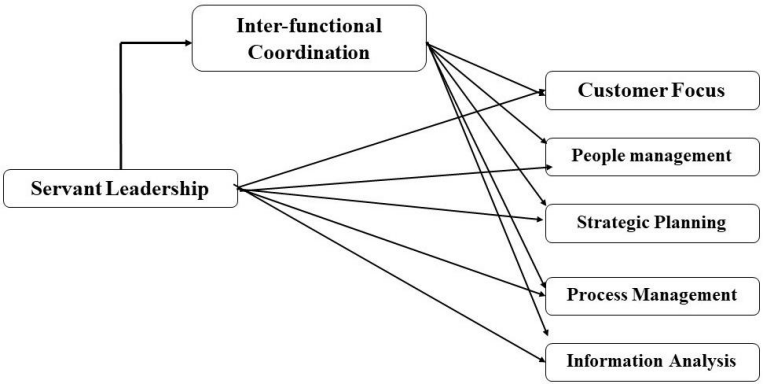

Fig. 1. Theoretical framework and relations among the study variables Interfunctional coordination services as a pathway (mediator) between Servant Leadership and TQM Practices

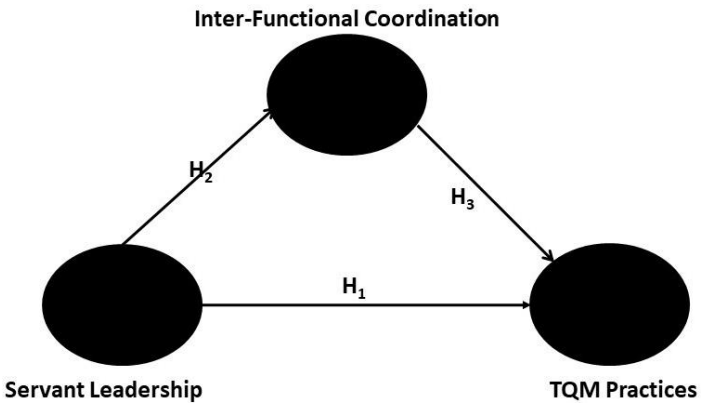

Fig. 2. Authors conceptual framework

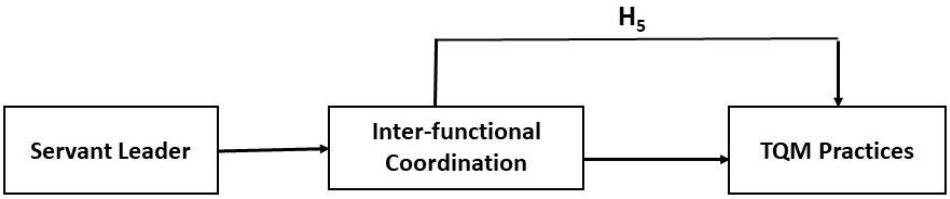

Fig. 3. Theoretical Model and Relations among variables (author's creation). Adopted from Metselaar et al., (2023)

Methodology

Data collection

The data were collected from March 2023 to October 2023. The questionnaire was published on Google Forms, and a link was provided through WhatsApp, Linkedin, and Email to the Lead Testers, Team Leads, Project Managers, Project Heads, and Marketing and Operation Leaders. The sample was collected from information technology companies at least at CMM Level 5 from the Associated Chambers of Commerce & Industry of India (ASSOCHAM). A total of 57 organizations were selected, and the questionnaire was circulated to 345 information technology professionals in Hyderabad. Forty-three (43) responses were not considered for the analysis because of inappropriate behavior, and certain answers were lacking. A five-point Likert-type scale was used to collect all of the replies. A total of 302 valid answers were analyzed via structural equation modeling (Table 1).

The authors used SEM with SPSS version 29 and AMOS version 28 to test the hypotheses. The bootstrapping method was followed for the mediation analysis via AMOS version 28.

Table 1
Demographic characteristics and descriptive statistics of the study sample

Item	*f*	Per cent
Gender		
Male	161	53.33
Female	141	46.67
Age Group (Years)		
20–29	57	18.33
30–39	125	41.67
40–49"	60	20.00
50 and above	60	20.00
Education		
Professional Graduate	127	41.67
Post-Graduate	150	50.00
Other	25	8.33
Roles		
Testing Lead	55	18.00
Team Lead	91	30.00
Project Lead	50	16.67
Project Managers	26	8.67
Marketing Heads	42	14.00
Operations Leads	38	12.67

Source: Primary data processed

Power analysis

A power analysis was conducted via SPSS version 29 to assess the power of the study sample (Faul, Erdfelder, Lang, & Buchner, 2007), with an alpha of 0.05. The standard deviation of the sample was 1.174 (Figure 4). The results revealed an actual power value of 0.955 for the sample size of 302, with an effect size of 0.8 indicating a stronger relationship among the variables, which is significant. Thus, the sample size of $N = 300$ is more than adequate to test the study hypotheses (Kyriazos, 2018; Goulet-Pelletier, J.C., & Cousineau, D. 2018). Therefore, sample selection with a size of 302 is justified.

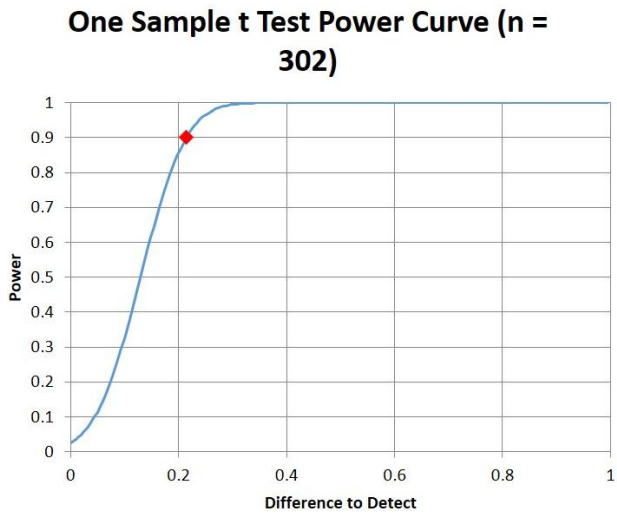

Fig. 4. Estimation of power for ($N = 302$)

Instruments

Servant Leadership: Service leadership behavior was measured via Ehrhart's (2004) questionnaire and 8 statements from the 14-item, single-dimensional servant leadership subscale. Ehrhart (2004) distinguished seven components of servant leadership conduct, including possessing conceptual abilities, acting morally, fostering relationships with subordinates, assisting them in developing and succeeding, giving them authority, and prioritizing them. The responses ranged from (1 = not at all; 5 = frequently, if not always).

Interfunctional coordination: A 7-item scale adapted from (Thongsri & Chang, 2019) was used.

Customer Focus: A 5-item scale adapted as described by Samson & Terziovski (1999).

People Management: Six items from the 8-item questionnaire developed by Samson & Terziovski (1999) were used.

Process Management: A five-item scale following the model of Samson & Terziovski (1999) was used.

Strategic Planning: The six-item scale was modeled by Samson & Terziovski (1999).

Information and analysis: A four-item scale was developed and validated by Samson & Terziovski (1999).).

Following the evaluation of the outer loadings for the constructs, the convergent validity was assessed by measuring the AVE and CR or the degree to which the items reflected a latent construct or an unobserved variable. The CR values of all three latent constructs are greater than the >0.5 criterion suggested by Hair et al. (2013), indicating the validity of each individual latent construct. The AVE values for each of the constructs are greater than the recommended cutoff point of 0.5 (Hair et al., 2013, Table 2).

Table 2
Study constructs and their respective factor loadings

Item description	Outer loadings
Servant Leadership Chronbachs' $\alpha =$ 0.902, CR = 0.900, AVE = 0.532	
SL1: I spend a lot of time to form quality relationships with our unit employees	0.748
SL2: I create a sense of community among unit employees	0.837
SL3: My decisions are influenced on unit employees output	0.790
SL4: I try to reach consensus among department employee on important decision	0.755
SL5: I am sensitive to department employees' responsibilities outside the work place	0.756
SL6: I try to display a wide-knowledge ad interests in finding solutions to work problems	0.585
SL7: I hold department employees to high ethical standards	0.673
SL8: I do whatever I promised to my colleagues	0.660

Table continued on the next page

Table 2 continued from the previous page

Item description	Outer loadings
People Management Chronbachs' $\alpha =$ 0.934, CR = 0.934, AVE = 0.703	
PEOM1: The concept of the "internal customer" (i.e., The next person or process down the line and including all employees) is well understood at this site	0.862
PEOM2: We have an organization-wide training and development process, including career path planning, for all our employees	0.888
PEOM3: On the site has an effective top down and bottom-up communication processes	0.780
PEOM4: Employee satisfaction is formally and regularly measured	0.814
PEOM5: Our occupational health and safety measures are excellent	0.803
PEMO6: All employees believe that quality is their responsibility	0.876
Customer focus Chronbach $\alpha =$ 0.949, CR = 0.950, AVE = 0.790	
CF1: We know our external customers' current and future requirements (both in terms of volume & product characteristics)	0.895
CF2: These customer requirements are effectively disseminated and understood throughout the workforce	0.922
CF3: In designing new products and services we use the requirements of domestic customers	0.890
CF4: We have an effective process for resolving external customers' complaints	0.885
CF5: We systematically and regularly measure external customer satisfaction	0.851
Strategic planning Chronbach $\alpha =$ 0.894, CR = 0.899, AVE = 0.601	
SP1: We have a mission statement which has been communicated throughout the company and is supported by our employees	0.721
SP2: We have a comprehensive and structural planning process which regularly sets and reviews short and long-term goals	0.886
SP3: Our pans focus on achievement of "Best Practice	0.738
SP4: When we develop our plan, policies and objectives we always incorporate customer requirements, supplier capabilities, and needs of other stakeholders, including the community	0.895
SP5: We have a written statement of strategy covering all manufacturing operations which is clearly articulated and agreed to by our Senior Managers	0.684
SP6: Our site's manufacturing operations are effectively aligned with the central business mission	0.696
Information analysis Chronbach $\alpha =$ 0.903, CR = 0.904, AVE = 0.760	
IA1: The information on relative cost position is available	0.897
IA2: We have information on Operation Processes	0.809
IA3: We have information on Technology available	0.847
IA4: We have enough information on quality procedures	0.796
Process Management Cronbachs' $\alpha =$ 0.899, CR = 0.904, AVE = 0.702	
PM1: Our suppliers work closely with us in product development	0.840
PM2: We work closely with our suppliers to improve each other's processes	0.941
PM3: Our suppliers have an effective system for measuring the quality of the materials they send to us	0.830

Measurement model

CFA was carried out via AMOS version 28 to test the measurement model. As part of CFA, factor loadings were assessed for each indicator/item. The model fit measures are used to assess the model's overall goodness of fit ("CMIN/df, IFI, CFI, TLI, SRMR and RMSEA"), and all the values fall at their respective acceptance levels (Ullman, 2001; Hu and Buntler, 1998; Bentler 1990). The seven-factor model (servant leadership, customer focus, process management, interfunctional coordination, strategic planning, information analysis and people management) yielded excellent model fit for the data (CMIN/df = 1.724, CFI = 0.953, TLI = 0.938, NFI = 0.936, SRMR = 0.049; RMSEA = 0.049, PClose = 0.626.

Structural model

The relationships were tested via an SEM created with AMOS. According to Hair et al. (2011), an excellent model is recognized if the confirmatory fit index (CFI) (Bentler, 1990), the Tucker Lewis (1973) index (TLI), the goodness of fit (GFI) indices (Hair et al., 2011), and the value of CMIN/df are less than 5. Moreover, if the "root mean square error approximation (RMSEA)" is between 0.05 and 0.08 and the AMOS computed value of the "standardized root mean square residual" (SRMR) is <0.05, the model was deemed to be adequately fit (Hair et al., 2011; Figure 5).

Discriminant validity: This demonstrates how the construct differs from other constructs and clarifies the appropriate degree of correlation between the measures (Anderson and Gerbing, 1988). Fornell and Larcker

(1981) declare that, in relation to the other constructs in the model, the variance of the construct should be smaller than the variance of the AVE construct. Given that the diagonal values in bold have a greater correlation with any other latent variable than with any other, the discriminant validity (Tables 2 & 3) is satisfactory.

The ratio of the trait correlations of the two constructs was examined via HTMT analysis. When the HTMT is less than 0.90, discriminant validity is met between the two constructs. All the values in Table 4 below are less than 0.90. As a result, discriminant validity is proven (Hensler et al., 2015, Table 4)

Table 3
Discriminant validity (Fornell and Larcker criteria)

	Interfunctional Coordinatin	Servant Leadership	People Management	Customer Focus	Strategic Planning	Information Analysis	Process Management
Interfunctional coordination	**0.791**						
Servant Leadership	–0.094	**0.724**					
People Management	0.298***	0.340***	**0.838**				
Customer Focus	–0.055	–0.063	–0.193**	**0.889**			
Strategic planning	–0.139*	0.067	0.004	0.035	**0.775**		
Information Analysis	–0.023	–0.086	–0.059	0.428***	–0.023	**0.838**	
Process Management	–0.038	–0.067	–0.212***	0.677***	–0.012	0.355***	**0.872**

$*$ and $**$ Significant at <0.05 level, ***Significant at <0.001 level

Table 4
Heterotrait – Monotrait ratio analysis (for discriminant validity)

	Interfunctional Coordinatin	Servant Leadership	People Management	Customer Focus	Strategic Planning	Information Analysis	Process Management
Interfunctional coordination	**1**						
Servant Leadership	0.085	1					
People "Management"	0.274	0.286	1				
"Customer Focus"	0.045	0.073	0.190	1			
"Strategic planning"	0.127	0.052	0.003	0.046	1		
Information Analysis	0.016	0.077	0.062	0.407	0.003	1	
Process Management	0.032	0.064	0.193	0.641	0.018	0.322	1

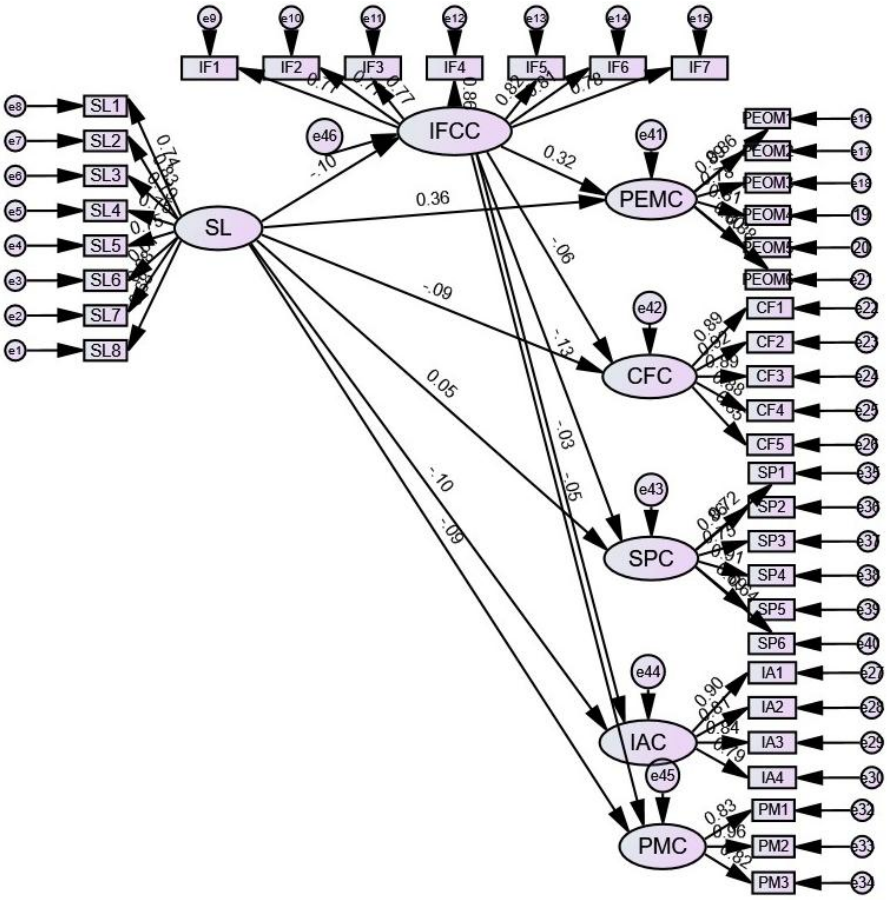

Fig. 5. Structural model with relationships among the constructs

Common method bias (CMB)

A depletion or inflation of the true correlation between the study's observable variables is known as common method bias, or CMB, and is caused by respondents responding to independent and dependent variables at the same time. Using Harman's single-factor test and the common method latent factor, this study computed common method bias.

Harman's single factor test: Confirmatory factor analysis was used to evaluate the model fit in this test, where all of the indicators were loaded onto a single factor. After verification, the model fit was excellent, ruling out common method bias.

Latent Common Method Factor: The researchers employed a latent variable in this process that has a direct relationship with each of the model's construct indicators. The common method, a latent construct, was draught. The model then includes a direct link between the latent construct of the unobserved common procedure and each indicator in the model. A path from the common method construct to each indicator in the model is drawn, and all the relationships from the method component are then constrained to be the same to ascertain whether all the indicators have a common effect. The chi-square value of this CFA model was determined after the model was run via the latent common method variable, which is directly related to each of the variables. The observed chi-square value with 677 DFs with a latent construct was 1167.258. The original model has 676 DFs and a chi-square of 1162.188 (without a latent factor). The chi-square difference of 5.06 suggests the presence of CMB. This is not, however, a significant issue, as the CMB is very low and has no bearing on the findings.

Direct tests with mediating variables included in the model

The regression weights from the servant leadership and TQM practices constructs indicate that the influences of servant leadership on the TQM practices constructs are statistically significant – customer focus ($\beta = 0.47$, $p < 0.001$), process management ($\beta = 0.46$, $p < 0.001$), people management ($\beta = 0.49$, $p < 0.01$), strategic planning ($\beta = 0.37$, $p < 0.01$), and infor-

mation analysis ($\beta = 0.39$, $p < 0.01$); Figure 6. The results support the hypothesis "H1: Servant leadership has a statistically significant influence on the direct effect on TQM practices".

An R2 value of 0.67 has strong predictive power, 0.33 has moderate predictive power, and a value of 0.19 has weak predictive power (Chin, 1998). The R2 values for customer focus (55%), process management (50%), people management (39%), strategic planning (57%) and information analysis (62%) indicate moderate predictive power (Figure 6). Therefore, "H2: Interfunctional coordination has a statistically significant direct effect on TQM practices".

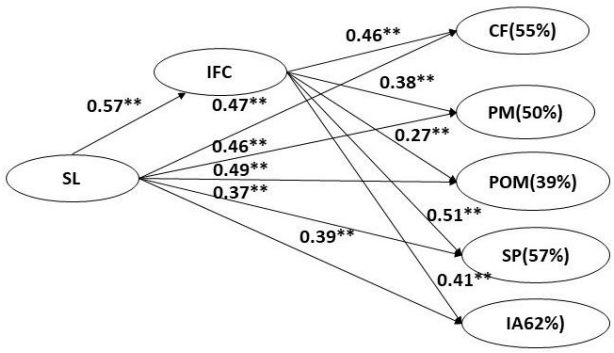

Fig. 6. Direct tests in the presence of Mediating variable Interfunctional coordination in the model

The indirect effects of servant leadership through the mediating variable interfunctional coordination – customer focus ($\beta = 0.21$, $P < 0.001$), process management ($\beta = 0.24$, $P < 0.001$), people management ($\beta = 0.17$, $P < 0.001$), strategic planning ($\beta = 0.29$, $P < 0.001$), and information analysis ($\beta = 0.21$, $P < 0.001$) – were statistically significant for all the TQM practice constructs. The direct effects of servant leadership on TQM practices are statistically significant, and the indirect effects in the presence of the mediating variable interfunctional coordination are significant; therefore, the mediating variable interfunctional coordination partially mediates the relationship between servant leadership (Figure 6, Table 5). Therefore, "H3 – Interfunctional coordination has a statistically significant mediating effect between servant leadership and TQM practices – is supported".

Discussion

Servant leadership has been recognized as a crucial leadership trait and is still a topic of great interest in the academic and popular press communities. One concern that remains unanswered and unexplored theoretically is whether interfunctional cooperation impedes the use of TQM practices and servant leadership. We have examined the role of servant leadership and its consequences for the execution of the above-mentioned TQM practices, which are composed of five components, using interfunctional coordination as a mediator.

Table 5
Mediation Effects: Bootstrapping

SL No	Path	"Indirect Effect"	"Direct Effect"	"Lower Bound"	"Upper Bound"	"p value"
1	SL→IFC→CF	0.21	0.47	0.11	0.34	$p < 0.001$
2	SL→IFC→PM	0.24	0.46	0.10	0.42	$p < 0.001$
3	SL→IFC→POM	0.17	0.49	0.09	0.31	$p < 0.001$
4	SL→IFC→SP	0.29	0.37	0.15	0.41	$p < 0.001$
5	SL→IFC→IA	0.21	0.39	0.11	0.39	$p < 0.001$

Source: Primary data processed

Ramdas et al. (2024) performed a comparative analysis of different types of leadership and their impact on the success of health systems in the context of servant leadership. The authors reported that servant leadership is one of the best ways to improve the quality and performance of healthcare systems. Our empirical research findings support the studies conducted by others by demonstrating that servant leadership has a statistically significant direct effect on the aforementioned TQM practices (Maden et al., 2014 and Yadeta et al., 2023). Servant leadership is directly associated with people management ($\beta = 0.39$, $p < 0.001$), and our results are in line with the studies carried out by (Jabnoun and Sedrani, 2005; Kaynak, 2003) in the area of people and process management. Servant leaders play an important role in ensuring that employees keep abreast of their knowledge through continuous learning and will design and plan training that is helpful to the employees of an organization for effective and efficient people management (Phelps et al., 2007). Kumar and Sharma (2018) examined leadership styles and their influence on TQM in the context of Indian firms surveying 111 firms in India. The authors reported servant leadership style and a positive relationship with TQM focus, and our outcome is consistent with this study. Weng et al. (2013) examined the relationship between customer orientation and interfunctional coordination and reported statistically significant effects on nursing innovation.

Yateda et al. (2022) investigated the mediating role of competitor orientation and interfunctional coordination between leadership styles and total quality management (TQM) implementation. A survey of 203 leaders from manufacturing and service firms in Addis Ababa was conducted. The authors reported that servant and transactional leadership had positive and direct effects on the implementation of total quality management practices. On the other hand, transformational leadership had only positive and indirect effects on implementing TQM through a competitor orientation and interfunctional coordination. Our results are consistent with the authors' findings.

Taking into account the perspectives of environmental economics and management, scholars have investigated the linkage between digitalization and technology management and its effect on the performance of QM in Pakistani businesses (Fangqi Dong et al., 2023). The authors evaluated organizational agility and culture as modifiers and used PLS-SEM to analyze the data. Additionally, organizational agility was essential in mediating the connection between TQM performance and technology management. Our study reports similar outcomes in the context of interfunctional coordination as a mediator. Andre et al. (2020) reported the factors that influence TQM outcomes – leadership, "people management, customer focus, strategic planning, process management and information analysis" – to effectively accomplish TQM practices in any industry. Our empirical study reported outcomes for similar constructs, and the results are in line with those of the study carried out by the authors. Ferdousi et al. (2018) studied the role of TQM in the context of information technology and expert systems, surveying 673 business units in Bangladesh. The results show a positive correlation between competitive advantage and the degree of TQM practice adoption. Furthermore, there was a positive correlation between the degree of TQM adoption and two organizational factors: the level of market competition and IT. We also report the results in the context of information technology.

Our study outlines the importance of interfunctionality coordination in organizations to understand stakeholder needs. Interfunctional coordination and communication at different levels in organizations in the context of the information technology industry are consistent with the theoretical framework of Reed et al. (2000). Therefore, we studied the interdepartmental interactions mediating the interfunctional coordination construct of surveying information technology companies. The study's findings imply that companies that use interfunctional coordination and servant leadership implement information and analysis, people management, strategic planning, process management, and customer focus more frequently. According to Kassim and Sulaiman (2011), supportive leadership that is more participatory, receptive, and consultative with staff members creates the right conditions for the successful development and maintenance of an interfunctional coordination culture.

Theoretical implications

Our results provide various extensions to previous research. First, we discovered that a crucial mediating factor in the relationship between servant leadership and TQM practices is interfunctional coordination. By elucidating the reasons behind the positive correlation between servant leadership and the five TQM practice components (via interfunctional coordination), these findings contribute to the existing body of literature. A recent discovery relates to the mediating function of interfunctional coordination between TQM practices and servant leadership. Furthermore, a significant discovery is the proof of the connection between interfunctional coordination and TQM practices, such as information and analysis, process management, strategic planning, people management, and customer focus. However, our study focused on the information technology industry. Finally, this study represents the first attempt to examine the application of servant leadership, cross-functional cooperation, and TQM in the manufacturing and service sectors of a developing nation. This is the first effort to investigate the relationships among these ideas in developing nations, even though they have been widely applied independently (Özsahin et al., 2013).

Practical implications

This study has several useful managerial implications. First, it details how servant leadership improves the application of these 5 TQM practice components. These results support the growing body of research supporting the application of servant leadership in emerging markets. The results of this study have significant ramifications for aligning the behavior of servant leaders with TQM practices. For leaders using TQM, it is important to recognize the basic design of leadership behavior. The conclusions of this study should also motivate senior managers in the manufacturing and service industries to prioritize servant leadership behaviors in addition to developing and sustaining transformational and transactional leadership behaviors. This study provides compelling evidence that servant leadership, which emphasizes developing relationships with followers, prioritizing them, giving them authority, assisting them in developing and succeeding, acting morally, exhibiting conceptual

competence, and adding value for those outside the organization, enhances the adoption of TQM practices. The authors suggest that future studies consider samples from the healthcare, banking, manufacturing and service sectors independently to control and reduce the bias resulting from industry differences. The results can be beneficial for current organizational leaders to achieve appropriate leadership styles and understand the mediating role of competitor orientation and interfunctional coordination between leadership styles and the implementation of TQM practices.

This study has several useful implications. First, it details how servant leadership improves the application of customer focus, people management, process management, strategic planning, information, and analysis. These results support the growing body of research supporting the application of servant leadership in emerging markets. The results of this study have significant ramifications for aligning the behavior of servant leaders with TQM practices. For leaders using TQM, it is important to recognize the basic patterns in leadership behavior. The conclusions of this study should also motivate senior managers in the manufacturing and service industries to prioritize servant leadership behaviors in addition to developing and sustaining transformational and transactional leadership behaviors. This study provides compelling evidence that servant leadership, which emphasizes developing relationships with followers, prioritizing them, giving them authority, assisting them in developing and succeeding, acting morally, exhibiting conceptual competence, and adding value for those outside the organization, enhances the adoption of TQM practices. The results of this study also demonstrate that the application of customer focus, people management, strategic planning, process management, information, and analysis was improved through interfunctional coordination, which served as a mechanism between servant leadership and TQM practices. The impact of servant leadership on interfunctional coordination is substantial. The relationship between servant leadership and the five TQM practices is mediated by interfunctional coordination, demonstrating that servant leadership provides an abundant resource that organizations can modify to attain interfunctional coordination. The sharing of resources and market knowledge among functional units can be sparked by interfunctional coordination, which will improve the application of TQM techniques.

Future directions

Although this research has made significant contributions, it has certain limitations that require further investigation. First, only servant leadership was examined in this study. It may be feasible to employ various leadership behaviors, such as charismatic, genuine, spiritual, and responsible leadership, in subsequent research. Second, self-report questionnaires from a single source were used to gather our data. Therefore, we acknowledge the possibility of common method bias. Therefore, data collection from multiple sources for dependent and independent variables should be considered in future research. This empirical study involved surveying the managers and leaders of IT sector employees. We conducted our empirical study via a quantitative method. Using the data gathered, hypotheses can be directly tested, which is one of the key advantages of quantitative analysis. However, more in-depth research on servant leadership behavior, interfunctional coordination, and the application of TQM in the information technology industry across India or elsewhere could be obtained by a future study that includes qualitative analysis. A more thorough investigation of these conceptions might also be possible through in-depth interviews with open-ended questions.

Although this research has made significant contributions, it has certain limitations that will require further investigation in the future. First, only servant leadership was considered in this study. It may be feasible to employ various leadership behaviors, such as charismatic, genuine, spiritual, and responsible leadership, in subsequent research. Second, self-report questionnaires from a single source were used to gather our data. Therefore, we acknowledge the possibility of common method bias. Therefore, data collection from multiple respondents for dependent and independent variables should be considered in future research. Third, this study employed a quantitative survey for data collection. Using the data gathered, hypotheses can be directly tested, which is one of the key advantages of quantitative analysis. However, more in-depth research on servant leadership behavior, interfunctional coordination, and the application of TQM in Ethiopia or elsewhere could be conducted through a future study that includes qualitative analysis. A more thorough investigation of these conceptions might also be possible through in-depth interviews with open-ended questions.

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