Relationship Between Execution of Quality Management Practices and Firm's Innovation Performance: A Review of Literature

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Abstract

This research study was conducted with the main objective of reviewing the impactful published research and exploring the nature of the association between the execution of total quality management (TQM) and a firm's innovation performance (IP) relation. Despite the strategic significance of both TQM and innovation for organizational sustained competitive gain, this is an under-researched area and a debatable issue among academia. For this purpose, a systematic literature review (SLR) was conducted covering the period 2003 to 2023 based on impact factor journals from databases (Scopus, WOS, cross-ref, Google Scholar, Etc.). SLR was applied to identify published research and analyze these papers to find out emerging research trends and potential gaps in the field for future research. In the final selection, 110 papers were shortlisted and analyzed to present findings and directions for future research. The earlier studies and the literature reveal inconclusive findings regarding this association. Few scholars report negative or no association between these two constructs. At the same time, many studies support the positive impact between the execution of TQM and the firm's Innovation (FI). Based upon LR, this paper identifies key practices and dimensions of QM that are more impactful for a firm's innovation (FI) and innovation performance (IP). Findings indicate that literature recognizes soft and hard QM dimensions or practices in relevance to a firm's innovation and IP.

Keywords: Quality Management Practices, Innovation Performance, Literature Review.

Introduction

In the contemporary business ecosphere, firms' key focus is on improving product' quality and waste reduction (Azam et al., 2022). In recent history, the total quality management (TQM) domain has attained huge attention, mainly on account of its significance in enhancing a firm's performance (Yas et al., 2021). In current technological advancement and competitive surroundings, TQM is being recognized as a central element that determines the success of a business (Wall, 2021). In prevailing economic competitive surroundings, TQM has become a crucial element that determines organizational success to sustain the continuity of a firm's business and the success of a company in maintaining its business (Suhendah & Brigita, 2021). Literature provides citations and references that support that TQM is the source through which a company achieves competitive gain (Madanat & Khasawneh, 2017). It is also considered vital for the survival of the majority of firms in the future, exclusively manufacturing companies. If TQM is effectively integrated and adopted within organizational business functions, it will result in enhancing market share and retaining the organization's customers (Wall, 2021). Quality management (QM) is thought of as a universal functional strategy of

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management to enhance a firm's performance to attain a firm's competitiveness (Babu & Thomas, 2021).

TQM is an all-inclusive approach that is focused upon continual refinement or improvement in the firms to fulfill the needs of their customer through the provision of superior-quality goods/services (Anil & KP, 2019; Tsou et al., 2021; Al Khasabah et al., 2022). It is aimed at creating a novel culture in the organization that involves all its workforce in a system. In addition, TQM brings continual process improvement, enhances the productivity of the labor force, reduces costs, and plans periods of production (Erkan & Mehmet, 2022).

Organizations integrate practices of QM in their philosophy at the firm level to enhance service/product quality and improve processes in order to fulfill consumer's demands (Sawaean & Ali, 2021). Several quality-focused companies embrace QM practices globally with the objective of enhancing their performance. Their execution may help management to appraise their influence upon multiple measures of performance and assist managers in evaluating the quality initiatives (Anil & KP, 2019).

TQM execution results in generating a system and culture within an organization that stimulates innovation (Bathaei et al., 2021). These QM practices are organizational mechanisms for improving workforce performance, developing productivity, controlling the quality of goods/services, and enhancing organizational capability to move towards the right path (Fatemi et al., 2016; Al Shraah et al., 2022). Additionally, QM practices are executed across organizational departments to help the workforce in meeting/exceed its customer's needs. Their execution also helps a company attain improved firm value in diverse markets as compared to its rival firms (Sawaean & Ali, 2021). Kalu et al. (2021) also conclude that the adoption of QM practices is a highly persistent approach for organizational survival in prevailing global competition.

Innovations (INN) may encompass developing a product/process/technology or efficiently performing firm activity (Suhendah & Brigita, 2021). SD (Sustainable Development) has received considerable attention from industrial experts, policymakers, and academia. Innovations' (INN) role in enhancing sustainability is among the main areas to be addressed by the discourse of SD (Silvestre & Ţîrcă, 2019). In the current age, firms need to innovate continuously on account of drastically altering demands of end-user and client satisfaction. Innovation plays the role of catalyst to cope with their demands. It is key for organizations to achieve success and competitive gain (Asghar et al., 2021). It is necessary for organizational long-range sustainability (Quandt & Castilho, 2017; Lim et al., 2019).

Firms nowadays have directives with their innovation performance (IP) to survive in competitive markets. Firms adopt innovative goods/services for their survival in competitive surroundings (Cengel et al., 2022). Organizations' IP approach is among the key driving factors to become competitive. Hence, firms must pay attention to improving product/process innovation, which, in turn, enhances organizational competitiveness and overall performance (Dehghani et al., 2022). In addition, rapid technological advancements and running in pace with the current Industry 4.0 (I 4.0) revolution demand that firms prioritize and focus on their innovations (Farish et al., 2017; Lim et al., 2019). Industries founded upon technology-oriented products have enhanced market share by shifting to high-tech, innovative product offerings (Cengel et al., 2022). Innovation is among the central element by means of which a firm attain competitive business gain (Asghar et al., 2021).

Presently, all industrial firms develop innovation to succeed in the marketplace. A firm's capability to innovate is considered as its potential to generate valuable and novel knowledge/products (Saunila, 2020). Both innovation (INN) and TQM have longer been topics of discussion on account of their contribution to the success of an organization. TQM in relevance to practices of management and innovation (INN) on account of technology-related change. However, an imprecise association has been recognized regarding the TQM-

innovation relationship in the literature (Taddese, 2017). As innovation is the essential basis to sustain competitive gain, in recent years, several researchers have tried to pay attention to exploring TQM and IP relations (Escrig-Tena et al., 2018). In the present day, both innovation and quality play crucial roles in organizational survival in a competitive international market. Exclusively, QM practices (like leadership, customer focus, and employee engagement) provide support to organizational innovativeness (Dehghani et al., 2022).

Firms may become more competitive through enhancing innovation. TQM encourages the emergence of innovation in the company as an organization requires novel/creative activities for the execution of TQM to enhance its performance (Suhendah & Brigita, 2021). According to Kafetzopoulos et al. (2015), TQM execution brings prospects for the organization to enhance innovation, which in turn improves organizational competitiveness. Santos-Vijande et al. (2007) research results also revealed that TQM has a strong impact on organizational innovation (INN) culture. Their findings supported the consideration of TQM as a suitable resource to stimulate innovation (INN) and innovativeness in an organization.

Innovation and managerial change focused on quality initiatives are the main organizational strategies. Execution of both innovation and quality enhancement impart crucial technical, managerial, and organizational challenges. These also bring important lags for companies before realizing their execution benefits (Bourke & Roper, 2017). Earlier empirical investigations (like (McAdam & Armstrong, 2001; Martinez-Costa & Jimenez-Jimenez, 2008) identified the positive influence of QM practices on both organizational performance as well as its innovation (Hung et al., 2011). The literature recognizes that comparatively little attention has been paid by researchers to empirically examine the influence of QM practices on a firm's innovation (INN), exclusively to process/product innovation (Sundram et al., 2016; Lim et al., 2019).

Nonetheless, the identification of an accurate set of QM practices is vital for firms to spur innovation and attain their strategic objectives. Existent literature reports varied findings regarding QM practices and IP relations. The majority of research to date on this relationship has suggested a direct association and neglected other potential impacting variables in this relationship (Escrig-Tena et al., 2018). To advance in the domain of this research, this review of literature is conducted considering these key objectives:

1. To review the most impactful research published in journals investigating the nexus between the execution of quality management (QM) practices and innovation.
2. To explore critical dimensions/practices of quality management in relevance to a firm's innovation performance (IP).
3. To highlight research gaps and under-researched areas in the literature for future direction in the above domain.

Considering the research problem and the above objectives, the following research questions are formulated for this review paper:

1. What is the significance of executing total quality management (TQM) and innovation for organizational success?
2. Is there any relationship between the execution of quality management (QM) practices and a firm's innovation or innovation performance (IP)? What is the nature of this association?
3. What are various types of QM practices or dimensions that are more impactful on a firm's innovation performance (IP)?

The rest of the research paper is segregated into the following sections: The methodology section presents the methods adopted and selection criteria of articles selection for SLR, which follows the Analysis and Findings section based upon a review of the literature in the domain of TQM and Innovation. The findings of SLR are also supported by tabular analysis from previous research studies. The final section presents SLR conclusions, study limitations, and directions for future research.

Methodology

This paper considers a systematic literature review (SLR) to analyze the TQM-Innovation relationship comprehensively. SLR is considered a scientific type of research that systematically and objectively integrates findings of empirical research regarding a specific problem of research in a specified study domain (Suárez et al., 2017). Researchers (like (Suarez et al., 2017; Sanchez-Meca, 2010) suggested four (4) phases to conduct SLR, which include: 1) Formulation of research questions; 2) defining articles inclusion or exclusion criteria; 3) searching and selecting articles; 4) reporting search results (García-Fernández et al., 2022). In this paper, the above stages have been considered to conduct SLR. In the first stage, researchers planned and reviewed the literature in TQM and innovation domain and developed the research questions to conduct SLR. Then, articles were selected initially using keywords, reviewing abstract, and considering other criteria defined in Table 1. After initial screening, selected articles were carefully reviewed and included, ensuring that the chosen articles fit the set criteria to determine QM and innovation association. It was also ensured to include maximum articles of top-tier impact factor journals from databases. The papers analyzed included published research from many impact factor journals like Technovation, TQM Journal, International Journal of Production Economics, Production Planning and Control, International Journal of Innovation and Learning, Journal of Operations Management, and many others. A total of approximately 423 articles were searched using keywords specified in table 1 from databases given in table 1. Out of these 423 articles, only 110 were chosen for final analysis, which fit the selection criteria. In the final stage, the results of the selected articles were reported. Table 1 gives an overview of article selection and inclusion criteria.

Table 1: Articles Inclusion/Exclusion Criteria

Period Covered	Articles since year 2003 till date (2023) were considered for inclusion in this SLR.
Data Bases	Articles published in journals indexed in databases like SJR/Scopus, JCR/WOS, cross-ref, Google scholar were included in initial screening.
Publication Language	Only articles published in English language were included.
Keywords for article search	Articles were searched from databases using keywords as: Quality management, TQM, quality management practices, quality management dimensions, innovation, innovation performance, product innovation, process innovation, quality management and innovation, TQM and innovation.

Analysis and Findings from Review of the Literature

This section presents the analysis and findings of SLR based on selected published papers.

Total Quality Management (TQM)

In the literature, TQM is recognized as the holistic philosophy of management, which attempts to bring continual improvement/refinement in entire organizational functions. This improvement can be attained if an organization follows the concept of total quality in all aspects (from acquiring resources to after-sale service provision) to its consumers (Kaynak, 2003). Deming has a firm belief that management is responsible for quality in the organization. Quality Gurus have contributed to the quality movement, and it is now considered the utmost priority for management and organizations in the 20th century (Cengel et al., 2022). With growing worldwide technological advancement, awareness of individuals is increasing regarding quality and receiving superior quality products/services. Along with this awareness,

companies and businesses are also recognizing the significance of providing superior quality to the clients.

As an outcome, quality is considered a crucial competitive factor for firms that are focused on providing superior quality in order to obtain competitive gain (Wall, 2021). Manik et al. (2023) stressed that firms should prioritize goods/services on the basis of quality to attain competitive gain. Moreover, enhancing product quality must be the main goal of a company. TQM is recognized as the systematic approach to enhance quality for the management all over the organization. It is aimed at performance improvement in the form of profitability, client satisfaction, productivity, and quality (Sadikoglu & Zehir, 2010).

Total Quality Management (TQM) Execution Benefits for the Organizations

TQM is also related to other significant facets of organizational growth (such as control and assurance of quality). The majority of firms that control their product's quality have constantly registered increased volumes of sales, resulting in higher growth (Yas et al., 2021). Over the past three (3) decades, TQM has been considered among the forms of practices of operations management. The literature cites cases that indicate that the execution of QM practices/principles has supported firms to become successful (Madanat & Khasawneh, 2017). In theory, quality systems (QS) in the contemporary world are actually associated with ISO standards Of QM. These standards relate to the epistemology of the foundational 'PDCA' cycle. (Cengel, et al., 2022). Specifically, the culture of quality is indispensable for the firm to outdo in each performance facet (Anil & KP, 2019). Successful execution of quality management (QM) brings extensive benefits to an organization. It enhances market share, the firm's profitability, competitiveness, and team collaborative work, reduces client complaints and enhances loyalty (Erkan & Mehmet, 2022). It supports companies in attaining sustainability. It also provides support to improve client satisfaction, productivity, and quality of goods/services and reduces production time (Manik et al., 2023).

Quality Management (QM) Practices or Dimensions in Relevance to Firm's Innovation Performance (IP)

QM practices are "significant techniques which organizations apply to improve the quality level of service provision to their consumers in order to fulfill their demands and level of satisfaction. It is achieved through the integration of entire quality-oriented functions across the firm" (Addae-Korankye, 2013; Al Shraah et al., 2022). QM practices have comprehensively been documented in both assessment research studies and relational studies investigating the impact of QM practices with different outcome variables (Kaynak, 2003).

QM practices are aimed at constantly developing the organizational capability. Hence, these practices enable organizations to respond to consumer's demands effectively regarding features of products (such as value, pricing, quality, novel design, and speed of delivery). Such QM practices support them in handling market-related challenges (Sawaean & Ali, 2021). Many researchers assert that organizations are required to execute QM in order to enhance competitive gain as the first step and later to improve their performance (Masrom et al., 2022). Various QM practices play a crucial part in improving organizational competitive gain and ultimately improving their levels of performance (Yas et al., 2021).

Literature on QM reveals that practitioners and scholars have different criteria of measure regarding QM practices (like study context, objective, and approach). This difference is on account of the absence of a broad definition of these practices. However, earlier research measures seven (7) central factors/dimensions that positively impact a firm's performance. These factors include customer focus, leadership, process management, supplier management, HRM, strategic planning, information and analysis (Sawaean & Ali, 2020).

Kalu et al. (2021) also recommend that firms prioritize the adoption of these practices as QM practices positively contribute to the firm's performance. QM practices are segregated into 'soft' and 'hard' QM. 'Soft QM' are the ones having extra focus on qualitative aspects. These include factors like employee involvement and leadership. While 'Hard QM' is more related to the management of operations/production, which applies standards of performance or statistical methods for quality assessment (Yunis et al., 2013; Al-Ali & Abu-Rumman, 2019). 'Hard' aspects focus on refining organizational operations. It achieves this target through measurement/analysis and management of processes. While 'soft' practices of QM pay attention to HR concerns and the commitment of management (Escrig-Tena et al., 2018). Companies must identify which practices of QM are more influential to foster process/product innovation (Lim et al., 2019). Table 2 presents QM practices that earlier researchers have applied in their empirical investigations on performance or IP studies.

Table 2: QM Practices applied in Research studies on Innovation and Performance

Practice	Description	Applied by Researchers
Leadership/ Top management commitment	It encompasses taking ownership of responsibility for quality. It also includes appraisal of quality, engagement in quality enhancement initiatives and comprehensive planning for quality (Saraph et al., 1989).	Black & Porter (1996); Flynn et al. (1994); Prajogo (2005); Ul Hassan et al. (2012); Singh et al. (2018); Zakuan et al. (2010); Feng et al. (2006); Chin et al. (2002); Kumar et al. (2011); Eng Eng & Yusof (2003); Pino (2008); Talib & Rehman (2012); Talib et al. (2011); Ahire et al. (1996); Yusr et al., (2016); El Manzani et al., (2019).
Customer Focus	It is related to the way a firm would define consumers' demands, expectations and their preferences (Alshourah, 2021).	Prajogo & Hong (2008); Ooi et al. (2012); Kanapathy et al. (2017); Camisón & Puig-Denia (2016); Taddese (2017); Prajogo (2005); Ul Hassan et al. (2012); Singh et al. (2018); Zakuan et al. (2010); Feng et al. (2006); Chin et al. (2002); Kumar et al. (2011); Eng Eng & Yusof (2003); Pino (2008); Talib & Rehman (2012); Talib et al. (2011).
Process management	It includes defining steps, boundaries and ownership of the process. It also covers applying SPC and choosy automization, minimize inspection and improve atomized process testing. There is more focus on preventive repair/maintenance and flawless design of the process (Saraph et al., 1989).	Black and Porter (1996); Flynn et al. (1994); Prajogo (2005); Talib et al. (2011); Talib & Rehman (2012); Yusr et al., (2016); Antunes et al., (2017); Taddese, (2017), El Manzani et al., (2019).
People Management/ HRM	It encompasses how a firm would involve its workforce, inspire them to participate, and encourage their commitment toward organizational activities (Alshourah, 2021).	Prajogo & Hong (2008); Antunes et al. (2017; Kanapathy et al. (2017); Sahoo (2020); Prajogo (2005); Ul Hassan et al. (2012); Antunes et al., (2017); Singh et al. (2018); Zakuan et al. (2010); Talib et al. (2011).

Information and analysis	This includes utilizing quality data and providing feed-back to both management/employees on the basis of this data for problem solving. It also involves appraising quality on time, and evaluating employees/management on the basis of quality related performance. It also covers making available this data for management/employees (Saraph et al., 1989).	Black & Porter (1996); Flynn et al. (1994); Prajogo (2005); Zakuan et al. (2010); Pino (2008); Ahire et al. (1996).
Continual improvement/ Improvement	This principle emphasises that life-long organizational goal must be set to constantly enhance/improve its performance. Firms must develop a strategy and pay attention to continually improve its systems, processes and products (Manders et al., 2016).	Martínez-Costa and Martínez-Lorente (2008); Perdomo-Ortiz et al. (2006); Prajogo and Sohal, (2001); Ul Hassan et al. (2012); Feng et al. (2006); Chin et al. (2002); Kumar et al. (2011); Eng Eng & Yusof (2003).
Strategic Planning	It encompasses formulating and revising goals, mission, policies taking into account expectations and requirements of diverse stake-holders (Sciarelli et al., 20220).	Psomas and Antony (2017); Burli et al. 2012; Sahney et al. (2006); Abdulla Badri et al. (2006); Calvo-mora et al. (2005); Prajogo (2005); Singh et al. (2018); Zakuan et al. (2010); Feng et al. (2006); Chin et al. (2002).

Source: Kaynak (2003); Manders et al. (2016); Alshourah (2021); Magd & Karyamsetty (2020); Sciarelli et al. (2020).

Anil and KP's (2019) study results conclude that the successful execution of QM practices supports a firm to attain benefits in each aspect, and management expects to realize performance improvement in all areas. As several organizations embrace QM practices worldwide, therefore many scholars from various fields pay attention to these practices. However, research findings from exploring the association between QM practices and organizational performance are mixed. On account of such results, there is a need to re-investigate this relation (Sadikoglu & Zehir, 2010). Execution of QM practices permits companies to restructure the prevailing regulations/rules to enhance the performance (in terms of productivity, efficiency, and proficiency) of their workforce (Sawaean & Ali, 2021). Tassie's (2016) research findings also support that a firm can consider QM practices a guiding principle for the provision of superior value to the consumer to exceed/meet the consumer's demands by means of effective coordination among its workforce (Al Shraah et al., 2022).

Innovation and Typology of Innovation

Damanpour et al. (1989) define innovation as "the adoption of an idea of behavior - whether pertaining to a device, system, process, policy, program, product, or service - that is new to the adopting organization." It is recognized as the process that adopts novel ideas to fulfill customers' demands that grow increasingly over time. It may encompass developing each organizational process, which results in novel product offers to its consumers (Suhendah & Brigita, 2021). Segregation of innovation suggested in earlier research studies differs (Kim et

al., 2012). Researchers (such as (Baird et al., 2011; Prajogo & Sohal, 2004 Prajogo & Sohal, 2001) recurrently argue that a firm's innovation is the foundation to becoming competitive and attaining completive gain (Kanapathy et al., 2017). Many researchers attempted to cover the fundamentals of innovation and established its typologies (Edwards-Schachter, 2018). For example, Kim et al. (2012) explored five (5) classes of innovation, which include four (4) classes of product and process innovation pertaining to radical and incremental, and a fifth one is administrative. Both types of innovation (breakthrough and incremental) are valuable for the organization (Sadikoglu & Zehir, 2010). At the same time, Schumpeter (1982) suggested five (5) innovation types, which include organization, market product, method, and process (Yonghong et al., 2005). Innovation typology is presented in Table 3.

Table 3: Mainstream of Innovation Typology

Innovation Typology	Key Characteristics
Radical vs. Incremental Innovation	*Radical innovations*: are novel to the world and extremely differ from current products/services. *Incremental innovations:* encompass alterations or modifications to current products/services.
Technological vs. Marketing Innovation	*Technological innovation:* is adopting the novel technologies which incorporate into product/processes. *Marketing innovation:* is related to internal processes which support product/service delivery.
Product vs. Process Innovation	*Product innovation:* is generating a novel or improved good or service. *Process innovation:* emphasizes on enhancing the efficiency and effectiveness of production.

Source: Suroso and Azis (2015).

Significance of Innovation for an Organization

Attaining SD (sustainable development) through Innovation is a newer and more complex concept. This fact has also received convergence in the literature that Innovation is inevitable to attain improved sustainable performance (Silvestre & Ţîrcă, 2019). Ever-rising organizational competition and the technological revolution have created pressure for survival for companies. A firm's competitive gain and survival are mainly dependent upon the way organizations manage Innovation, materialize novel ideas, and align with novel strategies of business (Asghar et al., 2021). Firms may become more competitive through enhancing Innovation. A firm can improve its performance and competitive gain through inoculating innovativeness in its culture (Dehghani et al., 2022). Innovation has become crucial for organizations to attain competitive gain in technology-oriented and dynamic industries (Yonghong et al., 2005). Currently, Innovation has arisen as among the organizational criteria to sustain a firm's competitive market positioning and obtain increased financial gains (Lim et al., 2019).

Nowadays, innovation performance (IP) is realized in the form of intangible resources (such as knowledge and creativity). Markets expand through the innovative measures that firms adopt, and Innovation forges competitive surroundings in these markets (Cengel et al., 2022). Many scholars highlighted that product/process-related innovative activities of the firm positively influence its competitive gain (Masrom et al., 2022). Asghar et al. (2021) recommend, on the basis of their study findings, that a firm should pay attention to Innovation to sustain competition and attain competitive gain. Saunila's (2020) research findings also provide

support that a firm's conscious acts to generate innovation-oriented outputs set the basis of sustainable competitive gain.

Furthermore, Innovation (both as an outcome and process) is also well-recognized in the context of small business. As innovations continuously change both consumer's lifestyles and external surroundings. Hence, innovations are recognized as significant factors for firms, countries, communities, etc., to attain sustainability. The literature recognizes to focus upon innovation-oriented strategies for tackling sustainability concerns (Silvestre & Ţîrcă, 2019).

Nature of Association between Total Quality Management and Firm's Innovation

Innovation and quality enhancement are recognized among proven approaches that companies consider to generate and sustain competitive positioning in the market (Bourke & Roper, 2017). Earlier research is evident that TQM positively impacts a firm's performance, like the quality performance of its products (Manik et al., 2023). Literature recognizes TQM as the basis and prerequisite for product/process innovation and organizational competitiveness (Dehghani et al., 2022). In the turbulent marketplace, companies are required to enhance both innovativeness and quality if they want to become competitive (Sadikoglu & Zehir, 2010).

Though QM was primarily established in firms to refine the process of product or cost reduction in operations, later QM execution has speedily broadened to various performance related functions of an organization into other aspects of organizational performance, exclusively firm's Innovation (Tidd et al., 1997; Projogo & Sohal, 2003; Al-Refaie et al., 2011; Ganapathy et al., 2017). A firm may execute QM, which is oriented towards meeting customer's demands through innovating products/services. Each firm decision demands Innovation by means of QM to attain improved performance (Suhendah & Brigita, 2021). Kafetzopoulos et al. (2015) argued that management must pay more attention to both Innovation and QM execution. They should give priority to the strategies oriented towards technology, production, and process to attain sustained competitive gain. Zeng et al. (2015) argued that both Innovation and quality should not be considered a trade-off issue as these conceptions may co-exist in an accumulative refinement model. Companies should not restrict QM ventures to attain Innovation.

Masrom et al. (2022) research study on Malaysian manufacturing industries showed that both TQM and Innovation positively and significantly impact a firm's competitive gain. Martinez-Costa and Martínez-Lorente (2008) research results indicated that firms executing QM and developing Innovation gain more advantages than other firms. Firms operating in the sector where constant Innovation is required must pay attention to TQM in order to support their process of Innovation. Firms do not need to abandon QM ventures to achieve Innovation. Zeng et al. (2015) also recommend that as an alternative, companies must struggle constantly to maintain a compact system of quality. Such a system must integrate practices of QM and associated measures of performance.

A review of the literature also reveals that earlier research contributed by scholars reports inconsistent results regarding TQM impact on a firm's IP (Segarra-Ciprés et al., 2020). Few scholars have emphasized that TQM and a firm's IP have a positive association (Bathaei et al., 2021). However, few researches showed that the relationship between QM practices and a firm's Innovation was unclear (Masrom et al., 2022). Whereas few scholars have stressed that both constructs have negative associations. According to these researchers, multidimensionality is the key reason behind this complex relationship between these two constructs. Scholars supporting negative association emphasize that QM execution involves standardization, which is a hurdle to innovativeness in the firms (Bathaei et al., 2021). Earlier studies (such as Jackson et al., 2016; Song & Su, 2015; Martinez-Costa & Martínez-Lorente, 2008; Thai Hoang et al., 2006) have not evidenced consensus regarding this association (Escrig-Tena et al., 2018). Literature also recognizes few studies that suggest that TQM may obstruct the process of Innovation in the firm. Proponents of this view think that

TQM limits Innovation to only incremental or reduces Innovation to fulfill the needs of its current customers (Prajogo & Sohal, 2001; Martinez-Costa & Martínez-Lorente, 2008). Some literature also evidences a few cases which indicated that QM can obstruct a firm's process of Innovation. It is due to standardization linked with TQM while managing processes and considered a limiting factor to constrain innovativeness only to fulfill the demands of the company's present consumers (Kim et al., 2012; Escrig-Tena et al., 2018). Table 4 presents a few studies reporting negative or no association.

Table 4: Studies supporting Negative or No Relation between TQM and Innovation

Studies	Study Context/Data Sources	Analytical Approach	Findings
Singh and Smith (2004)	Australian manufacturing companies	SEM	No strong association established between practices of TQM and innovation.
Leavengood and Anderson (2011)	Companies in West Cost, USA	Data envelopment analysis (DEA)	Positive impact of QM practices on IP was not supported.
Yusr et al. (2016)	Malaysian industries	SEM	Positive impact of QM practices on IP was not supported.
Yusr et al. (21017a)	Malaysian industries	SEM	Study concluded no association between TQM and IP.

Source: García-Fernández et al. (2022); Bon et al. (2012); Kim et al. (2012).

Researchers like Baldwin and Johnson (1996) and Flynn et al. (1994) also suggest that TQM execution fosters the process of organizational innovation on account of QM factors (such as customer focus and continual improvement). Dehghani Soltani and Azar (2020) conducted an empirical investigation by obtaining data from 250 respondents from Apparel firms. Study results supported that QM positively and significantly impacted the firm's IP and competitive gain as well.

Taddese (2017) study results revealed that TQM provides support to enhance organizational innovative capabilities. Additionally, the speed of innovation (INN) through TQM was also dramatic when compared to conventional innovation (INN). The execution of QM does not only improve innovation's speed but its responsiveness to various market requirements. Kafetzopoulos et al. (2015) study results also supported the direct contribution of TQM to a firm's (process, product) innovation (INN). In addition, these two types of innovations also directly influence the firm's competitive gain.

According to a few scholars (Escrig-Tena et al., 2018; Kim et al., 2012), practices of QM may foster innovation on account of a few factors (such as customer orientation and continual improvement. Many scholars from various countries and industrial contexts reported positive associations in their empirical investigations and reported positive TQM-innovation relations.

Khan and Naeem (2018) researched telecom companies in Pakistan and obtained data from 318 participants. Findings revealed concluded practices of QM enhance service innovations, which ultimately influence the performance of the firm. Hung et al. (2011) conducted research by obtaining data from high-tech firms in Taiwan. Their results revealed that TQM positively and significantly impacted the firm's IP.

Bourke and Rope (2017) conducted research by obtaining data from Irish companies in the manufacturing sector; their research revealed both longer and shorter-duration advantages and

impacts of QIM (quality improvement methods) on a firm's IP. They recommended considering the execution of both hard and soft-oriented QIMs individually to maximize the organization's innovation returns. Dehghani Soltani and Azar's (2022) results on the textile sector also supported that TQM significantly impacts product/process innovation. Some other scholars (Flynn et al., 1995; Prajogo & Sohal, 2003; Prajogo & Sohal, 2004; Hoang et al., 2006) also identified a positive association between TQM and innovation (Masrom et al., 2022). Table 5 presents a few studies reporting positive associations.

Table 5: Studies Supporting Positive Relation between TQM and Innovation

Studies	Data Sources	Analytical Approach	Findings
Hong et al. (2006)	manufacturing and service firms in Vietnam	Structural equation modeling (SEM)	Positive significant association between QM practices and innovation was found. All QM practices did not enhance innovation. Only three dimensions/ factors (leadership, people management, process, strategic management, and open orientation) had positive influence on innovation.
Perdomo-Ortiz et al. (2006)	machinery and instruments firms in Spain	Multiple regression analysis (MRA)	Positive significant association between QM practices and business innovation capability (BIC) was found. Mechanistic aspects/practices of QM were more effective to build BIC.
Santos-Vi Jande and Alvarez-Gonzalez (2007)	ISO:9000 certified manufacturing and service firms in Spain	SEM	Positive significant association between TQM and administrative innovation found. QM influence on technological innovation (TI) was subjected to mediation of organization's innovativeness.
Martinez-Costa and Martinez-Lorente (2008)	manufacturing and non-manufacturing firms in Spain	SEM	Positive significant association of QM practices with innovation (product, process), and organizational performance was found.
Prajogo and Hong (2008)	R & D divisions of manufacturing firms in South Korea	SEM	Positive significant association of QM practices with both product quality and innovation was identified.
Abrunhosa and Sa (2008)	Footwear manufacturing firms in Portugal	MRA	Positive association between practices of QM and technological innovation was reported.
Sadikoglu and Zehir (2010)	Turkish industries	SEM	A stronger positive association between TQM and IP was found. Findings also suggested that nature of such association may be direct or through a mediating variable.
Roldán Bravo et al. (2017)	Spanish manufacturing	SEM	Firms which implement TQM are highly oriented towards innovation.

	and service companies		
Vujovic et al. (2017)	Montenegro manufacturing and service industries	Ordinary least squares (OLS) regression	ISO: 9000 standard impacts positively on IP.
Escrig-Tena et al. (2018)	Spanish manufacturing and service companies	SEM	Hard QM aspects have direct impact on both product and process innovation.
Sahoo (2019)	Indian Manufacturing companies	SEM	Practices of QM stimulate both product and process innovation.
Mahmud et al. (2019)	Malaysian Industries	SEM	TQM impacts significantly both innovation and overall performance.
Wu et al. (2019)	Chinese industries	Regression analysis	TQM offers an imperative base for organizational internal controls to foster innovation activities.

Source: García-Fernández et al. (2022); Bon et al. (2012); Kim et al. (2012).

Conclusion

This review study was conducted with the main objective of understanding the nexus between the execution of QM practices and the firm's IP. Authors summarize key findings identified from this SLR as:

First, the literature recognizes that both total quality management (TQM) and innovation (INN) are multidimensional constructs. Both have strategic implications for organizational success and contribute to enhancing a firm's competitiveness and sustained competitive gain. Execution of QM practices improves systems, processes, and quality of products and ultimately enhances the overall firm's performance, a firm's innovation performance (IP) is a central driving element to remain competitive. The organizational IP approach is among the key driving factors to become competitive and sets the direction towards its long-run survival in the marketplace.

Second, the literature also recognizes various types of QM practices and dimensions that researchers have considered in their empirical investigations to determine the TQM-IP relationship. The most applied QM practices or dimensions are segregated into soft and hard practices. 'Soft practices' encompass factors like leadership and employee engagement. While 'the hard aspects of QM relate more to managing operations and involving procedures to appraise quality. Researchers have considered diverse soft and hard QM dimensions/practices (like leadership, customer focus, continual improvement, HRM or people management, process management, information, and analysis) in their studies to explore TQM and firm's IP relationship. However, studies and empirical investigations considering the dimensionality of QM in relevance to IP are scant in the literature. Therefore, there is a need to focus more on this under-researched area of dimensionality. It will result in the identification of the right dimensions/ practices of QM, which are more critical to enhancing the firm's IP.

Third, the literature also reveals that despite the strategic significance of both TQM and Innovation (INN) for organizational success and competitiveness, the relation between these two constructs (TQM, INN) is debatable and contradictory among the academicians. Various researchers, in their empirical investigation of diverse sectors (manufacturing, service) and different contexts (developed and developing countries), reported contradictory results. Few

researchers (like (Yusr et al., 2017; Yusr et al., 2016; Leavengood & Anderson, 2011; Singh & Smith, 2004) reported negative or no association between TQM and innovation (INN). Proponents of the negative view argue that the multidimensional nature of both constructs and standardization involved in TQM execution are the main reasons for the negative association. While many others (like Wu et al., 2019; Sahoo, 2019; Escrig-Tena et al., 2018; Roldán Bravo et al., 2017; Prajogo & Hong, 2008; Santos-Vi et al., 2007; Perdomo-Ortiz et al., 2006) identified positive association between these two constructs (TQM, INN). Such inconclusive findings and contradictions make this association more complex. Therefore, further research is needed to explore the right dimensions and factors in a framework to address this complexity.
Fourth, based upon SLR, it is revealed that most of the researchers in their empirical investigation focused on the direct relationship between these two constructs (TQM and INN). These researchers did not consider mediating and moderating variables in their frameworks. There is a dearth of research exploring more mediating and moderating factors to address the complexity of this relationship.
Despite the diverse and contradictory research findings, several studies report a positive impact of the execution of QM practices on a firm's IP. Both types of QM practices (soft and hard) positively impact a firm's IP; both TQM and innovation are central elements that determine the successful competitive positioning of an organization and enhance its sustained competitive gain.
According to Irani et al. (2004), both quality and innovation (INN) are determinants of achieving success in a firm's business. At the same time, Projogo and Sohal (2003) consider 'innovation' (INN) as the 'winning criterion' and 'quality' as the 'qualifying criteria' for the company (Kanapathy et al., 2017). Therefore, there is a need to conduct more research studies in the future to clarify this debatable relationship, considering various mediating and moderating factors. Future researchers should also pay more attention to the dimensionality of QM to identify the right dimensions/practices that are more influential in enhancing a firm's IP exclusively in relevance to I4.0. The dimensionality of TQM still lags in the industry 4.0 revolution, and there is a dearth of research in this domain.

Limitations and Future Directions

This study is inclusive as researchers have tried to shed light, cover maximum studies, and research published regarding the TQM-innovation relationship. However, like all other studies, this research is also subject to the following limitations, which should be addressed in future research.
First, the authors used secondary data from previously published papers to analyze TQM execution and IP relation and reporting results. Future researchers should conduct empirical research using primary data and survey methods applying statistical analysis to reconfirm previous research findings on TQM-IP relation.
Second, future researchers should develop comprehensive frameworks considering moderating and mediating variables (such as knowledge creation and organizational learning) in direct association with TQM and innovation. They should also test the framework in the presence of these variables in the above TQM-innovation relations in various firm sectors and country contexts. The majority of the researchers in earlier research only considered the direct relation between these two constructs.
Third, due to resource constraints, authors only considered a few databases (like SJR, WOS/JCR, cross-ref) for screening and selecting published research papers/articles. Future researchers may extend their search and broaden inclusion criteria by considering other databases.
Fourth, the authors have tried to identify soft and hard QM practices/dimensions in relevance to a firm's innovation (INN) and innovation performance (IP) based on earlier studies. There

is a dearth of empirical investigation on the dimensionality of QM practices, which are more influential for a firm's IP. Therefore, future researchers should pay more attention to considering dimensionality (soft, hard) in their framework and empirically test which practices of QM have more relevance to a firm's IP.

Fifth, the SLR findings can be compared and contrasted with another study applying the SLR technique in a local or foreign context to know and evaluate research outcomes. It can enhance the impact of research in this domain.

Lastly, considering the advancement in digital technologies in relevance to the fourth industrial revolution (I4.0), future researchers should develop and test frameworks considering the I4.0 digitalization impact on TQM and IP link.

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