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Leveraging the hard and soft elements of TQM: the interplay of benchmarking and improvement processes

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Abstract

Purpose – This study aims to analyze how the interplay between hard and soft elements of total quality management (TQM) produces the conditions for sustaining success in the quest for quality.
Design/methodology/approach – A qualitative analysis (Gioia method) was carried out on an original dataset collected through both direct and indirect methods (i.e. archival sources, interviews and observations) to generate a new interpretive framework.
Findings – The interpretative framework identifies four categories of elements: trigger elements create the starting conditions for a quality virtuous cycle; benchmarking tools set the standards of performance; improvement tools enable exploration of the space of possible alternative practices and finally, catalytic forces allow the institutionalization of effective techniques discovered in this search process into new standards.
Research limitations/implications – The findings the authors present in this paper are derived by a single case study, limiting the generalizability of our results in other settings.
Practical implications – This study has three implications: first, the design of trigger elements is critical for the success of any TQM initiative; second, the interplay of improvement and benchmarking tools at several levels should be coherent and third, to exploit the potential of TQM, efforts should be devoted to the dissemination of new effective practices by means of catalyzing elements.
Originality/value – The model provides a more specific understanding of the nature and purpose of the hard and soft elements of TQM and the dynamic interaction between the two classes of elements over time.

Keywords Total quality management, World-class manufacturing, Qualitative methods, Automobile industry

Paper type Research paper

1. Introduction

Total quality management (TQM) practices have become pervasive in businesses (Powell, 1995; Lewis *et al.*, 2006) with the aim of satisfying the needs of customers (Pun, 2002) by producing goods and services of quality (Graham *et al.*, 2014). TQM practices are considered to be among the most important developments of management practices (Haffar *et al.*, 2013), as they help

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improve firm performance, generate a competitive advantage and enhance survival (Powell, 1995; Chin *et al.*, 2001; Douglas and Judge, 2001; Lam *et al.*, 2011; Sinha *et al.*, 2016).

TQM has been defined as a management philosophy and related practices concentrating on aspects such as continuous improvement, customer satisfaction, employee involvement, benchmarking and closer relationships with suppliers (Powell, 1995). Thus, it concerns the entire organization and its employees, relies on specific tools and techniques and implies a stakeholder perspective and a customer orientation (Lewis *et al.*, 2006; Graham *et al.*, 2014; Ershadi *et al.*, 2019).

One crucial, controversial issue in the definition of TQM is the search for an interpretive key linking its components to the results it promises to achieve (Fotopoulos and Psomas, 2009). The distinction between hard and soft TQM elements (Wilkinson, 1992) has become prominent in this debate for two reasons. On the one hand, it is widely accepted that a TQM initiative will succeed or fail because of a fruitful—or less fruitful—compresence of hard and soft elements (Gadenne and Sharma, 2009). On the other hand, scholars have failed to produce a conclusive explanation of how this compresence can be produced and sustained, either mainly concentrating on the effects on performance of individual factors (e.g. Powell, 1995; Ahire *et al.*, 1996; Dow *et al.*, 1999; Bayazit, 2003; Graham *et al.*, 2014), underscoring the prevalence of a specific subgroup of factors (either hard or soft) (e.g. Rahman and Bullock, 2005; Lewis *et al.*, 2006; Fotopoulos and Psomas, 2009), or specific configurations of hard and soft factors (e.g. Gadenne and Sharma, 2009; Calvo-Mora *et al.*, 2013). Moreover, an overwhelming majority of studies on hard and soft dimensions of TQM have a distinct cross-sectional nature (e.g. Powell, 1995; Rahman and Bullock, 2005; Fotopoulos and Psomas, 2009; Abdullah and Tarí, 2017).

Thus, previous literature has failed to understand the interaction between hard and soft TQM elements and to identify the dynamics by which the two groups of elements can sustain performance in terms of quality (Ershadi *et al.*, 2019; Khalili *et al.*, 2019). In addition, the cross-sectional nature of previous studies prevents an evaluation of these interactions and dynamics over time. To fill these research gaps, this paper aims to answer the following research question:

RQ1. How does the interplay between the hard and soft aspects of TQM produce the conditions for sustaining success in the quest for quality?

Answering this question is of paramount importance, from both a theoretical and a practical standpoint.

Theoretically, the mechanisms through which the two separate kinds of elements of TQM (hard and soft) combine to generate performance remain unresolved. In part, this is due to a lack of agreement on a univocal definition of "soft" elements. According to different viewpoints, soft elements include disparate organizational features, ranging from specific HRM practices (e.g. training and selection) to complex individual (e.g. commitment) and social (e.g. organizational culture) constructs (e.g. Lau and Idris, 2001). For these reasons, a more specific understanding of the nature and purpose of soft elements would significantly improve the understanding of their role in the implementation of TQM initiatives.

The second theoretical contribution of the research question pertains to understanding the dynamic interaction between the two classes of elements in longitudinal terms. Time has been recognized as the most important factor in aligning each category of TQM elements (hard or soft) first with one another and then with firm culture (Imeri *et al.*, 2014). One stream of literature has attempted to address this problem by hypothesizing the distinction and tension between control and exploration processes in TQM initiatives, largely coinciding with hard and soft elements (Shea and Howell, 1998; Douglas and Judge, 2001). However, the resulting explanations are partly unsatisfactory, as they rely strongly on the role of contextual elements that are largely exogenous.

From a practical standpoint, answering the research question above helps to overcome a major problem currently hindering many attempts to implement TQM initiatives: the

tendency of both scholars and TQM gurus to clearly define causal relationships within relatively complex models and, as a consequence, to offer precarious justifications for TQM adoption (Mosadeghrad, 2014a). This tendency has complicated successful adoptions of TQM; understanding the dynamics of the interaction in terms of process would represent an extremely useful step forward in implementing such a complex tool.

The rest of the paper is structured as follows. Section 2 sets out the theoretical background, outlining the critical factors of TQM and the alternative hypotheses regarding the interaction of hard and soft TQM elements identified in the literature. Section 3 describes the method adopted and the data used in the analysis. The next section presents the results of the analysis (Section 4). Finally, Section 5 is devoted to a discussion of the results, followed by the conclusions (Section 6).

2. Theoretical background

2.1 Critical factors of TQM

Critical TQM factors have been defined as "the indispensable principles and practices for the TQM to produce the desired effects on an organization's results and performance" (Calvo-Mora *et al.*, 2013, p. 116). In the literature, many studies have sought to identify which critical factors contribute to TQM success (Calvo-Mora *et al.*, 2013). They vary considerably (Graham *et al.*, 2014), and there is substantial disagreement about the number of relevant factors. This suggests the absence of a precise identification of which elements constitute critical TQM factors (Graham *et al.*, 2014; Mosadeghrad, 2014b). However, despite the variance in number, there is quite some similarity and overlap among the sets (Dow *et al.*, 1999; Graham *et al.*, 2014). Some common critical factors include leadership and top management commitment, customer focus, supply management, workers' involvement, process management, benchmarking, continuous improvement and empowerment (Sila and Ebrahimpour, 2003).

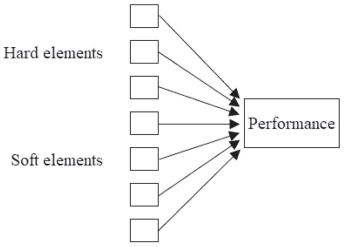
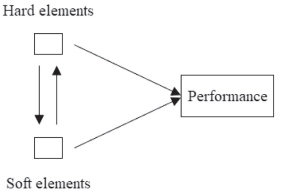
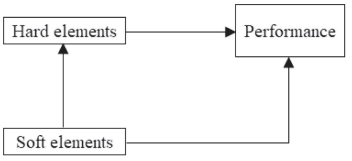
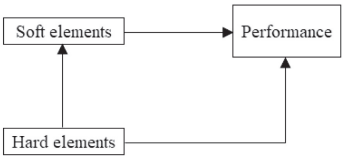
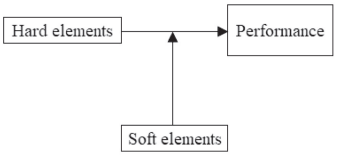
Critical TQM factors have traditionally been classified into two broad categories: "soft elements" and "hard elements" (Wilkinson, 1992). This distinction was proposed to underscore that in the early 1990s, little attention was given to soft elements despite their clear implications for the success of TQM initiatives (Wilkinson, 1992). For example, corporate culture and employee acceptance and support critically affect the success of TQM (Seddon, 1989; Wilkinson, 1992).

According to one stream of literature, soft elements include social and behavioral aspects and, therefore, practices related to the management of people (e.g. culture, leadership, customer orientation). In contrast, hard elements are related to the technical aspects of quality management, specifically manufacturing systems and tools (e.g. planning, process control, continuous improvement) (Dow *et al.*, 1999; Rahman and Bullock, 2005; Lewis *et al.*, 2006). By contrast, a second line of thought defines soft factors as the principles needed to guide TQM—albeit difficult to assess and make tangible (e.g. shared view and employee commitment and involvement)—while hard factors are the tools employed to guide decision-making and TQM implementation proper (e.g. just-in-time philosophy and control graphs) (Calvo-Mora *et al.*, 2013). In some cases, the distinction between the two types of elements is difficult to identify precisely (Black, 1995), and there is no clear consensus on their definition (Calvo-Mora *et al.*, 2013).

Moreover, there is great heterogeneity in how the interaction between hard and soft elements is conceived. The variety of theoretical modelizations linking hard and soft elements identified in the literature is presented in the following section.

2.2 The interaction between the hard and soft elements of TQM

Four distinct theoretical modelizations of the interaction between hard and soft elements of TQM have been identified (and labeled) (see Table 1).

Approach	Graphical representation	Examples of studies
Linear		Powell (1995) Ahire *et al.* (1996) Dow *et al.* (1999) Samson and Terziovski (1999) Ahire and Dreyfus (2000) Rahman (2001) Bayazit (2003) Valmohammadi (2011) Graham *et al.* (2014) Zeng *et al.* (2015) Aba *et al.* (2016) Sinha *et al.* (2016) Baidoun *et al.* (2018)
Combinatorial	A)  B)   C) 	A) Fotopoulos and Psomas (2009) B) Rahman and Bullock (2005) Lewis *et al.* (2006) C) Abdullah and Tarí (2017)

(*continued*)

Table 1.
Theoretical hypotheses on the interaction of hard and soft elements of TQM

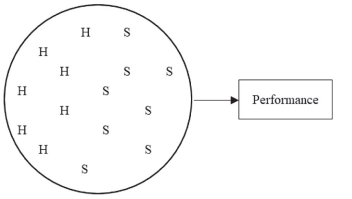
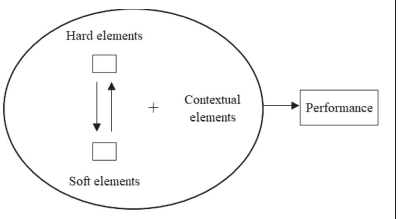
Holistic		Gadenne and Sharma (2009) Calvo-Mora *et al.* (2013)
Contextual element		Shea and Howell (1998) Douglas and Judge (2001)

Table 1.

In the "linear approach," critical TQM factors are hypothesized to affect firm performance without necessarily interacting with each other. Studies that have adopted this view have aimed to identify which critical TQM factors increase firm performance (Rahman and Bullock, 2005), generally finding that only some soft elements of TQM are related to performance (Abdullah and Tarí, 2017). These soft elements include management involvement, commitment, leadership and support; employee involvement, empowerment and commitment; education and training; customer focus; shared vision; open organization; and quality policy (Powell, 1995; Ahire *et al.*, 1996; Dow *et al.*, 1999; Bayazit, 2003; Graham *et al.*, 2014). In contrast, hard elements, such as benchmarking and process improvement, do not lead to increased performance if some intangibles are lacking (Powell, 1995). However, according to other studies, even hard elements of TQM are related to performance (e.g. Ahire and Dreyfus, 2000; Aba *et al.*, 2016). Finally, some studies (e.g. Valmohammadi, 2011; Sinha *et al.*, 2016) have found that both soft and hard elements affect performance.

In the "combinatorial approach," the hard and soft elements of TQM directly and indirectly affect quality performance following three different configurations. In the first, the hard and soft elements play different roles in impacting performance. According to Fotopoulos and Psomas (2009), quality management results are mainly influenced by soft elements and are only secondarily, but still significantly, affected by hard elements. In the second configuration, one category of elements (hard or soft) supports the implementation of the other. According to Rahman and Bullock (2005), in addition to directly affecting performance, soft elements affect hard elements, which, in turn, will have an effect on performance. Specifically, hard elements do not necessarily increase quality because—while these elements may produce quality improvements—it is the soft elements that predominantly do so, as they regulate employees' efforts (Rahman and Bullock, 2005). Therefore, soft elements enable the creation of an environment in which the diffusion and implementation of hard elements can be both smooth and coherent (Rahman and Bullock, 2005). Conflicting results on the primary importance of the

soft elements of TQM were found by Thiagarajan and Zairi (1997) and Lewis *et al.* (2006), according to which it is the hard elements that support the implementation of soft elements. In the third configuration, soft elements moderate the impact of hard elements on performance. Specifically, Abdullah and Tarí (2017) found that the relationship between hard elements and performance is positively moderated by six soft elements.

In the "holistic approach," the hard and soft elements of TQM must be present in a specific combination and the resulting mix, which must be adopted as a whole, affects firm performance. According to Calvo-Mora *et al.* (2013), soft elements are crucial for TQM success, as they facilitate the formulation and effective implementation of strategies and actions concerning hard elements (Calvo-Mora *et al.*, 2013). At the same time, hard elements allow soft elements to become more effective (Calvo-Mora *et al.*, 2013). Thus, both soft and hard elements must be implemented together—otherwise, they do not affect performance (Calvo-Mora *et al.*, 2013). Similarly, Gadenne and Sharma (2009) found that performance is positively influenced by a combination of hard and soft elements.

In the "contextual element approach," various elements (mainly related to the organization) have been introduced to explain how critical TQM factors impact firm performance. Shea and Howell (1998) stressed the centrality of employee perceptions for TQM success. They noted that according to social cognitive theory, individuals choose between available alternatives by processing information related to the situation at hand (Shea and Howell, 1998). In this process, two cognitive mediators are prominent: self-efficacy (i.e. the perception of possessing the necessary capacity to achieve a certain level of performance) and outcome expectancy (i.e. the belief about whether a behavior will lead to desirable results that reward efforts) (Shea and Howell, 1998). These two self-regulatory mechanisms explain how organizational characteristics (i.e. situational variables) influence the extent to which the choices and behaviors of individuals are consistent with TQM (Shea and Howell, 1998). In turn, TQM-related outcomes influence the perceived environment and affect individual cognition, giving rise to a feedback loop that may influence individual involvement in TQM (Shea and Howell, 1998).

Building on Shea and Howell (1998), Douglas and Judge (2001) focused on the role of the organizational structure in terms of control (i.e. the standardization of operations to ensure reliable outcomes) and structural exploration (i.e. the extent to which the organization is open to new ideas). They found that in organizations with high control and structural exploration, the relationship between TQM and performance is stronger (Douglas and Judge, 2001). Moreover, control and exploration may be interdependent and mutually reinforcing (Sutcliffe *et al.*, 1999).

In this paper, two aspects of the relationship between hard and soft elements of TQM that are still largely controversial are addressed. First, there is a need to clarify the meaning and nature of the opposition between hard and soft elements for generating quality, as proposed in the traditional dichotomy prevalent in the literature. Second, this interaction is often understood in terms of causality, yet it is usually investigated cross-sectionally. The interplay between hard and soft elements of TQM over time is studied with the aim of explicitly accounting for the dynamics of this exchange.

3. Method and data collection

3.1 Method

A single case analysis was selected to provide insights into the dynamics that develop between TQM factors, considering the context in which these envelopments can be reconstructed over time as an effect of the deliberate introduction of TQM practices in the operating environment. A single case study enables the examination of a phenomenon at a fine-grained level of detail, which cannot be achieved through multiple cases or other methods (Siggelkow, 2007; Ozcan *et al.*, 2017). Specifically, it is advantageous to gain an in-depth

understanding of such a complex phenomenon from a variety of perspectives and to observe how it develops longitudinally (Ozcan *et al.*, 2017). Moreover, the opportunity of observing a case that has not been accessible to researchers before constitutes an additional feature to obtain novel information on the phenomena under investigation (Ozcan *et al.*, 2017). Corresponding to Yin's (2014) rationales for conducting single-case research, the selected case exhibits "unusual," "longitudinal," and "revelatory" properties.

This research embraces a holistic case design, which is more appropriate because a holistic organizational-level process is investigated, and the case has no clearly identifiable subunits. Data were collected from different levels of analysis within the case (e.g. from lower level employees to upper management of the corporation), resulting in more fine-grained insights into the phenomenon; this allows to mitigate the risks of excessive abstraction and unnoticing changes to the research focus (Ozcan *et al.*, 2017). The remarkable source of longitudinal data provided by the case for understanding the dynamics among TQM factors has been an inspiration for the model setting and vividly illustrates the theoretical contribution proposed here (Siggelkow, 2007).

The case selected is focused on an automotive assembly plant located in Italy that has a long continuous history of manufacturing and has recently introduced world class manufacturing (WCM) methodologies. WCM is a collection of concepts that set standards for production and manufacturing excellence; the approach has been extended and universalized by Schonberger (1986) and is deeply rooted in the Toyota Production System. In both approaches, TQM is paramount.

This study followed an inductive research design (Gioia *et al.*, 2013) through a methodology rooted in a grounded theory-inspired approach (Gioia and Chittipeddi, 1991). The Gioia method offers rigorous and standardized steps for data management and processing, allowing for the reconciliation of interpretive research and measurable constructs (Mees-Buss *et al.*, 2022). Longitudinal qualitative data from a case study were used to develop a process model (Glaser and Strauss, 1967; Langley *et al.*, 2013) aimed at explaining how the factors relevant to a TQM setting are intertwined. Historical (Vaara and Lamberg, 2016) and archival data, semi-structured interviews and direct observations (Corbetta, 2003) were combined, responding to recent calls to integrate historical approaches to understand management phenomena (Argyres *et al.*, 2020). Data were analyzed through a hierarchical multi-stage codification process, with a gradual consolidation of replications that emerged from the initial proliferation of codes into first-order dimensions (Gioia *et al.*, 2013) that were labeled by employing, whenever possible, terms used by the informants, thus reflecting their "concepts in use" (Gephart, 2004).

This methodology enabled the identification and extraction of a set of dimensions from the case study that represent the fundamental building blocks of the proposed model, with the purpose of showing how the factors involved in this TQM implementation interact over time.

3.2 Data collection

Main field access to the case was obtained through the authors' former collaboration and personal relationships with top managers in the case setting; this contingency granted access to archival data and turned out to be crucial in identifying further key informants. Data collection began with archival data, which provided familiarity with the setting and were a great source of secondhand quotes by individuals associated with the case. Later, preliminary interviews with corporate top managers were an efficient means to gather additional rich empirical data (Eisenhardt and Graebner, 2007) that captured both real-time and retrospective processes of interest. In this phase of the investigation, particular attention was devoted to covering different levels of analysis, from corporate top managers to line workers and balancing the number of interviews with the availability of archival data.

Top managers in the plant where the WCM methodology was introduced were the subject of two sessions of longitudinal interviews, with the purpose of catching how the influence of TQM factors unfold over time within the case study. Finally, interviews with line workers in different hierarchical positions (i.e. team members, team leaders, supervisors and shift managers) were conducted. This choice allowed both to trace the longitudinal unfolding of the phenomenon under interest and to triangulate answers with archival data and among informants. All key informants were interviewed through semi-structured interviews that focused on specific topics of TQM factors and their interactions and allowed for the exploration of different views expressed by the participants (Bryman and Bell, 2015). At this stage of the investigation, particular attention was devoted to achieving convergence through data saturation (Saunders *et al.*, 2018).

Information from archival data and interviews was complemented by direct observations during the fieldwork. In particular, the whole plant was visited twice at different times, focusing both on meetings and interactions among employees and on their daily activities in various work environments (e.g. assembly lines, job shops, quality and metrology departments and others).

In summary, data gathering relied on three main sources (see Table 2).

Archival sources, historical and contemporary, were collected offline through generalized and specialized repositories (public and university libraries) and online through search engines (e.g. Lexis-Nexis, Factiva and Google). Documents detailing the history of the plant were gathered from corporate archives and careful attention was paid to collecting information about the organizational and operational context of the plant before and after the introduction of WCM methodologies. All key informants at both the corporate and plant levels were tracked, including those who had formerly been involved with the introduction of a novel TQM paradigm, along with the related redesign of the plant. Overall, documents were collected from a broad range of sources, such as books, archival documents, generalist and specialized press, journal articles and websites, for a total of around 1,300 pages.

Eleven semi-structured interviews (Corbetta, 2003) were conducted with informants in different hierarchical positions who held distinct functional roles. Past and current corporate top managers involved in WCM reorganization were identified and interviewed to integrate and cross-check archival sources. Thus, the understanding of strategic, managerial and operating issues connected with the reorganization that occurred at the plant was enhanced.

Plant managers (HR and production managers) and workforce professionals in different roles (team leaders, supervisors and shift managers) at the plant were then interviewed with a twofold goal. The first part was to deepen the understanding of the events that led to the introduction of TQM practices currently used in the plant, how such practices were institutionalized, and how such events were perceived by the direct witnesses. The second part of the goal was to investigate the current utilization of TQM practices and tools, their nature and organization, their impact on the work experience, behaviors and expectations of management and workers and the implications of such practices and tools with respect to individual, group and corporate goals and performance. During this set of interviews, the typical activities and roles of different factory workers were tracked, taking into consideration the internal division of labor. All interviews were conducted in Italian, recorded and then transcribed.

Finally, during the visits to the plant, direct observation (Corbetta, 2003) was also carried out to deepen the understanding of the context and behaviors of managers and workers involved in everyday operations by directly observing some of the activities in the different departments of the plant.

4. Data analysis

Archival data allowed for a detailed reconstruction of the main events of the last 20 years, with a specific focus on the elements that led to the introduction of WCM and, in particular,

Type of data	Sources	Use in the analysis (e.g. gathering, triangulating)
Archival sources	*Automotive industry documents:* industry reports [2], history books [3], online (archival) newspaper and journal articles and webpages [15], documentaries [1], books and publications about industry [2]. Total pages: 1,100 Various public libraries archives, specifically relevant national and local newspapers: La Repubblica, 2005–2015; Corriere della Sera, 2005–2015; La Stampa, 2005–2015. Total pages: 40 Corporate internal documents: reports [6], technical memos [2], and corporate presentations [5]: Total pages: 150	Familiarize with the history and evolution of TQM practices, in particular with the WCM standards and practices. Frame the plant in the global context of car making Put together the reorganization of the plant and its role in the introduction of quality practices. Clarify event timelines
Interviews	*Preliminary interviews with top managers company headquarter*. Recorded time: 2.5 h (43 pages of transcribed text)	Integrate and cross-check archival sources related to TQM introduction. Familiarize with strategic, managerial, and operating issues connected with the reorganization occurred in the plant
	Semi-structured interviews with factory managers and workforce in the plant: functional managers and various workforce positions (team leaders, supervisors) interviewed. Recorded time: 3.5 h (65 pages of transcribed text)	Investigate the mechanisms by which the emergence of TQM elements has been triggered in the plant. Understand how tools, practices and other TQM elements are used and managed through production
Observations	*Corporate visits to the plant:* on-site visit through shops and lines, with direct observation of operations and managerial processes (assembly, logistics, metrology, etc.). Duration: 4 h x 2 visits	Integrate archival and interview evidence with informants' accounts and practices, to improve the understanding of workers' and plant's dynamics, and to support emerging interpretations. Discuss insights from observation, clarify uncertainties regarding tools and practices for quality

Table 2.
Data sources and use

TQM tools, processes and practices. While the narrative covers the introduction of WCM standards and methods in the plant, the analysis and theorization concentrate on the mechanisms that currently support the development of TQM.

Data were open-coded to identify concepts and mechanisms (Gioia *et al.*, 2013) that support the comprehension of the TQM elements traced in the historical reconstruction and the identification of those still in use at the plant. To do so, interviews and secondary data were analyzed in parallel, iterating between rounds of data analysis and rounds of additional data collection informed by provisional emerging interpretations (Lincoln and Guba, 1985; Locke and Golden-Biddle, 1997; Langley, 1999). Attention was paid to the actors, sentiments, practices, tools and methods that characterized the establishment, development and utilization of TQM in the plant. The analysis was conducted through a multi-stage codification process, one in which redundancies that stemmed from the initial proliferation of codes generated from different sources were gradually consolidated into 38 first-order codes (as per Gioia *et al.*, 2013). These were labeled by using (whenever possible) the very terms adopted by the informants, thus reflecting their "concepts in use" (Gephart, 2004). Any discrepancy was extensively discussed among the authors' interpretations and shifted back to data coding whenever necessary. First-order concepts were then collapsed

into 14 more abstract second-order themes (Gioia *et al.*, 2013) based on their similarities—a technique known as "axial coding" (Strauss and Corbin, 2003). One further round of aggregations led to four overarching aggregate dimensions (i.e. benchmarking factors, improvement factors, catalyzing forces [reacting] and triggering forces [sparking]). Codes were gathered around factors that identified goals, standards and benchmarks; factors used to develop enhancements; forces that fostered the emergence and institutionalization of improvements; and forces that acted only for a limited time interval (see the code structure in Table 3).

The focus then switched to the historical timeline and to the previous reconstruction of process taxonomies to establish a relational and temporal sequence among the four identified aggregate dimensions, thus helping substantiate an intuitive, logical process whose components will be detailed in the next section. To check the reliability of the findings (Lincoln and Guba, 1985), the results of the analysis were reported to some of the key informants, and the associated interpretations were shared with them. Their feedback was thus used to refine the understanding and finalize the analytical process.

4.1 The interpretive framework: the generative interplay between hard and soft elements of TQM

The concepts emerging from the coding exercise decisively pointed to the definition of a clear causal chain, shared by all of the interviewees, linking the introduction of total quality practices and the turnaround of the plant, in terms of both output and processes (see Figure 1). Some *trigger elements* create the conditions needed for a quality virtuous cycle to emerge. These consist of *benchmarking tools* that set the standards against which operators compare their current performance and for which they aim by means of (continuous) *improvement tools*. Specific *catalyzing forces*, mainly in the form of organizational design solutions, allow for the exploration of the techniques—among those performed by operators—that produce better performance and result in their institutionalization into new, superior standards. Each element is further described below.

4.1.1 Trigger factors. The turnaround was stimulated by a few trigger factors that had the dual function of signaling the need for a change and creating the conditions that made that change possible. Some examples include the following: a workshop meant to solidify a sense of belonging and collectively explore technical alternatives on the assembly lines, a simplification of the hierarchy aimed at promoting discretion at the lower levels, and HR practices aimed at fostering a positive commitment to change.

Proper quality practices were understood by the informants in terms of two main groups of elements.

4.1.2 Benchmarking tools. These tools and practices are mainly aimed at defining standards in terms of either process/execution (e.g. standard operating procedures [SOPs] and rules regulating behavior within the factory) or input/output (e.g. measuring standards within the metrology department and technical descriptions of output with a tolerance for variations). These standardization practices are meant as points of reference against which performance can be measured. Quality is internally considered as the difference between actual performance and the level of performance prescribed by the standard. The same logic applies both at the individual practice level:

> [Male Supervisor 1]: "In the past, if the worker had not mounted [correctly] the car's power windows, you went to him, you told him, 'You haven't mounted the piece,' you formally rebuked him and that was it. Today, this is done differently, you go talk to the worker, you discuss with him/her the mistake and ask [him/her] for an explanation of the origins of the anomaly."

and at the plant level:

First-order concepts	Second-order themes	Aggregate dimensions
(1) *Safety and technical rules*: everyone must wear personal safety devices, walking in safe areas and lanes, checking personal PSD, and other safety and technical rules (2) *Rules of conduct and behavior:* the plant is characterized by a strong commitment for obeying rules of conduct, such as non-smoking in the workplace, wearing uniforms, and time regulations	i. Plant Rules	Benchmarking factors
(3) *Relevance of WCM technical pillars:* technical WCM pillars are developed, some of them (i.e. workplace organization and cost deployment) vividly emerging (4) *Recurrence of managerial pillars:* there is a recurrent and systematic emphasis on managerial WCM pillars: among them, "management commitment" and "motivation of the operators" are stressed (5) *WCM level certification*: the organization is committed to reaching the highest level of the WCM certification (gold WCM plant attained in 2013) (6) *Technical tools and Toyota-like methods:* the plant is characterized by the pervasive introduction and ongoing refinement of technical tools such as Andon, poka-yoke devices, assembly cards, 5 W tools	ii. WCM Standards	
(7) *Productivity and quantity goals:* traditional performance indicators such as volume/quantity per period or factor productivity are still relevant and bear strong interdependencies with other classes of objectives (8) *Quality goals*: at all organizational levels, people emphasize the importance of attaining quality goals, specifically those attached to formal KPIs (e.g. quick kaizen) (9) *Safety goals*: avoiding in-plant injuries is one fundamental requirement of WCM and this is communicated both internally and externally (signboard outside the plant)	iii. Performance and quality goals	
(10) *Co-design of the workplace:* the design of the workplace has been shared by experts and operators, who are directly involved in the (re-)design of their workstations (11) *Focus on ergonomics:* the continuous redesign of the workplace is strongly justified by the need for enhancing the workers' psychophysical wellbeing (12) *Ongoing efforts for innovative search:* there is a continuous attention to testing and introducing innovations aimed at redesigning the workplace (13) *Formal, bottom-up practices for WPR management:* the bottom-up development of formal practices aims at facilitating WPR management (e.g.: line bookkeeping of errors by type/operator: can help redesign a problematic practice/better train operators)	iv. Workplace redesign (WPR)	Improvement factors
(14) *Central role of team leaders:* team leaders are the focal actors; their role is particularly relevant in designing the WPR, in quality control, and in the management of team structure (through hirings) and dynamics (15) *Supervisors and other technical roles:* the compression of the hierarchical structure entails a larger span of control for supervisors: they tend to manage more workers with a widening of the responsibilities (16) *Plant manager and HR manager:* they are readily available, can be reached within one hour, and can immediately mandate new regulations	v. Line positions and roles	
(17) *Small plant:* a small plant is introduced for purposes of training and job redesign. The small plant is located on-site (normally located remotely, only used for studying ergonomics and the design of the working stations) (18) *The small plant as a compass*: all workers learn in the small plant. It helps them make sense of their contribution to the whole process	vi. Small plant design and refinement	
(19) *Mistake management process*: the work process is designed to allow for an early detection of mistakes, through procedures, incentive systems (no punishment for errors) and tools (HERCA) (20) *Obsessive focus on continuous improvement*: it occurs through promoting improvement, maintaining attention, no punishment, and understanding of individual issues (21) *Innovations aimed at removing elements that could hamper problem solving:* initiatives are aimed at structurally reducing the scope for mistakes and improving the potential of problem solving (e.g. attention management)	vii. Problem solving approach	
(22) *Daily Briefing (DB)*: DB was introduced as a key tool for institutionalizing the outcomes of the PDCA-based improvement process. It consists of meetings where shop floor employees propose changes to the current work practices. If successful, it can lead to plant-wide adoptions of proposals (23) *Emotional factors and incentives of DB*: showing a non-conformity and its solution in front of the whole plant implies a relevant emotional involvement and represents a strong incentive for improvement	viii. Daily Briefing (DB)	Catalyzing forces
(24) *High level of education*: a very high share of line workers have attained a high level of formal education at bachelor's or master's degree (MS) levels (25) *Strong emphasis on soft skills and competences:* line selection and career progression is correlated with soft skills such as listening, problem solving abilities, and empowerment, rather than technical abilities or seniority	ix. Selection and training	
(26) *Offices directly in the plant:* management offices and facilities are located close to the assembly line, such that problems and issues are addressed immediately, with minimal recourse to hierarchy (27) *Workstation layout aimed at ergonomics:* from the onset, the design of the layout privileged ergonomics: this made it possible to preserve the well-being and attention of workers, so they could focus on improvement (28) *Suppliers have direct access to internal facilities*: supply tables and other solutions allow to locate suppliers as close as possible to the assembly line, where supply issues may emerge, in order to address them quickly	x. Layout design	
(29) *Listening*: management of internal vertical communication has decisively changed towards a greater ability to listen actively and to take into account bottom-up signals (30) *Personal incentives for sharing information:* horizontal communication is facilitated; workers are encouraged to share knowledge with peers, in the belief that it enables a better work environment	xi. Communication	

Table 3.
Gioia methodology conceptual mapping

(*continued*)

First-order concepts	Second-order themes	Aggregate dimensions
(31) *Hierarchy simplification:* an important organizational redesign has produced two changes in structure: a hierarchical level has been removed and teams have been downsized	xii. Organizational restructuring	Triggering forces
(32) *Initial workplace redesign:* the workplace has undergone a profound restructuring, by using technology-based tools for the division of labor and the redesign of job description and rotation		
(33) *Need for an abrupt discontinuity*: the productive context was not reformable through incremental change, but needed a strong signal of discontinuity aimed at radical change	xiii. Initial workshop	
(34) *Overall recognition of a memorable event*: the initial workshop is widely recognized, at all levels, as a milestone in the process of change management and initiating a new course of action regarding the plant		
(35) *Change workers engagement*: in the workshop, workers were encouraged to set and discuss a wide range of issues (contracts, working conditions, etc.) and, in particular, start focusing on the redesign of the workplace		
(36) *Leverage on positive beliefs about change:* positive feelings condition the behavior of workers and are a fundamental factor for change: among these, pride and identification with the company, and lack of fear about change	xiv. Management of feelings about change	
(37) *Manage negative beliefs about status quo and change:* many negative feelings had to be managed in the initial stage, such as, for example, beliefs related to rule violation, fear of dismissal, and generic fears about change		
(38) *Monitor and influence neutral feelings*: the initial context was characterized by neutral feelings about organizational change; many workers never thought of not making it and there was a broad scepticism about closing the plant		

Table 3.

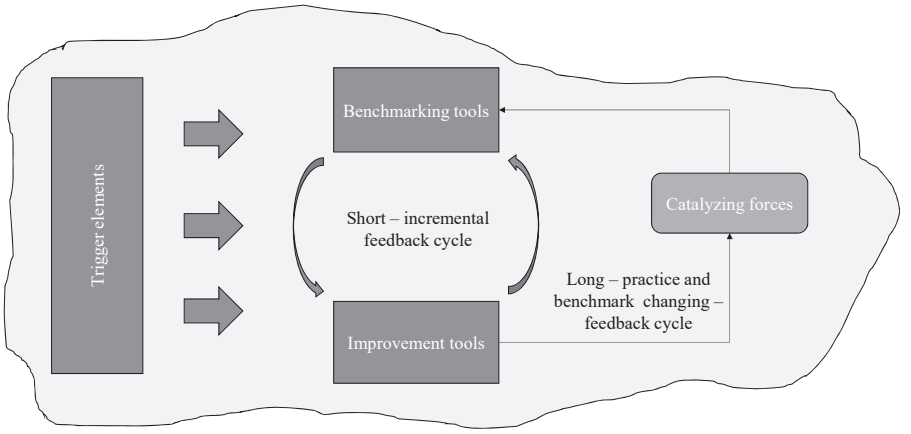


Figure 1. Interpretive framework of the interactions between improvement and benchmarking elements in TQM

[Team Leader 1]: "The [starting] goal was to allow for 1% of defective cars. Out of 400 cars, I needed to have [at most] 4 cars with defects. We made it, and they asked for a stratification of data starting in January. In January [a new benchmark came out] asking for 20 defect[ive cars]. Twenty! But out of 13,000 cars. They came back to us, saying, 'You cannot think this way anymore, you could have said it before, but now you are excellent, and to be truly excellent we need to work on those 20 anomalies out of the 13,000 cars.'."

and it extends to interorganizational relationships, such as interactions with suppliers:

[Former top manager, EMEA region]: "[. . .] the supply tables. Right at the assembly line, we have physical tables on which team leaders lay defective pieces—in this case, this is not about the initial setup, as these are cases where we see a systematic mistake on the part of the supplier, and there the specialists immediately analyze the piece, and if the piece is in fact defective in its visuals, because of damage, or in its geometry, a representative of the supplier is convened right there at the table, we diagnose things right there, and the supplier makes a commitment, so that the defect will not reemerge in the future."

4.1.3 Improvement tools. These consist of an aligned set of organizational tools aimed at favoring exploration, such as workplace redesign:

> [Former top manager, EMEA region]: "How can we call this? Workplace integration, i.e. the workplace is integrated in the sense that all the know-how of the WCM methodology is integrated. All the know-how in general, we put it in the workplace. And then a workplace is born, as I said before, which is capable of producing quality, reducing waste, being effective, safe, and so on . . ."

specific organizational design elements (decisions about the team structure, with an emphasis on discretion at all levels, but mainly for team leaders):

> [Team Leader 1]: "We have said that we want to put the team leader at the center of everything, who, as they have explained to you, is a worker who manages six workers, but a *primus inter pares* [. . .] he has no hierarchy, so he is someone who coordinates with his knowledge, with his natural leadership, not with a leadership given to him by the hierarchy."

the adoption of a "small-plant" (a mock-up assembly line that allows for studying each workstation and for training employees on each position on the line):

> [Former top manager, EMEA region]: "We used a small-plant' to bring out all of the suggestions, ideas, and proposals of the line workers and team leaders in order to act at an early stage of product design and easily make changes that would facilitate not only the quality of the product but also facilitate the ease of assembly."

and the explicit adoption of an active problem-solving stance at all levels and rules for rapidly escalating crises to top management when needed:

> [Team Leader 2]: "The importance of what they are doing; if the person on the line has a part that is not assembled, he takes the initiative to solve that problem in the station; he calls you, he gives you ideas on how to solve that problem, while before they were just like, 'Ah, it's not assembled? Ok, the car goes on.'."

TQM appears to work because of the interplay between benchmarking tools and improvement tools. On the one hand, benchmarking tools function as reference points. For instance, at the plant level, statistics on defects are carefully computed and used to assess the level of readiness of working teams in terms of technical prowess and training. Similarly, at the individual level, SOPs are maintained and enforced to constantly regulate the contributions of each worker. The reference point serves the purpose of presenting a clear, measurable goal for any meaningful set of tasks. Consequently, mastery in terms of execution corresponds to the ability to flawlessly reach the level of performance prescribed by the standard. On the other hand, improvement tools are designed and adopted with two goals in mind: they help workers reduce the gap with respect to the benchmark and, additionally, they permit workers to explore possible alternatives in terms of courses of action and decisions.

The interactions between these sets of tools operate through two related but different feedback mechanisms. The first level of feedback is represented by a constant comparison between performance and the benchmark. On the one hand, the benchmark allows the operator to learn and appreciate the effects of his/her actions, both by direct observation/comparison and with the support of more expert actors (i.e. the team leader). On the other hand, a formalized definition also helps define the scope of the operators' problem solving. Using the benchmark as a reference point, it is also easy to understand possible alternative courses of action that might improve performance. Whenever an operator discovers a better way to perform, the improvement becomes obvious within the confines of the team to which the operator belongs.

4.1.4 Catalyzing elements. The discovery of a better way to perform is also the basis on which a slower, deeper feedback cycle can be initiated. When a newly discovered practice systematically beats the benchmark, the group that has implemented it can decide to formally present it to both management and its peers through daily briefing (DB). The new practice,

then, is peer-reviewed, and, if considered superior to the current standard, adopted as the new benchmark. This possibility is maintained, incentivized and institutionalized:

> [Team Leader 1]: "I would like to say, the last time a DB happened to me and it also seems very motivated, it's like that because I had such a nice solution to solve a problem that I couldn't wait to share it with my colleagues, and so it also becomes an instrument of knowledge, of diffusion. The idea that I had can maybe help another colleague of mine, it changes everything at the DB."

Thus, on the one hand, benchmarking elements provide an institutional frame for action, both driving continuous learning and clearly defining a domain in which operators can explore alternatives. On the other hand, improvement tools/practices find their scope in their comparison with the benchmarks, and they are also the main tools for redefining and pushing current benchmarks. This push becomes effective plant-wide thanks to the presence of catalyzing elements that can institutionalize proposed changes into new benchmarks.

5. Discussion and implications

This paper offers several contributions to the literature on the relationship between the hard and soft elements of TQM. It also outlines some practical implications for the implementation of TQM initiatives.

The first theoretical contribution consists of an alternative classification for the components of TQM initiatives, which has the advantage of clarifying the role of each component in generating quality outcomes. The practices adopted in the case suggested the distinction between benchmarking and improvement tools.

To some extent, benchmarking tools are akin to the "hard" elements of TQM, while improvement-related tools mostly coincide with the subset of "soft" elements of TQM. However, the terms "benchmarking" and "improvement" better characterize the role of these elements as value-creating tools in a TQM intervention. The notion of improvement factors that contribute to changing the reference benchmark is closely connected to the core concept of TQM and is at the root of the idea of continuous improvement itself. For example, the very idea of zero "X"—where X can be defects, waste, accidents, etc.—constitutes a theoretical goal that must be steadily specified and updated to have any practical consequences (Crosby, 1996). In fact, the importance of both formal feedback and the evaluation of strategies and processes for achieving continuous improvement has been previously emphasized (Ershadi *et al.*, 2019). Adding to this line of thought, the importance of other processes promoting continuous improvement was underscored, such as formal processes of knowledge sharing and fostering a problem-solving attitude at all levels. Second, this proposal is coherent with the contrast between continuous improvement and "plateau thinking" (Wilkinson, 1992), which is typically associated with the idea of predefined, unmoving goals that are unable to stimulate a continued effort in the search for quality. Specifically, a key to properly understanding TQM in terms of continuous improvement is that of interpreting the process that allows for the transformation of practices, over time, because of the interactions between benchmarking tools and improvement tools, as mediated by the action of catalyzing forces. This idea is akin to the modelization of TQM in terms of control and exploration processes (Douglas and Judge, 2001). However, a few designed (i.e. under organizational control) elements play an extremely important role in the interaction between benchmarking tools and improvement tools alongside the contextual (i.e. external) factors prominent in Douglas and Judges' (2001) model.

Third, this processual modelization of TQM is coherent with the idea that TQM must become a way of life in the company to properly unleash its potential. Time is a crucial factor in this process, allowing for the alignment of approaches and concepts with appropriate tools and techniques (Imeri *et al.*, 2014). While the definition of linear connections among broad categories—hard and soft—may represent an important initial step for understanding the

interconnections among TQM elements, only the dynamic appreciation of the underlying processes proposed here can unpick the longitudinal nature of their role and flesh out the interdependencies and tensions typical of nonlinear development.

The results of this study also have several practical implications for the implementation of a TQM initiative. First, the design of trigger factors is critical for the success of the initiative, both because of their symbolic value and because of their enabling effects. Second, the interplay of improvement and benchmarking tools operates at several levels using similar dynamics; ensuring coherence between the levels seems to be of paramount importance for achieving sustained success in implementation. Finally, a specific deliberate effort should be devoted to collecting, formalizing and disseminating new effective practices by catalyzing elements to fully exploit the potential of TQM.

6. Conclusions

The present study suggests that the analysis of TQM cannot be limited to the traditional dichotomy of hard versus soft elements, stressing how other types of factors might emerge and must be considered. The contribution of this study lies in the identification of a truly holistic interpretation of TQM where trigger factors (e.g. a training workshop signaling the start of a new phase, a new set of HR practices aimed at fostering support for the change) establish the starting conditions for fruitful implementation, and catalyzing forces (e.g. the DBs) facilitate the interaction between hard and soft elements. Specifically, this study extends prior work on the interplay among TQM factors (Douglas and Judge, 2001) by shedding light on the generative role of factors that are within the control of the organization. Future research is needed to better specify the scope and features of these elements.

The importance of carefully considering the boundary conditions of this research is recognized. First, it relies on a single case study, so the results cannot be interpreted in an extensive way. Second, the specificities of the scenario in which the data were collected might limit its heuristic value in different settings. However, replicating this research design in other contexts also represents one of the most obvious directions for future research.

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