



Kari Lepistö

IMPACT OF TOTAL QUALITY MANAGEMENT ON SUSTAINABILITY PERFORMANCE



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Abstract

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Total quality management (TQM) has been a significant philosophy since the 1950s when companies were developing their operations. Its implementation is, however, difficult because there is no detailed and accepted definition of the matters that it covers. Efforts have been made to solve this problem in Europe and America with the EFQM and MBNQA criteria, respectively. The large-scale implementation of the TQM way of thinking is supported by the ISO 9001 certification, which is considered to be the first step. The understanding of TQM has been facilitated due to the latest quality standard updates in the TQM way of thinking. Currently, there is a global trend in the industry that aims to improve sustainability performance. Business sustainability is considered to be divided into economic, environmental and social sustainability. This tripartiteness is called the Triple Bottom Line. This quantitative dissertation aims to increase the understanding of the TQM content through a broader definition of the dimensions related to the company's performance. In addition, the dissertation examines the impact of extended TQM and certification on companies' sustainability performance. The dissertation provides useful information for the management of SMEs about how the dimensions of TQM currently affect the sustainability performance of SMEs. On the other hand, this research shows managers items whose real functionality they can evaluate in their organization together with their staff in order to find performance-related development items. The data for the dissertation were collected from Finnish SMEs, about half of which were certified. The companies represented both the service sector and the industry.

The results show that in industrial and small enterprises (5–49 employees), certification has a positive effect on the dimensions of TQM, but a similar effect was not observed in medium-sized (50–250 employees) enterprises or the service sector. Risk Management and Stakeholder Management indirectly affect the profitability of companies. Business management systems and HR practices affect environmental sustainability, while only business management affects social sustainability.

Keywords: Quality, TQM, Sustainability, ISO 9001, Certification

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Kari Lepistö
May 2024
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List of publications

This dissertation is based on the following papers. The rights have been granted by publishers to include the papers in the dissertation.

- I. Lepistö, K., Saunila, M., & Ukko, J. (2022). The impact of certification on the elements of TQM exploring the influence of company size and industry. *International Journal of Quality & Reliability Management*, 39(1), 30–52.
- II. Lepistö, K., Saunila, M., & Ukko, J. (2024). Enhancing customer satisfaction, personnel satisfaction and company reputation with total quality management: combining traditional and new views. *Benchmarking: An International Journal*, 31 (1), pp. 75–97.
- III. Lepistö, K., Saunila, M., & Ukko, J. (2022). Facilitating SMEs' profitability through total quality management: the roles of risk management, digitalization, stakeholder management and system deployment. *The TQM Journal*, 34(6), 1572–1599.
- IV. Lepistö, K., Saunila, M., & Ukko, J. (2023). The effects of soft total quality management on the sustainable development of SMEs. *Sustainable Development*, 31(4), 2797–2813.

Author's contribution

In Publications I–IV, Kari Lepistö is the principal author and investigator. He was responsible for the research design and conducting the research (literature review, empirical data collection, methodology, data analysis, and conclusions). He had a primary role in writing the paper.

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1 Introduction

1.1 Background of the study

Nowadays, sustainable activities are associated with the idea of increasing wealth and ensuring justice while preventing the destruction of natural resources. The problem of continuous global warming is widely recognized, and several countries are striving for carbon neutrality (Alola and Onifade, 2022). Companies have to take care of their financial results, but they must not forget the environmental (Fangqi, Irfan and Baloch 2023) and social aspects (Dyllick and Hockerts, 2002). This consideration of economic, environmental and social aspects is called the Triple Bottom Line (TBL) thinking (Elkington, 1998; Shahzad, Ying, Ur Rehman, Zafar, Ding, and Abbas, 2020; Tseng, Lim, and Wong, 2015; Hussain, Rigoni, and Orij, 2018; Vifell and Soneryd, 2012), based on the 1987 report "Our Common Future" published by the World Commission on Economic Development (WCED).

Sustainable development is being increasingly emphasized in planning development strategies and goals of companies. By taking responsibility into account in their operations, companies strive to improve their sustainability, productivity and competitiveness. (Bateh, Heaton, and Arbogast, 2013; Magd and Karyamsetty, 2021) Companies are now investing in sustainable development to such an extent that it has become a 21st-century trend. This development has been led, in particular, by stakeholders' pressure on companies (Koç and Durmaz, 2015) and the fact that companies see sustainable business as increasing their value, where value is not only derived from financial performance but also environmental and social factors (Zink, 2007). TQM is also considered an important tool in achieving sustainability performance goals and competitive advantage (Ooi, 2014; Tasleem, Khan, Shah, Saleem, and Nisar, 2017; Chen, Lee, and Wang, 2020).

Recently, the process of improving the quality of companies has changed significantly. Good quality is no longer based on inspection but has been replaced by comprehensive operational systems guided by various standards. (Fotopoulos and Psomas, 2009) Nowadays, the goal is to improve the quality, productivity, customer satisfaction, and profitability of companies with the help of TQM, which is a quality improvement method related to managing the entire company (Gharakhani, Rahmati, Farrokhi, and Farahmandian, 2013). In addition to product quality, customers pay attention to services and operational flexibility (Kaur, Singh, K. and Singh, D. (2023). Using TQM as a framework for their development, companies can increase their market share and improve their customer satisfaction, reliability, and productivity (Sharma and Gadenne, 2008).

Although there is no complete agreement on the content and implementation of TQM (Modgil and Sharma, 2017), according to Powell (1995), its essential elements are continuous improvement, identification of customer requirements, compliance with requirements, error-free operation, long-term operation and planning, process

development, effective problem-solving, personnel participation, teamwork, active monitoring of results, and cooperation with suppliers. Powell's view of functional TQM also follows the current views of EFQM. The ISO 9001 quality standard is also a widely used tool for business development. According to Pelantová and Šlaichová (2017), the latest updates of the quality standard ISO 9001 in 2015 have reduced its differences with TQM. There are more than one million certified quality systems in the world (ISO Survey, 2021); thus, it is important that ISO 9001 helps companies improve their performance. There are studies in the literature such as Gotzamani and Tsiotras (2002), Douglas, Coleman, and Oddy (2003) and Hussain et al. (2018) that show that TQM and ISO 9001 certifications have a positive impact on company performance. It is also widely thought that certification can help start the TQM development process (Biazzo and Bernardi, 2003).

Several studies have concluded that certified quality systems improve business performance. The results can be considered, for example, an improvement in the long-term financial competitiveness of companies (Corbett, Montes-Sancho, and Kirsch, 2005; Shafiq, Mirza, Abid, and Naeem, 2014). The system does not work without investment, but Psomas, Vouzas, and Kafetzopoulos, (2014) report that a correctly implemented ISO 9001 system leads to numerous benefits in the company, such as those related to sustainability performance, referring to the results of economic, environmental, and social activities (Büyükožkan and Karabulut, 2018). However, previous studies have shown that continuous improvement after certification has remained low in several companies (Dick, 2000; Terziovski and Guerrero, 2014; Shafiq et al., 2014). In addition, Piskar (2007) reported on the effects of the ISO 9001 system in Slovenian companies—stating that the system affects the fulfillment of customer requirements—but did not find that it had an effect on business success and profitability.

In contrast to certification, where operations in accordance with the requirements of the standards are checked, TQM does not have an agreed structure or quantitative content, but the company has every right to choose things suitable for its own system and emphasize them as it wishes. This lack of a common operating model is also visible in TQM studies; thus, the dimensions used and their numbers differ from each other. With their limited resources, the question arises as to which aspects—economic, environmental, and social—that SMEs should invest in to achieve the best result in terms of sustainability performance.

1.2 Purpose of the study and research problem

In recent decades, TQM has been a widely studied subject. It has been found to have an impact on business and affect business-relevant issues, such as company performance (Hansson and Eriksson, 2002; Kaynak, 2003; Sadikoglu and Zehir, 2010; Al-Dujaili 2013), staff satisfaction (Boselie and van der Wiele, 2001; Ooi, Arumugam, the, and Chong, 2008; Nourae, 2014; Kabak Şena, Göçera, Küçüksöylemez, and Tuncer, 2014; Arunachalam and Palanichamy, 2017; Al-Damen, 2017), customer satisfaction (Beheshti

and Lollar, 2003; Terziovski and Power, 2007; ul Hassan, Mukhtar, Qureshi, and Sharif, 2012; Topalovic, 2015; Sheikholeslam and Emamian, 2016), company reputation (Beheshti and Lollar, 2003; Yusuf, Gunasekaran, and Dan, 2007; Mourougan and Sethuraman, 2017; Yousif, Najm, and Al-Ensour, 2017), and sustainable development (Isaksson, 2005; Iqbal and Asrar-ul-Haq, 2018; Abu-Alain, 2018; Nazar, Jahan, Amoozegar, Anjum, and Raju, 2019; Ali and Johl, 2022; Khalil and Muneenam, 2021).

Despite its wide-ranging effects and the number of previous studies, the content of TQM or its implementation has not been defined (Calvo-Mora, Blanco-Oliver, Roldán, and Perriñez-Cristóbal, 2020; van Kemenade and Hardjono, 2019). In previous studies, researchers have determined the research dimensions from their own starting points and extant studies. The number of dimensions and their alignments vary in individual studies whose purpose is to clarify the effects of TQM. There is no common vision of the comprehensive content of TQM; however, EFQM exists in Europe, which is a European cross-section of TQM. A similar document in America is The Malcolm Baldrige National Quality Award.

TQM does not have a clear structure and implementation; thus, it is quite often called a management philosophy (Sureshchandar, Rajendran, and Anantharaman, 2001; Dreyfus, Ahire, and Ebrahimpour, 2004; Sharma and Gadenne, 2008; Padma, Ganesh, and Rajendran, 2008; Wang, Chen, and Chen, 2012; Chen et al., 2020). Consequently, companies must build a TQM suitable for themselves to improve their operations from their own starting points (Elhuni and Ahmad, 2014).

TQM was developed and implemented in the 1950s. Despite its long history, no clear specifications have been created for its implementation. TQM research has also produced relatively few new perspectives (dimensions) over the years, even though the surrounding society has changed significantly. Such functional changes in companies' business include, among others, the growth of certified systems, increased digitalization, emphasis on risk management, emphasis on the customer perspective, and sustainability performance. In addition, previous studies have taken little to no stance on whether the company's operational system has been fully implemented throughout the organization or whether it has remained at the level of writing operating instructions.

First, from all of the above, the question arises as to which things are essential in the realization of the company's benefits because there is no complete consensus among researchers about the TQM content and its implementation (Calvo-Mora et al., 2020). In addition, now that years have passed since the adoption of the renewed standard, it is necessary to examine what kind of impact the certification, which includes TQM elements, as stated by Pelantová and Šlaichová (2017), has on the company's performance and finances. It is also worth emphasizing the importance of this study as an added value to the TQM literature as no studies have combined the effects of extensive TQM and those of certified quality systems formed according to the renewed quality standard on sustainability performance.

Second, previous studies have shown that small businesses tend to underestimate their own influence in matters related to sustainability performance. (Cassells and Lewis, 2011). Nunes, da Silva, da Silva Moris, and Giannetti (2019) and Lopez-Perez, Melero, and Javier Sese (2017) assume that large companies have more resources to invest in sustainability performance; Lopez-Perez et al. (2017) state that large companies have better opportunities to train their personnel.

Third, certified management systems are very common today, and worldwide certifications have been made in more than a million companies (ISO Survey, 2021). Some previous studies show that the effects of certification have been small, as discussed earlier, but there are also opposing views. Some studies have found that ISO 9001 supports the company's performance by improving, for example, its processes and supply chains (Fernandes, Sampaio, and Sameiro, 2017; Georgiev and Georgiev, 2014; Santos and Millán, 2013) by focusing on customer requirements, satisfaction, and management (Caro, García, and Antonio, 2009; Padma et al., 2008; Santos and Millán, 2013), emphasizing personnel management, training and personnel competence (Casadesús, Giménez, and Heras, 2001; Padma et al., 2008). For the reasons mentioned above, this study aimed to answer "how to manage sustainability performance through the TQM of SMEs."

TQM is considered a holistic management philosophy; thus, its effects were investigated with the following research questions:

Prerequisites:

1. What factors constitute TQM?
2. How does certification affect TQM?

Impacts:

3. What are the effects of TQM on the economic dimension of sustainability performance?
4. What are the effects of TQM on the environmental dimensions of sustainability performance?
5. What are the effects of TQM on the social dimension of sustainability performance?

As can be seen from the questions above, this dissertation aims to update the dimensions of TQM, taking into account the comprehensiveness of business and meet the requirements of the 21st century. In addition, the study considers the impact of certification on TQM. This is essential because companies spend significant amounts of money on system certification and certification maintenance. The study also deals with the impact of TQM on sustainability performance, taking into account economic, environmental and social aspects as they should be handled in modern industry.

1.3 Definition of the key concepts of the study

1.3.1 Scope of the study

This study is based on the field of TQM studies. It focuses on examining the effects of two management ideologies that have become common in the Finnish industry—TQM and quality management systems (QMS)—for improved corporate responsibility and its sub-elements. The TQM approach included all essential elements of business management, starting from the conception of the company's strategy. The QMS level measure was considered to be the achievement of the certification level. Combining management-related ideologies in the same study opens up new perspectives on management procedures and provides business managers with information when they plan business strategies and measures to achieve their goals in selected priorities.

This research is fully consistent with Elkington's (1998) view of the scope of sustainability when he describes it as including issues related to the economy, the environment, and the social aspects of business. Increasing awareness of climate change and increasing pollution increase people's concern about the state of the environment, and companies balance their operations between economic, environmental and social issues (Gupta, Czinkota, and Melewar, 2013). This has forced companies to take sustainability performance into account in their own strategies, and responsible operations are better taken into account when planning the operations of companies (Bateh et al., 2013). Managers must be able to run a sustainable business while ensuring long-term profitability (Corredor and Goñi, 2010). TQM is seen as an important factor in improving competitiveness (Chen et al., 2020; Sureshchandar et al., 2001; Wang et al., 2012; Dreyfus et al., 2004) and strengthening sustainability performance (Tasleem et al. 2017), which includes economic, social, and environmental issues (Shahzad et al., 2020; Tseng et al., 2015; Hussain et al., 2018; Vifell and Soneryd, 2012). The scope and perspectives of the present study are illustrated in Figure 1.

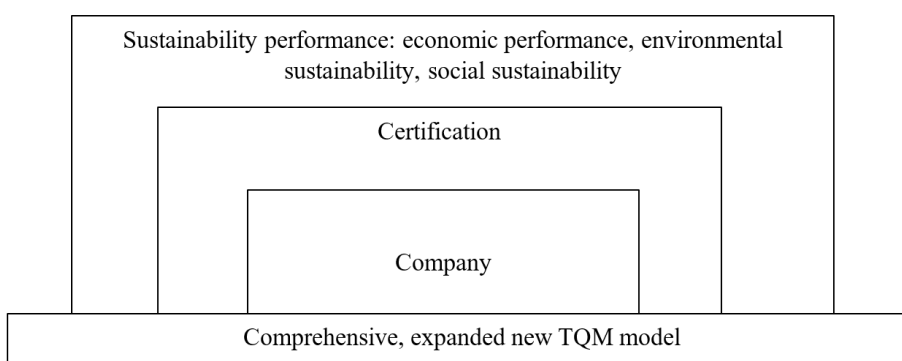


Figure 1 The scope and perspectives of the study

1.3.2 Concepts related to research

TQM

TQM is a management approach that aims for long-term success, increased competitiveness and customer satisfaction (Benzaquen and Charles 2022). TQM consists of several dimensions; it has no commonly accepted content and, thus, can be thought of as some kind of philosophy or way of thinking related to management (Sureshchandar et al., 2001; Chen et al., 2020). According to Brown (2013), TQM aims to continuously improve process functions. It is often associated with the idea of a high-quality organization. TQM is used especially by companies that want to improve their operations (Gadenne and Sharma, 2009) as a tool that continuously ensures such improvement (Padma et al., 2008). According to Nasim (2018), TQM is suitable for the development of both service activities and industrial companies. It is considered to improve the operations of companies in several sectors; thus, companies are ready to invest in its use. With the help of TQM, companies have achieved positive results, for example, in innovation (Singh and Smith, 2004) and competitive advantage (Douglas and Judge, 2001) and in the development of corporate culture (Irani, Beskese, and Love, 2004). In addition, TQM has helped companies identify and fulfill company needs (Psomas et al., 2014).

EFQM model

EFQM is the most widely used model in Europe for developing and evaluating TQM procedures (Heras-Saizarbitoria and Casadesús and Marimón, 2011). Nabitz, Klazinga, and Walburg (2000) state that the operating principles of EFQM are derived from TQM. The EFQM model is well structured and contains criteria for evaluating the performance of companies (Ruiz-Carrillo and Fernández-Ortiz, 2005).

The latest version of the EFQM model was updated in 2019. The model is divided into three parts, which are the company's direction, its operating methods, and the results achieved by the operation. When developing the organization's direction, EFQM focuses on two basic topics, that is, 1) the development of core mission, vision, and strategy, and 2) organizational culture, pioneering, and leadership. The second part of EFQM's "activity" is divided into stakeholder engagement, sustainable value creation and performance management, and innovation. EFQM's results are divided into two parts: 1) stakeholder views and 2) strategic and operational performance. EFQM emphasizes that performance data are essential for clarifying stakeholders' views, creating sustainable value, and reforming performance management.

ISO 9001

The focus of ISO 9001 is building trust in the organization's products and services (ISO 9004, 2018). ISO 9001 defines the requirements for certification-level QMS that an organization can use in situations where it needs to demonstrate its ability to produce products or services that meet the requirements. The ISO 9001 standard is based on the quality management principles presented in the ISO 9000 standard. These principles are customer focus, leadership, people engagement, process-based approach, improvement, evidence-based decision-making, and relationship management. The organization can improve its internal operations and customer satisfaction with the help of the standard by implementing continuous improvement processes that focus on the company's operations and meet the requirements of customers and authorities (ISO 9001, 2015). Systems implemented in accordance with the ISO 9001 standard can be certified (Kiwa, 2023).

ISO 9000

The ISO 9000 standard presents the key concepts and operating principles of quality systems, on which other quality management standards are based. It aims to expand the understanding of quality management and help in effectively implementing systems. The standard can be used in all types of organizations and different industries. Its ultimate aim is that organizations achieve the goals they set through the system and improve the organization's commitment to meeting the demands of stakeholders (ISO 9000, 2015). The ISO 9000 standard is not used for third-party certifications.

ISO 9004

Unlike ISO 9001, which emphasizes stakeholder trust in an organization's products and services, ISO 9004 emphasizes building trust in an organization's ability to continuously improve its performance and success. Consequently, ISO 9004 deals with improving the overall performance of an organization. This requires the introduction and development of an effective management system. In addition to efficiency and quality, for an organization to succeed, it must control factors related to social responsibility, the environment, and culture. Achieving the desired success is supported by efficient information flow, continuous improvement, and active innovation (ISO 9004, 2018). The ISO 9004 standard is not used for third-party certifications.

ISO 14001

At present, balancing environmental, social, and economic requirements is necessary so that future generations also have the opportunity to meet their own needs. Sustainability performance is a goal that is achieved by implementing the three basic requirements mentioned above. Growing regulatory requirements also require companies to act to protect the environment, often through systems that support sustainability performance. ISO 14001 guides companies in environmental protection. It sets requirements for an

environmental system that can be used to achieve the desired goals (ISO 14001, 2015). The ISO 14001 standard can be used for third-party certifications.

SA 8000

SA 8000 is an international standard whose goal is to develop and follow socially accepted practices. This standard takes into account employee rights and procedures in dealing with employees. In the standard, issues related to sustainable business include forced labor, child labor, occupational health and safety, organization of working conditions, and compensation for work. The principle in these matters is in compliance with international agreements, such as the International Declaration of Human Rights and the UN Convention on the Rights of the Child. By certifying its operations in accordance with SA 8000, the company shows that it has taken social requirements into account both in its internal operations and supply chains (SGS). The SA 8000 standard can be used for third-party certifications.

Certification

Certification refers to the assessment of conformity. The subject of certification can be, for example, a company's management system, which is built according to the quality standard ISO 9001. In this case, the external certification body checks whether the company's operations meet the requirements of the standard used in the certification. Evaluation can be carried out, for example, based on documents or with the help of information collected from processes. The certification is not valid indefinitely, but the extension of validity requires re-evaluations and periodic re-certification (Det Norske Veritas).

The certification can be performed with or without accreditation, that is, verification of competence. The goal of accreditation is to demonstrate the reliability and credibility of certification or other results. Accreditation involves several requirement standards, depending on the object being assessed. In Finland, accreditations are granted by FINAS (FINAS).

Sustainability performance

As noted earlier, in 1987, the WCED introduced the definition of sustainability performance in its report "Our Common Future." The basic idea of sustainability performance is that our own activities do not endanger the ability of future generations to take care of their own needs. Sustainability performance must include economic, social, and environmental factors. These three requirements are called TBL thinking, which Elkington (1998), Tseng et al. (2015), Hussain et al. (2018), Shahzad et al. (2020), and Cancino, La Paz, Ramaprasad, and Syn (2018) have emphasized.

According to Carew and Mitchell (2008), sustainability is a complex system based on the company's values, which, thus, enables its versatile interpretations. Different views of stakeholders are also related to sustainability. Sustainability can be considered from

several perspectives. The starting point of the review can be the extent to which the environment benefits humanity in the provision of products and services. However, the environment can be interpreted as a complex and fragile entity that has its own value, regardless of its benefits to people. Although sustainability is a multifaceted issue, an essential part of sustainability performance includes reuse and recycling, which allow us to reduce our dependence on diminishing raw materials. In an environment of continuous demand growth, this requires continuous innovation to reduce environmental pollution (Tsiliyannis, 2014)

Although social sustainability is widely accepted, its content has not been precisely defined (Dempsey, Bramley, Power, and Brown, 2011). McKenzie (2004) describes social sustainability as a condition that improves the life of a community, which may include mechanisms by which the community can collectively identify its strengths and needs. Dempsey et al. (2011) state the social capital underlying social sustainability. According to Pennington and Rydin (2000), social capital is achieved by building and maintaining general social trust. In this research, social sustainability refers to all issues related to people in the hands of a company, such as equality, treatment of personnel and customers (their satisfaction), and compliance with labor legislation.

Morelli (2011) defines environmental sustainability as procedures that enable people to satisfy their needs without exceeding the regenerative capacity of the ecosystems that support them, and the procedures do not pose a danger to the preservation of diversity. Similarly, in this research, environmental sustainability refers to environmental means such as limiting emissions, complying with environmental legislation, and minimizing waste.

Boar, Bastida, and Marimón (2020) argue that financial sustainability includes cost-effectiveness management, that is, the goal of increasing profits and business opportunities, taking into account the stability of operations and reducing risks, as well as increasing well-being. In this study, financial sustainability means profitability in the sense of the extent to which the CEO evaluates the company's operations.

1.3.3 Structure of dissertation

This dissertation consists of two parts; the first part focuses on the general description of the research, its implementation, and the findings and their analysis. In the second part, four articles supporting the research are presented.

The first part of the dissertation contains an introduction to the research area and an understanding of its background, as well as research questions related to these aspects. The first part also focuses on creating a comprehensive theoretical background for the research and concretizing the concepts related to it. These questions are followed in the first part by a presentation of the research methodology and a discussion of the research quality. Subsequently, the results of the research are presented, and a summary of the publications and their contribution to this dissertation is described. The dissertation

contains a discussion section where the results of the research are discussed. The first part ends with the conclusions of the study, which highlight, among other things, its limitations and possible subjects for further research.

The second part of the dissertation contains the four articles mentioned above. These articles aim to examine the details of the research questions as comprehensively as possible. The articles provide the clearest possible answers to the research questions and increase the understanding of the research area. With the help of publications, information gaps related to research questions can be answered. Figure 2 illustrates the inter-relationship between research questions and publications.

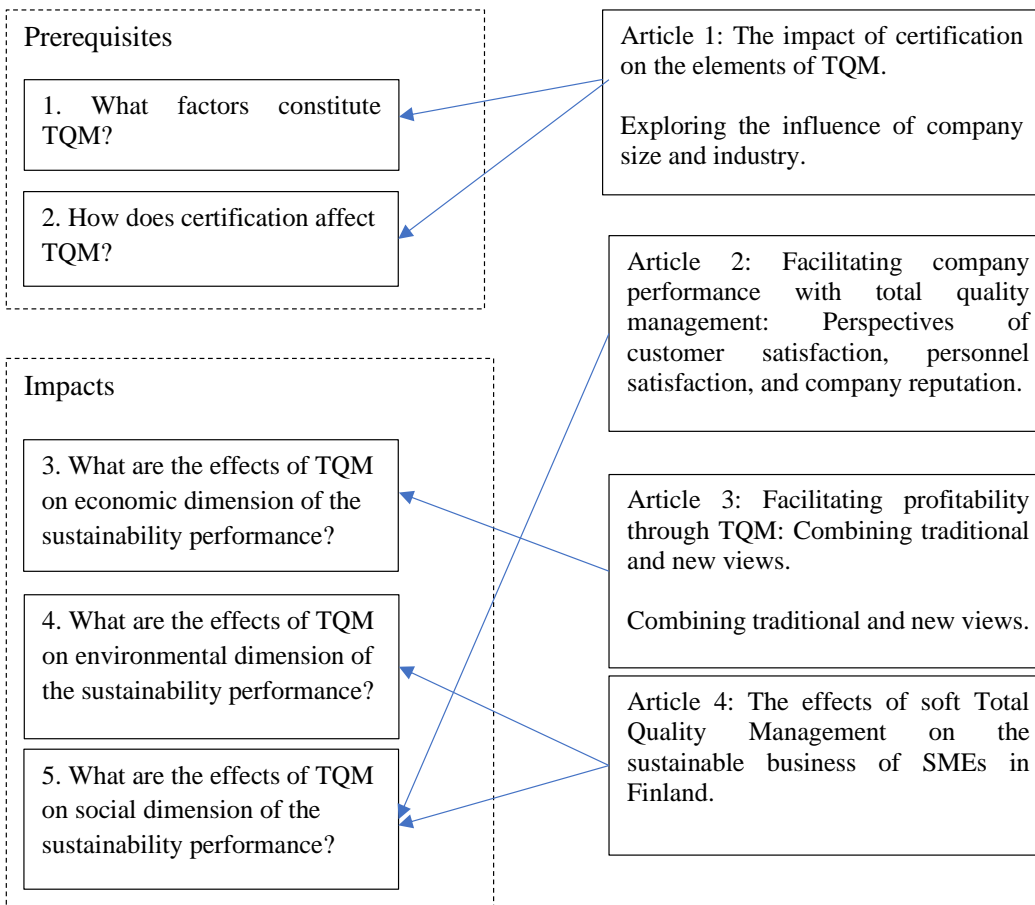


Figure 2 Inter-relationship between research questions and publications

2 Theory

2.1 TQM and its history

TQM has a long tradition, as it has been used as a business control model since the 1950s. When Japanese companies adopted the TQM quality idea developed by Deming in the 1950s, they quickly gained a clear competitive advantage over their American competitors (Fotopoulos and Psomas, 2009). Realizing this, American companies also invested in TQM, as a result of which TQM was already widely used in the United States in the 1980s (Powell, 1995; Ahire, Waller, and Golhar, 1996).

Although TQM comes from industrial business, it is also very useful in service industries (Al-Dhaafri and Alosani, 2020). Saleh and Hassan (2015) state that TQM can be implemented in all industries and companies that want to improve their performance. It is widely recognized that TQM plays a significant role in improving competitiveness, regardless of industry (Nasim, 2018; Powell, 1995).

Powell (1995) has compared the views of respected TQM consultants on the content of TQM. Table 1 shows the views of Deming, Juran, and Grosby on the successful implementation of TQM. It also shows that there are many ways to implement TQM. Tari (2005) also states that a good TQM program is a network of several things important to the company.

Table 1 The views of Deming, Juran, and Grosby on the successful implementation of TQM

Deming	Juran	Grosby	Powell (2015)
Product and service development	Quality planning: setting goals, identifying customers and their requirements, developing products and processes	Top management commitment	Top management commitment to philosophy, quality management, and continuous improvement
Adopting a new philosophy	Quality control: evaluation of effectiveness, comparison of results with objectives and changes in operations	Quality improvement groups	Embracing TQM through communication, tasks, and themes
Reducing the importance of inspections	Improving quality: creating infrastructure, setting up projects and teams, acquiring resources and training, and setting up controls	Quality measurement	Close external and internal customer relationships Fulfilling customer requirements in all situations
Minimize operating costs by working with main suppliers		Costs used to assess quality	Close supplier relationships Working closely with suppliers and ensuring suppliers' ability to produce the required quality

Continuous improvement of all processes		Awareness of quality	Benchmarking
Increasing the amount of training		Corrective actions	Training, TQM principles, teamwork and problem-solving
Investing in leadership		Zero Error Committee	An open and light organization. Competences of working groups. Communication and de-hierarchy
Eliminating fears		Supervisor and management training	Employee empowerment, participation in planning and decision-making
Removal of border fences		Zero error days	Zero error idea. A system that detects errors on time. Minimizing re-manufacturing
Elimination of slogans and prompts		Target setting	Flexible manufacturing, teams or cells, JOT, SPC, streamlining planning
Deleting numerical targets		Eliminate the causes of errors	Improving processes: efficiency, lead times, waste reduction, etc.
Emphasis on professional pride and abolition of annual appraisals		Positive feedback	Measurement, goals and interest in data. Continuous performance measurement using SPC
Development and training program for all		Quality Council	
All staff involved in making the change		Start from the beginning	

2.2 TQM and its possibilities

Views on quality improvement have changed significantly in recent decades. In the past, the importance of product quality control in realizing good quality has been emphasized. This idea has moved on to quality assurance, which can be achieved through various standards (Fotopoulos and Psomas, 2009). TQM focuses not only on product quality but also on improving quality in all company processes. The process approach related to the company's management system has become one of the most important procedures in the company operations (Martínez, 2022). To achieve comprehensive effectiveness, TQM consists of several components and is generally thought of as a "management philosophy and mindset"; thus, the company is free to implement a TQM that suits itself (Elhuni and Ahmad, 2014; Batista and Francisco, 2018). In the intensifying competition, companies must ensure continuous development of operations. TQM has been shown to influence corporate culture (Irani et al., 2004), innovation (Singh and Smith, 2004), and competitiveness (Douglas and Judge, 2001); thus, it is understandable that companies are

willing to invest in implementing TQM. To succeed in the market, companies must invest in meeting the requirements of customers and other stakeholders, which increases holistic business thinking and is the basis for launching TQM projects (Chin, Pun, and Hua, 2001; Pun, 2002; Mouhib, Naciri, Gallab, Merzouk, Soulhi, Bhiri and Dinardo, 2022). Padma et al. (2008) state that TQM focuses on the quality of operations and continuous improvement. However, considering the economic benefits of the systems, Chow-Chua, Goh, and Tan Boon (2003) point out that few international studies have investigated the real economic benefits of quality assurance.

Companies have observed the extensive effects of TQM on the internal and external business environment (Santos-Vijande and Alvarez-Gonzalez, 2007; Abdullah, Uli, and Tari, 2008; Kumar, de Grosbois, and Kumar, 2009; Arumugam, Chang, Ooi, and The, 2009; Corredor and Goñi, 2010; Valmohammadi, 2011); consequently, it is used in many organizations to improve, for example, customer satisfaction, operational reliability, productivity, and market share (Gadenne and Sharma, 2009; Milovanović, 2014). In addition, Gharakhani et al. (2013) and Gupta, Khanna and Soni (2023) mention that TQM has positive effects, such as quality, productivity, customer satisfaction, and profitability.

The positive effects of TQM on the company's costs and financial position have been reported by, for example, Gharakhani et al. (2013), Oakland (2011), Tasleem et al. (2017), and Iqbal and Asrar-ul-Haq (2018). Nekoueizadeh and Esmaeili (2013) also state that TQM has a positive impact on quality, innovation efficiency, and organizational performance. Furthermore, Munizu, (2013) states that TQM has a positive effect on organizational performance and company competitiveness, whereas competitiveness has a positive effect on organizational performance. Simegnaw Ahmmed and Ayele (2020) also state that significant benefits can be achieved in processes with the help of TQM tools. Alzoubi and Ahmed (2019) state that TQM has a significant impact on business development, and its effectiveness increases the more the company operates in a competitive and rapidly changing industry. Ul Hassan et al. (2012) report that successful implementation of TQM improves organizational performance. They emphasize that production organizations can improve their performance, customer satisfaction, and quality. According to Zimon (2017), TQM improves the integration of supply chains and customer service; thus, it is possible to improve customer relations and increase customer satisfaction. Liao (2023) points out that to achieve significant benefits, a company's TQM should focus on shared responsibility and understanding of performance fluctuations, aiming for continuous improvement.

Irfan and Kee (2013) report that organizations can benefit significantly by focusing on TQM, and their research also shows a significant positive relationship between TQM and service quality. Al-Qahtani, Alshehri, and Aziz (2015) state that focusing on customer satisfaction improves organizational performance. In addition, Ngambi and Nkemkiafu (2015) show that leadership and staff training significantly affect the company's finances and the increase in responsible operations. Regarding responsibility, Faeq, Ali, and Akoi (2022) reported that TQM and social responsibility have a significant impact on employee

satisfaction. Gorondutse and Hilman (2021) report that organizational culture has a significant impact on the realization of TQM results.

According to Talib, Rahman, and Qureshi (2013), TQM emphasizes the importance of a company's quality culture to continuously improve its performance. This cultural change is achieved as work tasks change with adequate training. If TQM is successful, it not only increases the efficiency of one function but also leads to an improvement in the overall performance of the organization (Nasim, 2018). Improving the company's profitability requires continuous streamlining of processes, which is achieved through the effective implementation of TQM (Oakland, 2011). Achieving significant change requires better management and the development of internal functions and stakeholder cooperation. Sinha and Dhall (2020) also report that organizational culture significantly impacts the implementation of TQM.

An important part of improving performance is personnel, who must be trained and involved in the development work (Milovanović, 2014). Motivating and involving personnel plays an important role in TQM. Since people's work contribution affects success, it is therefore important for all organizations to combine customer-oriented TQM with personnel issues. (Sharma and Rahim 2021) Boselie and van der Wiele (2001), Ooi et al. (2008), Kabak et al. (2014), Arunachalam and Palanichamy (2017), Al-Damen (2017), and Babu and Thomas (2021) have reported on the impact of TQM on personnel satisfaction. In addition, Yee, Yeung, and Cheng (2008), Jones, M. K., Jones, R. J., Latreille, and Sloane (2009), and Latif, Ahmad, Qasim, Mushtaq, Ferdoos, and Naeem (2013) have shown the positive effect of job satisfaction on company performance. The commitment of the management, integration and training of employees, and training of the benefits of TQM processes have a huge importance in successfully implementing TQM (Garcia-Alcaraz, Flor-Montalvo, Avelar-Sosa, Sánchez-Ramirez, and Jiménez-Macias, 2019). Anand, Ward, Tatikonda, and Schilling (2009) point out, however, that when developing continuous improvement procedures, personnel training alone is not enough, but steps must be taken to manage and maintain the procedures. In addition, the results of continuous improvement procedures must be monitored to ensure the achievement of goals and avoid inefficiency.

Balamurugan (2021) states that industry should invest in finding out and understanding customer expectations and needs. By investing in these aspects, it is possible for companies to significantly influence their customer satisfaction. Beheshti and Lollar (2003), Ooi, Lin, Tan, and Chong (2010), ul Hassan et al. (2012), Topalovic (2015), and Sheikholeslam and Emamian (2016) have found that TQM affects customer satisfaction, which has a direct impact on business profitability as it leads to long-term customer relationships (Yeung, Ging, and Ennew, 2002; Wang, Po Lo, Chi, and Yang, 2004; Moshan, Nawaz, Khan, Shaukat, and Aslam, 2011). Customer satisfaction improves customer loyalty (Yeung et al., 2002; Wang et al., 2004; Moshan et al., 2011), and companies do not need to invest in finding new customers (Yusuf et al., 2007).

Beheshti and Lollar (2003), Yusuf et al. (2007), Mourougan and Sethuraman (2017), and Yousif et al. (2017) argue that TQM also affects the company's reputation. According to Beheshti and Lollar (2003), a company can improve its reputation and market share by investing in the quality of its operations, and Mourougan and Sethuraman (2017) state that the reputation of service companies depends on the quality performance of the company. In a tightening market, a company's reputation has a significant impact on business success. Reputational damage is, indeed, one of the biggest risks for companies; when it occurs, it also affects the company's financial results (Vig, Dumičić, and Klopotan, 2017).

Psomas et al. (2014), Abu-Alain (2018), and Iqbal and Asrar-ul-Haq (2018) state that the goal of implementing TQM is to improve operational productivity, reduce costs, and minimize errors and losses, which improves the company's finances and increases the sustainability of operations. Tasleem et al. (2017) also report on TQM very comprehensively, emphasizing that its goals are aimed at improving customer satisfaction and the quality of products and services and reducing costs, and these goals have raised TQM high when considering the development of business strategies. Tang (2019) connects to the basic idea of TQM the aspects related to personnel, which support the understanding of customer requirements, measurement of core processes, and minimization of operational variability.

According to Psomas et al. (2014), Chin et al. (2001), and Pun (2002), one goal of TQM is to identify customer requirements and serve customers with quality products or services that increase efficiency and affect the company's cost level. To succeed in implementing TQM, Talib et al. (2013) emphasize the importance of a company's quality culture in achieving lasting results. Fok, Morgan, Zee, and Mock (2023) also state that organizational culture and TQM improve companies' sustainability performance. In addition, they state that the more the managers are aware of their company's environmental issues, the more positive they are toward the actions related to their company's sustainability performance. According to Tasleem, Khan, and Nisar (2018), companies where TQM implementation was successful achieved better performance than others in terms of results and sustainable business implementation. Successful implementation of TQM requires full management commitment (Gupta et al. 2023) and changes within the company and between the company and its stakeholders (Milovanović, 2014). Kumar, Verma, Mangla, Mishra, Chowdhary, Sung, and Lai (2020) state that the company's measures to implement TQM may also improve its business opportunities. They report top management's lack of commitment and weak leadership as the biggest barriers to successful TQM. This same conclusion has also been reached by Kaynak (2003). To succeed in implementing TQM, an organization must identify strategic barriers related to its internal structure and address them (Kumar et al., 2020).

In addition, Kuruppuarachchi and Perera (2010) state that a lack of knowledge and weak personnel management can weaken the performance of even high-level process management. It is important for the company that the organization's activities have common goals and is ready to commit to them. The management must authorize the entire

organization and ensure appropriate working conditions. Employee participation can also be used as a strategy implementation tool (Abu-Alain, 2018).

Referring to the observations mentioned above, Powell (1995) already states that TQM is a management practice based on continuous improvement, including the fulfillment of customer requirements, doing the right things at once, long-term thinking, employee participation, teamwork, process redesign, competitor monitoring, effective problem-solving, performance measurement, and supplier management. To succeed in implementing effective development work in the described areas, Arranz, Arroyabe and Fernandez de Arroyabe (2020) and Tran, Santarelli and Wei (2022) emphasize the company's capability to acquire a competitive advantage to its competitors. These capabilities, which combine new innovations and their practical implementation, can be called dynamic capabilities.

Although Qasrawi, B.T., Almahamid, and Qasrawi, S.T. (2017) have found that several TQM dimensions have a positive effect on organizational performance, they state that failures in TQM implementation are caused by neglecting to identify the company's key success factors, which have a significant impact on its performance. In addition, poorly informed and managed TQM may create uncertainty in the organization and its working atmosphere. Quality goals and process improvement must be consistent and justified. The same requirement of awareness also applies to the management because a management team unfamiliar with TQM can leave its required measures unimplemented and the desired results will not be achieved. (Tang, 2019)

Notably, although a considerable number of studies show that it has a positive effect on performance, difficulties in implementing TQM have been reported. In addition to Qasrawi et al. (2017), such difficulties have also been reported by Han, Chen, and Ebrahimpour (2007), Demirbag, Tatoglu, Teknikus and Zaim (2006), and Kober, Subraamanniam, and Watson (2012). As the most common reason for the failure of TQM, the abovementioned studies point to the management's weak commitment or support for the organization. Riaz, Khan, Ullah, Tahir, Alqurashi and Alsulami (2023) reported that the biggest problems in implementing effective TQM included lack of management commitment, poor customer satisfaction and inadequate training.

In summary of the above, Talha (2004) states that SMEs, in particular, must consider six key issues when implementing TQM, which is expected to have an impact on the company's performance. These six key issues are: 1) all employees must be committed to quality work and customer satisfaction, 2) all employees must be committed to improving quality and customer satisfaction, 3) quality, customers, and suppliers must be taken into account in all the company's operations, 4) prioritizing high-quality operations and customer satisfaction does not have to be more expensive than normal operations, 5) improving quality and customer satisfaction may require significant changes, and 6) small improvements in the company's operations may bring an advantage compared to competitors.

When planning TQM implementation, the results reported by Gadenne and Sharma (2009) must also be taken into account; that is, to support successful TQM implementation, it is necessary to know that TQM consists of so-called hard and soft dimensions, which should be equally considered when developing operations. Hard dimensions refer to various tools used for quality improvement and monitoring, while soft dimensions focus on measures related to management development. Notably, both elements are needed for a functioning system, but soft TQM has been shown to have a greater impact on performance than hard TQM (Fotopoulos and Psomas, 2009).

2.3 The role of certification in TQM

As stated in the presentation of the concepts, certification refers to the assessment of conformity. Due to the prevalence of certification, its effects on business operations have been studied in depth. Regarding the effects of certification, it has been found that the profitability of companies has improved (Shafiq et al., 2014), and processes have become more efficient (Gotzamani and Tsiotras, 2002; Padma et al., 2008; Fernandes et al., 2017; Georgiev and Georgiev, 2014). The quality culture essential for the success of quality work has been developed (Douglas et al., 2003), and organizations focus better on customer requirements, their implementation, and customer satisfaction (Gotzamani and Tsiotras, 2002; Padma et al., 2008; Caro et al., 2009; Santos and Millán, 2013). In addition, certification has been reported to have a positive effect on individual procedures such as personnel management, training and employee competence (Curkovic, Vickery, and Droge, 1999; Padma et al., 2008; Casadesús et al., 2001), and supplier cooperation (Georgiev and Georgiev, 2014); Prajogo, Huo, and Han, 2012) and for continuous improvement (Padma et al., 2008; Santos and Millán, 2013). Kuo, Chang, Hung, and Lin (2009) also state that ISO certifications significantly improve the effectiveness of quality management practices.

In addition, Ullah (2022) has found that certified companies are more innovative than uncertified companies. Poksinska (2010) states that certified companies can be at very different levels on the TQM scale, and companies can decide what kind of processes they want to follow. In addition, Castillo-Peces, Mercado-Idoeta, Prado-Roman, and del Castillo-Feito (2018) present the view that the time elapsed since the certification of a quality system has a significant impact on the company's interests, and Dick (2000) reports that in a well-functioning TQM, the quality certification of organizations has only a small impact on profitability. However, over the years, different operating methods have also been developed, and the effect of different operating methods on companies' results has changed. For example, Pelantová and Šlaichová (2017) state that the latest update of the quality standard in 2015 includes many TQM elements.

Companies can be certified according to several different standards; consequently, Zimon, Madzík, Dellana, Sroufe, Ikram, and Lysenko-Ryba (2022) have studied how the combined effect of different standards can be seen in companies. They report that in those cases, companies gain the greatest environmental benefits by implementing ISO 9001 and

ISO 14001 systems. The combined effect of the systems is stated to be greater than their separate effects. The researchers state that when quality management is important, the formation of all kinds of waste, for example, must be reduced, thus, increasing the benefits received by the company.

Despite numerous positive reports highlighting the positive effects of TQM, opposing views have also been reported. For example, Chen, Wu, and Zhai, (2019), who have studied the effects of ISO 9001 on the financial performance and sustainability performance of Chinese service companies, estimate that the reputational benefit brought by the certification weakens companies' readiness and motivation to effectively adopt the systems. Terziowski and Guerrero (2014) have also observed a decrease in development activity after certification.

Jeroen, Gwenny, and van de Water (2001) warn against the often-occurring incorrect idea that the quality of certified companies is better than that of uncertified companies. Rahman (2000), Chow-Chua et al. (2003), and Terziowski and Power (2007) claim that a certified system does not automatically guarantee quality management, but the company's quality culture is more important than certification for quality realization. Poksinska (2010) also warns about a worrying aspect of certification; that is, companies can claim that their operations comply with the standard and get a certificate without changing their operations at all. Kiefer (2018) states that ISO certification can, in certain cases, even slow down development.

Moreover, Martínez-Costa and Martínez-Lorente (2007) state that in many matters related to the economy, uncertified companies performed better than certified companies. They think that this phenomenon occurs because, in situations where the system is built due to external requirements, it is not used as part of TQM to achieve results; rather, the aim is to maintain the certification with minimum costs. Terziowski, Power, and Sohail (2003) emphasize that the management's participation and commitment have a direct impact on the benefits produced by the system. Notably, however, in the worst case, deficiencies due to the poor performance of the systems may be caused by the certifiers who may have different interpretations of the standards' requirements, even within the same certification body (Andrews, Charm, Habicht, Knowlton, Sale, and Tschinkel, 2001).

Mehralian, Nazari, Zarei, and Rasekh (2016) emphasize development work by stating that an organization can strengthen its performance and improve the satisfaction of its customers and stakeholders by implementing comprehensive development work. Similarly, Yusuf et al. (2007) also emphasize the coverage of development work and focus, in particular, on developing customer orientation.

2.4 TQM and sustainability performance

Improving sustainability performance suffers from the same problem as TQM; that is, no clear consensus exists on what things should be developed and how the development work

should be carried out (Alharbi, Al-Matari, and Yusoff, 2016). However, management functions and strategic planning are considered essential in planning and implementing sustainable business (Bansal, 2002; Elhuni and Ahmad, 2014). According to Evans, Vladimirova, Holgado, Van Fossen, Yang, Silva, and Barlow (2017), improving sustainability very often requires new innovations or a comprehensive modification of operations in relation to the environment and previous operating models. Companies representing a low level of sustainability generally operate according to the principles of traditional profit maximization, and environmental and social sustainability are taken into account only based on external factors. In companies representing high sustainability performance, sustainability is integrated into their operations, such as managing stakeholders and measuring operations (Eccles, Ioannou, and Serafeim, 2014).

In current management processes, the goals of sustainability performance have gained a foothold, and it has been found to have a significant impact on the growth and development of companies (Bateh et al., 2013). Consequently, an increasing number of companies have initiated measures to improve the sustainability of their processes and monitor their social and environmental impacts (Petrini and Pozzebon, 2009). Business management has long followed economic issues, but alongside the economy, social issues and environmental impacts have grown in pursuit of comprehensive sustainability (Dyllick and Hockerts, 2002). In this context, the importance of the proper implementation of TQM is considered essential for the company, as Tasleem et al. (2018) state that in companies where the introduction of TQM has been successful, a better result has been achieved than in other companies when evaluating sustainability performance achievements.

Although many advantages have been found for sustainability performance, several barriers also exist to its implementation. The most important barriers have been described to be, for example, lack of resources and expertise, high costs (Álvarez Jaramillo, Zarthá Sossa, and Orozco Mendoza, 2019), availability of trained personnel (Lopez-Perez et al., 2017), and lack of management support or lack of support to implement the necessary investments (Bakos, Siu, Orenge, and Kasiri, 2020). The better the awareness of sustainable solutions in the company, the more likely the sustainability of its operations will improve. Consequently, Altinay (2016) and Bakos et al. (2020) emphasize the importance of education and organizational learning ability in the sustainability performance of SMEs.

According to Aboelmagedi, (2018), pressure from customers and competitors has a very large impact on the behavior of companies. However, the change in the company's operating methods will not start unless the personnel is committed to the changes and unless the company's management supports the changes. This shows that companies operate within networks of mutually influencing relationships according to Resource Dependence Theory. These networks and operating models can determine the critical resources of companies. For this reason, these networks can introduce uncertainty into the strategies implemented by companies, necessitating careful management of resource quality. (Jiang, Lou, Xia, Hitt and Shen, 2023)

2.5 The effects of TQM on sustainability performance

2.5.1 The impact of TQM and sustainability on the company's business

The sustainability of results or procedures has a significant impact on improving performance. Quality culture plays an important role in the sustainability of results. Changing the way a company operates requires commitment and also adaptation from all parts of the organization. The success of the change requires extensive training and a change in work tasks; thus, large-scale development work always causes a change in the company's quality culture (Talib et al., 2013). Successful use of TQM leads to better performance (Yusuf et al., 2007), and Oakland (2011) states that continuous improvement and the implementation of TQM support, in turn, improve profitability. Both performance and profitability are parts of economic sustainability. Real changes aimed at improving performance should focus on the internal operations of companies and also on the processes between the company and its stakeholders (Milovanović, 2014).

2.5.2 The effects of TQM on the economy

TQM has been found to have a positive impact on business performance and financial performance (Kaynak 2003). Arawati, Ahmad, and Muhammad (2009) show that the TQM dimensions they used—personnel training, supplier management, benchmarking, and organizational commitment—have a significant impact on improving the profitability of companies. Barker and Cagvin (2013) also claim that an effectively implemented TQM has a positive effect on the company's profitability. Nasim (2018) states that TQM improves the performance of the entire business and is not limited to streamlining individual operations. Notably, the improvement of operational efficiency is not automatic but is essentially dependent on the level of TQM implementation (Yusuf et al., 2007). The implementation rate of TQM is assumed to be higher than average in companies that have received various quality awards. Recipients of the quality award have been examined by, for example, Boulter, Bendell, and Dahlgaard (2013), Kumar et al. (2009), York and Miree (2004), and Hansson and Eriksson (2002). Their research showed that the profitability and financial performance of the companies that received the quality award were better than the corresponding figures of the reference companies.

According to Isaksson (2005), financial success, which belongs to the TBL idea, is one of the basic conditions for sustainability performance. It would be useful to add elements of sustainability performance and its improvement to the management system guided by TQM. This would lead to a situation where companies' processes would take into account environmental and social performances in addition to economic issues; in such cases, sustainability performance would be even more closely related to the company's operations and would be part of management and, thus, also easier to justify.

2.5.3 The effects of TQM on social and environmental sustainabilities

Considering the effects of TQM on sustainability performance, TQM is found to affect staff satisfaction (Boselie and van der Wiele, 2001; Ooi et al., 2008; Jun and Cai, 2010; Nouraei, 2014; Kabak et al., 2014; Arunachalam and Palanichamy, 2017; Al-Damen, 2017), customer satisfaction (Beheshti and Lollar, 2003; Terziovski and Power, 2007; Ooi et al., 2010; Jun and Cai, 2010; ul Hassan et al., 2012; Topalovic, 2015; Garcia-Alcaraz et al., 2019), and company reputation (Beheshti and Lollar, 2003; Yusuf et al., 2007; Mourougan and Sethuraman, 2017; Yousif et al., 2017). Findings about the positive effect of TQM on customer satisfaction are significant, as satisfied customers do not actively plan to change suppliers (Yeung et al., 2002; Wang et al., 2004; Moshan et al., 2011). Consequently, the company does not need to invest in finding new customers, and resources remain for developing other activities. Achieving customer satisfaction enables the company's efficient and high-quality operation and continuous improvement (Yee et al., 2008; Latif et al., 2013). Thus, achieving customer satisfaction directly affects not only the company's profitability but also the customers' opinions of it. The more positive the customers' view of the company, the higher reputation it has among customers. One of the company's biggest risks is losing its reputation in the customer base (Vig et al., 2017)

Khalil and Muneenam (2021) reported the positive effects of TQM on green performance in Pakistani service companies. In particular, they emphasized the impact of strategic planning, process management, and personnel management on Corporate Green Performance. Nazar et al. (2019) have studied the impact of TQM on the hotel business and state that TQM has a statistically significant impact on corporate social responsibility. Ali and Johl (2022) studied the effects of soft TQM on social and environmental sustainabilities in manufacturing SMEs. Their soft TQM dimensions were top management commitment, customer orientation, and employee training. They report a positive effect between soft TQM and social sustainability as well as environmental sustainability. Moreover, Abbas (2020) reports that TQM has a significant positive effect on company sustainability performance, which information management partly facilitates.

When companies fail to develop sustainability performance strategies related to the environment and ignore other details related to sustainable operations, they limit their opportunities for growth and lose future investment opportunities. However, what suits one company may not bring the same result in other companies, due to the organization's commitment to the implemented procedures (Batista and Francisco, 2018). Das, Rangarajan, and Dutta (2020) report that SMEs have neglected the social and environmental details of sustainability, thereby, missing out on opportunities that could impact their business in the long run.

2.5.4 Standards and sustainability

Although the issues related to sustainability have not been determined in depth, numerous international standards define the quality of operations in various subject areas. Talapatra, Uddin, and Rahman (2018) state that management systems built according to ISO 9001, ISO 14001, OHSAS 18001 (ISO 45001), and SA 8000 include the requirements of both external and internal stakeholders. When combined, the requirements of these systems will be covered in a certifiable way, the requirements related to the quality of operations, occupational health and safety, and environmental issues and manage Social Accountability. In addition, ISO 37001 is also essential for sustainable business management, as it prevents companies from becoming targets of bribery. Talapatra et al. (2018) mention OHSAS 18001 (ISO 45001) as a guiding occupational safety and health standard, but nowadays companies have adopted the standard ISO 45001. Notably, for example, the standards ISO 9001, ISO 14001, and ISO 45001 contain a requirement for identifying and handling risks. If the subject in question is strange to the company, and it is not known how to get the best possible benefit from it, considering operation sustainability, the standard ISO 31000 can be used as an aid in handling risks. Thus, even though it has not been determined in detail which things are part of sustainability, companies have numerous tools and information sources that they can use in building their own system.

2.6 Conceptual framework of the research

As stated earlier, no unequivocal operating model has been defined for TQM. Consequently, it can be described as a kind of philosophy (Padma et al., 2008) aimed at improving the company's business operations in industry and service companies (Gadenne and Sharma, 2009; Nasim, 2018). In the absence of a jointly agreed approach, companies must focus on development priorities that are important to them (Elhuni and Ahmad, 2014). Owing to the 2015 updates, the requirements of the ISO 9001 standard have converged with the ideas of TQM (Pelantová and Šlaichová, 2017); thus, it is expected that the ideas of TQM will become more common in companies as there are approximately one million certified companies globally. However, the impact of the revised standard on the operations of certified companies has not been extensively studied. The financial performance of systems is important for companies; however, the need to take care of environmental and social performances has also emerged (Bakos et al., 2020). In addition, several studies comment on the impact of TQM on the company's results, although the dimensions they use are very narrow and do not even cover the most common TQM criteria in Europe, that is, EFQM's requirements.

The conceptual reference framework of this study is built to consider the dimensions of TQM as comprehensively as possible and also the effects of a well-implemented quality management system on company performance. The results have been examined from the perspective of sustainability performance, which is divided into economic, environmental, and social elements. The conceptual framework is presented in Figure 3.

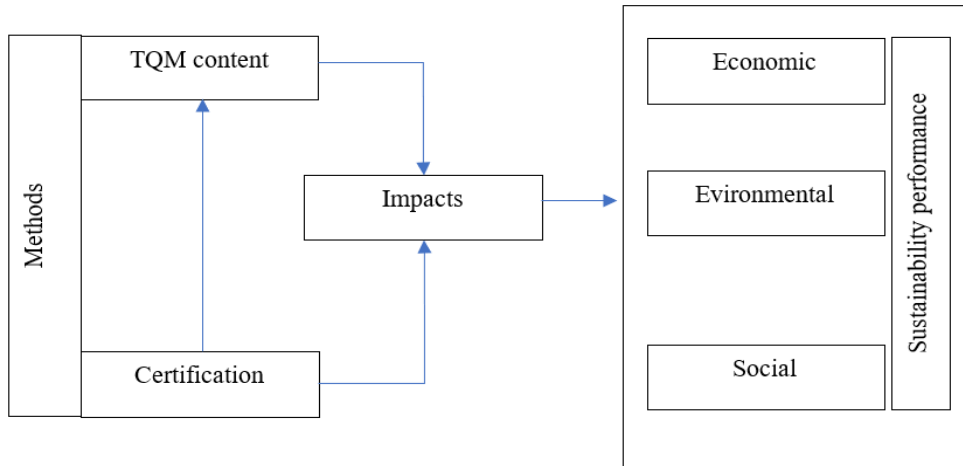


Figure 3 The impact of TQM and certification on sustainability performance

3 Research methodology

3.1 General philosophy of research and research approach

The background of successful research lies in the selection of important research questions, a good research plan, and the implementation of the right measures and analyses related to key research questions. The research should be done by effectively using these steps, making it possible to achieve meaningful results. Every study is different; thus, the decisions described above must always be made on a case-by-case basis (Aguinis and Vandenberg, 2014). According to the abovementioned arguments, researchers should pay attention to several factors and choices before commencing a study. When choosing research methods, the research-related choices must be justified (Crotty 1998).

O’Gorman and MacIntosh (2015 p. 51) divide the research process into three stages: 1) Research Paradigm, 2) Data Gathering, and 3) Data Analysis Approaches. The research paradigm is divided into ontology and epistemology. Data collection includes methodology and techniques. Data analysis can be either deductive or inductive.

Usually, the researcher commences the research work by defining the ontology related to the research, which is related to the nature of reality. This research assumption serves as the cornerstone for all subsequent assumptions. Thus, the researcher’s ontological views influence their epistemological thinking about acquiring knowledge that has a direct connection to the chosen methods (Holden and Lynch, 2004).

The division of ontology into objectivity and subjectivity is clarified by Holden and Lynch (2004) who also have found alternative names for these terms in the literature. Objectivity can be described by the following terms: quantitative, positivity, scientific, experimental, traditional and functionalism. However, subjectivity can be described with the terms as follows: qualitative, phenomenological, humanistic, and interpretive. O’Gorman and MacIntosh (2015 p. 56) concretize the differences between these terms by stating that the objective point of view refers to the existence of things to be measured or tested, while the subjective point of view indicates examining reality based on observations or opinions.

O’Gorman and MacIntosh (2015 p. 51) divide epistemology into four parts as follows: positivism, critical realism, action research, and interpretivism. The basis of positivism is an observable and measurable reality that helps develop objective knowledge. In an ontological sense, there is one reality in this paradigm, and in an epistemological sense, everything can be measured and tested. Measurements and testing give certain general “laws.” O’Gorman and MacIntosh (2015 p. 61) point out that the popularity of positivism in business research is due to the accuracy of the data used.

Critical realism is a young epistemological paradigm with elements of both objective and subjective ontology. This paradigm assumes that a reality exists regardless of people's perceptions of it, and our perceptions of that reality are distorted. In the paradigm, reality is formed from layered observations. The invisible levels of reality affect the more easily perceived levels; thus, observations can lead to different conclusions when changing perspectives (O'Gorman and MacIntosh, 2015 p. 61).

Action research originated in the social sciences from the great social changes of the Second World War. It includes many types of research, which are united by the goal of changing the situation being studied. One of the most commonly used definitions of action research is that it involves collaboration with organizational members to help researchers and managers work to bring about change (O'Gorman and MacIntosh, 2015 p. 63). This starting point means that researchers must also be participants, which requires collaboration with the researched object (Baskerville and Myers, 2004).

According to O'Gorman and MacIntosh (2015 p. 64), interpretivism has been developed as a counterweight to the supremacy of positivism as a research paradigm. Interpretivism emphasizes the differences between the natural sciences and the humanities. In the interpretivist paradigm, the researcher cannot get real information about the state of mind of the subject being studied, which leads to the fact that the researcher can only share trends, not "laws." According to Petty, Thomson, and Stew (2012), interpretivism assumes that people do not necessarily have an understanding of the world under study, but individuals create subjective meanings for things based on their experience. Consequently, the research question is considered vague, and the research proceeds iteratively between data collection and analysis of the obtained data.

In the epistemological sense, positivism and interpretivism form the extremes, the occurrence of which is described by O'Gorman and MacIntosh (2015 p. 60) in Figure 4.

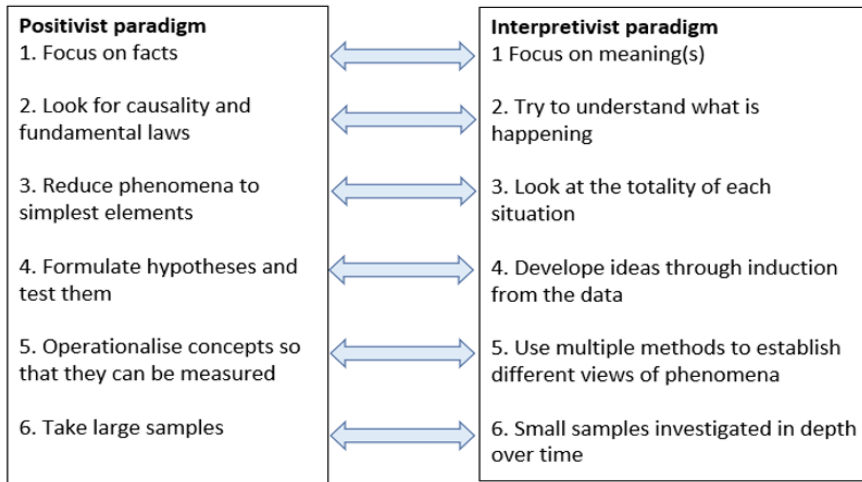


Figure 4. Positivism and interpretivism in the epistemological sense

Data collection is essential for research. O’Gorman and MacIntosh (2015 p. 51) divide data collection into two main parts, methodology and techniques. In this context, the methodology is divided into quantitative case study and qualitative methods. Hirsjärvi, Remes, and Sajavaara (2007, p. 187) share research-related data collection through surveys, interviews, observations, and document review. A survey can be conducted either by mail or online, in which case the researcher has little chance to influence its success. Questionnaires can also be implemented as a controlled survey, in which case the researcher can guide the respondents when sending the questionnaires or check the form-filling process themselves when applying for the forms.

The analysis of the collected data can be carried out according to the deductive and inductive models of O’Gorman and MacIntosh (2015 p. 51). Deductive analysis refers to an analysis based on a theory, where the direction of the analysis is from general knowledge to details. Inductive analysis refers to data-driven analysis, where the direction of the analysis is from details to general information.

3.2 Positioning this dissertation in the general philosophy of research

O’Gorman and MacIntosh (2015 p. 70) have described the philosophical view of the study in Table 2, where the assumptions are examined through the characteristic instances of positivism, critical realism, action research, and interpretivism. The position of this dissertation in the field of philosophy of science is marked in yellow in Table 2.

Table 2 The position of dissertation in the field of philosophy of science

Assumption	Question	Positivism	Critical Realism	Action Research	Interpretivist
Ontological	What is the nature of reality?	Reality is singular, set apart from the researcher	Reality is stratified and engaged with by the researcher	Reality is knowable through interaction with the specifics of a given situation	Reality is multiple and interpreted by the researcher
Epistemological	How do we obtain knowledge of that reality?	Researcher is independent from that being researched	Interdependent but analytically distinct nature of society, culture (structure) and individual (agency)	Researcher interacts with what is being researched with the express intention of changing the situation	Researcher interacts with that being researched
Rhetorical	How is language used in the research?	Formal Based on set definitions; impersonal voice	Formal as well as considers first and third person voice	Tends toward the first person voice	Informal evolving decisions; personal voice
Axiological	What is the role of values	Value-free and unbiased	Considers the influence of values as experience	The values of the researcher are imposed thorough the overt attempt to effect a particular kind of change	Valueladen and biased

In an ontological sense, the reality related to this research is unique and separate from the researcher, because the latter collects the data from the company and analyzes them completely independently.

In an epistemological sense, the research was conducted without in-depth interaction with the company under study but as a survey, and no interpretive interviews were used. The researcher performed the work independently.

In a rhetorical sense, to avoid misunderstandings, the study uses only the vocabulary established for quality standards and TQM practices, and all materials are treated in a passive form. The chosen approach emulates a positivist approach to presenting things. When examining the values related to the research and those of the researcher, it can be stated that the research strives to be completely impartial. However, in the present study, the researcher himself has a background in work related to quality control; thus, personal experience may be reflected in some value choices. For the reasons given, the study represents definitions of positivism.

A research strategy refers to the basic choices for conducting research. Traditionally, research methods are divided into quantitative and qualitative research. Quantitative research focuses on drawing conclusions and validating theories and/or hypotheses through standardized data collection and statistical analysis. The traditional features of qualitative research are inductive reasoning, searching, and finding, in which the researchers themselves act as the most important tool. Based on these criteria, the present research can be concluded as quantitative.

3.3 Data collection and analysis

Sampling frame

The study focused on randomly selected Finnish SMEs. The criteria for an SME are that the company's turnover does not exceed 50 million euros, and the number of employees is less than 250. Moreover, the balance sheet total must be no more than 40 million euros, and no more than 25% of its shares or voting rights are to be held by a large company (Statistics Finland, 2021). The survey questionnaire was sent to the CEOs of the companies that participated in the study. The survey asked about the number of employees, and companies with less than five employees were removed from the answers. With this restriction, we wanted to ensure that the CEO's thoughts did not overtly influence the company's operating methods but that the companies had real TQM practices. It is also assumed that in companies with fewer than five employees, the quality culture is dictated by the CEO and has not formed as an internal synthesis of the organization. When deciding on this issue, the functionality of the processes in small companies was also considered, and it was suspected that the operation consists of functions, which would call into question the analysis of the actual processes.

A Webropol survey was conducted. In connection with the survey, CEOs were sent a short presentation of the research and its priorities and goals. The survey included definitions of things that the respondents could consider in many different ways. As mentioned above, such questions were on, for example, environmental and social sustainabilities. The survey was sent to 6,889 CEOs of SMEs representing both the industry and the service sector. There are 379,653 companies in Finland, and 343,590 of them have less than 5 employees (Statistics Finland, 2021). Therefore, 36,063 companies were suitable for the survey in Finland; consequently, the survey was sent to 19.1% of the suitable companies. The survey was supported by two reminder messages. When examining the answers, those answers where the answer was left unfinished, and the answers where all statements were answered in the same way were removed from the group. The final result was 271 responses, which is 3.9% of the sent surveys. Although the total number of 271 valid responses was considered sufficient based on the sample size (Kotrlík and Higgins, 2001), future studies could improve response rates by employing additional data collection methods such as phone surveys.

Respondent demographics

Table 3 describes the structure of the companies that participated in the study. The table shows that 60.1% of the respondents represented industrial companies, and 50.9% of the industrial companies were certified. Only 21.2% of service companies were certified. Certification was, therefore, clearly more common in industrial companies than in service companies. A total of 39.1% of the companies that participated in the study had a certificate.

Table 4 shows the classification of the companies that participated in the study according to the number of employees and the prevalence of certification in these categories. Table 4 shows that the most common company size category measured by the number of employees is 16–30 people, and the 31–60 employee size category has the most certified systems.

Table 3. Description of the responded companies

	Industrial	%	Service	%	Total	%
Type of company	163	60.1	108	39.9	271	100
Certified	83	50.9	23	21.2	106	39.1
Uncertified	80	49.1	85	78.8	165	60.9

Table 4. Number of companies grouped by the number of people

Number of people	Number of companies	%	Certified	%	Uncertified	%
6–15	78	28.8	12	15.4	66	84.6
16–30	86	31.7	30	34.9	56	65.1
31–60	58	21.4	32	55.2	26	44.8
61–150	41	15.1	27	65.9	14	34.1
151–200	6	2.2	4	66.7	2	33.3
201–249	2	0.8	1	50.0	1	50.0

Bias

Podsakoff et al. (2003) highlight assessing common method bias due to research methods as it can cause problems in behavioral research. According to them, common method bias problems can be caused by information obtained from one respondent, the use of a uniform measurement method, or a poor research design. Problems can be prevented, for example, by considering the temporal implementation of the study and differentiating different measurement methods, emphasizing the anonymity of the answers, and balancing the order of the questions correctly so that the logical progression of the study is not jeopardized.

The same respondents produced the response material in this study; thus, there was a risk that common method bias could distort the results of the study. This potential problem was already addressed within the planning phase of the study by conducting a comprehensive literature review, which broadened the view of previous studies related to the topic that can be used to effectively plan the issues to be discussed and related perspectives. In the survey, it was ensured that the answers were given anonymously; thus, the respondents did not have to answer the questions against their own opinions. Respondents had the opportunity to choose the most convenient time for them, and they did not have to fill in all the answers at once. No time limit was presented for completing the survey; thus, respondents could think about their answers before returning them. The

survey was aimed at people who were considered to be in the best position to answer the questions.

When planning the actual research, a balanced order of the examined issues and related statements was taken into account. This led, among other things, to managing the integration of statements related to reporting and data analysis of traditional TQM, as well as integrating benchmarking statements into processes and products. The correct placement of the checked issues gave the survey a logical order of progression.

Craighead et al. (2011) state that the likelihood of common method bias can also be reduced by designing surveys correctly and unambiguously. When planning the survey, special attention was paid to ensure that the respondents did not confuse causes and consequences, and possible causes of ambiguities were opened in connection with the questions. In addition, a test survey was conducted before sending the questionnaire. As a whole, the design principles of quantitative research by Mohajan (2020) were followed in the study design. Considering all the measures related to planning and preparation, it can be assumed that common method bias will not cause problems in this study.

Not answering the questions can also cause non-response bias in the study. The presence of this bias can be investigated by dividing the responses into two groups consisting of partial and complete responses (Whitehead, Groothuis, and Blomquist, 1993). The responses of these groups were compared using a one-way analysis of variance (ANOVA) test, where no statistically significant difference was found. Therefore, it can be concluded that non-response bias does not cause problems for this study.

Variable measurement

Regarding TQM dimensions, to determine the content of a sufficiently comprehensive TQM, an extensive literature study was conducted. In the mapping, 11 dimensions of TQM were found (Tables 7 and 8), which were divided into 61 researchable topics. The company's management was asked to respond to the statements made on these topics on a Likert scale (1=completely disagree, 5=completely agree).

Regarding sustainability performance, measures for all three dimensions were included in the survey. To ensure that the respondents evaluate the right things, relevant research-related issues such as social and environmental sustainabilities were specified in the survey. When examining social sustainability, the evaluators were asked to examine the issue by considering, for example, equality, parity, and compliance with labor legislation. When evaluating environmental sustainability, the respondents were asked to consider the company's operations, for example, in limiting emissions, complying with environmental legislation and minimizing waste. When evaluating economic issues, the respondents have excellent knowledge of the company's situation and the best skills to evaluate their company's profitability compared to competitors. The variable measurement constructed in this way gives a clear picture of the sustainability performance of companies based on the TBL idea. The company's management was

asked to respond to the statements on a Likert scale (1=bad, 2=satisfying, 3=good, and 4=excellent).

Venkatraman and Ramanujan (1987) have reported high correlation and concurrent validity between objective and subjective measures; thus, the responses obtained from within the company do not pose a problem for the reliability of the study. In addition, external evaluations are not even suitable for this study, because all the matters examined must be taken from the company's perspective, and outsiders do not have sufficient information about the company's goals, processes, products, competitive situation, and so on, on which the evaluations should be based. Therefore, the only option left was to collect the necessary data from within the company. In addition, data collection conducted from outside the company would have taken an unreasonable amount of time and caused huge costs.

Citing extensive literature research, the quantities selected as control variables may have an impact on the investigated matters. The selected control variables are the company's industry sector, company size, and certification of the company's operating system. According to the ISO Survey (2021), there are more than one million ISO 9001 certificates, and almost 3000 companies in Finland have certified their systems. In addition, numerous previous studies, such as (Fernandes et al., 2017; Georgiev and Georgiev, 2014; Santos and Millán, 2013), report on the positive effects of certification on the company's operations. Consequently, the impact of certification on sustainability performance must be studied. In addition, industry and service businesses are assumed to be different from each other. According to Reinartz, Krafft, and Hoyer (2004), a company's organization can also have an impact on company performance and, thus, cannot be ignored when planning control variables. In addition, large companies are assumed to have more resources to invest in sustainability performance (Nunes et al., 2019; Lopez-Perez et al., 2017); thus, company size is important in the realization of sustainability performance. Consequently, the issues mentioned above were chosen as the control variables of the study.

Validity

In general, validity refers to how well the research method measures the characteristics that it is intended to measure (Roberts and Priest, 2006).

The data from the respondents were checked, and the answers that did not meet the set criteria were removed from the group. The set criteria were: the respondent had to answer more than 50% of the questions, all the answers could not be the same, and they should have consistency. When the responses that met the criteria were left in the material, 271 responses were received.

When planning the study, Diamantopoulos et al. (2012) view that single-item measurement may cause problems with the study's reliability, and validity was taken into account. However, this idea is refuted by, for example, Bergkvist and Rossiter (2009). To

ensure the clarity of the questions, explanatory texts were added to the multidimensional questions to harmonize the respondents' way of thinking, which ensured the validity and reliability of the study.

According to Hair, Black, Babin, and Anderson (2010), construct validity can be examined using criterion, content, and discriminant validity. Criterion validity was assessed by correlation analyses to ensure that the TQM constructs function as desired. Content validity was ensured by utilizing extant studies in planning the content of the current study. In addition, the unambiguity of the study was evaluated with the help of test respondents. Discriminant validity was affected by planning the study as consistently as possible. No significant cross-loadings were observed in exploratory factor analyses, which supports the unidimensionality of the constructs. Generalizability was ensured by a precise sample selection procedure and non-response bias checking, as described above.

Reliability

Reliability indicates that something can be measured consistently and get similar results every time (Fitzner, 2007).

The research examined the averages, standard deviations, alpha values, and correlations of the research variables. The study showed a significant mutual correlation between the variables, which provides a reliable basis for testing the hypotheses. Cronbach's alpha values were used for reliability testing. The tested values exceeded the threshold value of 0.7, which ensures sufficient reliability of the structures.

The robustness of the models was tested with the Durbin–Watson value. All models had values close to 2, which are considered acceptable. The linear regression method was used to test the hypotheses. Prior to hypothesis testing, the pre-assumptions of linear regression were checked. Normality and heteroscedasticity were investigated with a normal P-P plot and a scatterplot of the residuals. Multicollinearity was checked by analyzing the correlation coefficients and variance inflation factor values.

Analyses of publications

In Publication I, the survey data was analyzed by a one-way ANOVA. The analysis examined the differences between certified and uncertified companies, targeting 1) the entire dataset, 2) service companies, and 3) industrial companies. In addition, the analysis examined the effects of certification on TQM dimensions in different company size classes and in the context of the number of employees.

In Publication II, regression analysis was used to examine the survey data and test the relationship between TQM and customer satisfaction, personnel satisfaction, and company reputation.

In Publication III, regression analysis was used to examine the survey data and test the effect of TQM on SMEs' profitability. In addition, the study examines whether Risk

Management, Digitalization, Stakeholder Management, and System Deployment facilitate the impact of traditional TQM dimensions on profitability.

In Publication IV, the study investigates the soft TQM dimensions that affect environmental and social sustainabilities. The study was conducted using hypotheses. The linear regression method was used to test the hypotheses. All used analyses are summarized in Table 5.

Table 5. Summary of the measures and analyses applied.

Publication	Independent variables	Dependent variables	Mediator variables	Control variables	Analyses
1	TQM dimensions	Certification			One-way ANOVA
2	TQM dimensions	Customer satisfaction Personnel satisfaction Company reputation		Number of employees Industry/service Certification	Correlation analysis Regression analysis
3	TQM dimensions	SMEs' profitability	Risk management Digitalization Stakeholder management System deployment	Number of employees Industry/service Certification	Correlation analysis Regression analysis
4	Soft TQM dimensions	Sustainable development of SMEs		Number of employees Industry/service Certification	Correlation analysis Regression analysis

4 Results

This chapter presents summaries of four research-related publications that provide answers to the research questions. Figure 2 shows how the articles provide answers to the research questions, and Figure 5 concretizes how the articles relate to the conceptual framework.

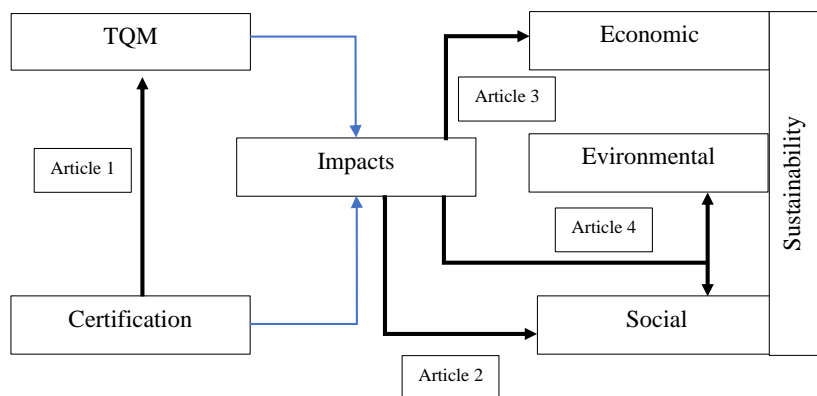


Figure 5 The impacts of certification and TQM on sustainability performance

4.1 Summary of the publications

All four publications are related to the research objective: "How to manage sustainability performance through the TQM of SMEs"? To achieve this goal, five research questions were set as follows:

Prerequisites:

1. What factors constitute the TQM?
2. How does certification affect TQM?

Impacts:

3. What are the effects of TQM on the economic dimension of sustainability performance?
4. What are the effects of TQM on the environmental dimensions of sustainability performance?

5. What are the effects of TQM on the social dimension of sustainability performance?

Previous studies demonstrate that there is no common view of the TQM content and its implementation. Thus, Publication I focuses on mapping the factors that influence the well-being and success of companies. This mapping formed an expanded basis for TQM and, in Publication I, examined the impact of certification on these essential TQM dimensions. Thus, Publication I answers research questions 1 and 2.

Publication II reports which of the aforementioned extended TQM factors support customer satisfaction, employee satisfaction, and company reputation. In addition, the publication reports the contextual factors that came up most often in the literature research, which were used as control variables in the future. Thus, Publication II provides an answer to research question 5.

Publication III examined which elements of traditional TQM (in Table 7) affect the profitability of companies and which elements of extended TQM (in Table 8) facilitate the traditional elements affecting profitability. Publication III answers research question 3.

Publication IV examined the impact of TQM factors identified in Tables 7 and 8 on environmental and social sustainabilities. Publication IV answers research questions 4 and 5. The results of the publications are summarized in Table 6.

Table 6. Summary of the results of the publications

	Publication 1	Publication 2	Publication 3	Publication 4
Title	The impact of certification on the elements of TQM exploring the influence of company size and industry	Enhancing customer satisfaction, personnel satisfaction and company reputation with total quality management: combining traditional and new views	Facilitating SMEs' profitability through total quality management: the roles of risk management, digitalization, stakeholder management and system deployment	The effects of soft total quality management on the sustainable development of SMEs
Main objective	This study determines TQM dimensions and examines whether certification improves such dimensions and whether the impact of certification is similar across companies of different sizes and industries.	Find out the impact of TQM and its dimensions on personnel satisfaction, customer satisfaction, and company reputation.	The study examines whether the new TQM dimensions, namely Risk Management, Digitalization, Stakeholder Management, and System Deployment, facilitate the impact of traditional TQM dimensions on profitability.	This study investigates which soft TQM dimensions affect environmental and social sustainabilities

Research question	1 and 2	5	3	4 and 5
Main findings	In industrial and small enterprises (5–49 employees) certification has a positive effect on the TQM dimensions, but a similar effect was not observed in medium-sized (50–250 employees) enterprises or in the service sector.	Customer Focus and Product Management were related positively to companies' customer satisfaction. Management/Leadership and Personnel procedures were related positively to companies' personnel satisfaction. Instead Customer Focus and Risk Management were related negatively to personnel satisfaction. None of the TQM dimensions were related to company reputation. The control variables do not affect customer satisfaction, personnel satisfaction, or company reputation.	Risk Management facilitates the relationship between Continuous Improvement and firm profitability. Digitalization does not facilitate the relationship between TQM dimensions and firm profitability. Stakeholder Management facilitates the relationship between Management/Leadership and firm profitability, Customer Focus and firm profitability, and Continuous Improvement and firm profitability. System deployment does not facilitate the relationship between TQM dimensions and firm profitability. In addition, the results show that certification, company size, and company industry do not have an impact on a company's profitability.	Business management systems and HR practices relate to environmental sustainability, while only business management relates to social sustainability. None of the control variables affect environmental sustainability, but industry/service influences social sustainability
Main contribution to the dissertation	Increase understanding of TQM and demonstrate that new ways of thinking can legitimately extend traditional TQM. To awaken the readers to notice what issues certification	Increase understanding of the impact of TQM on matters relevant to companies such as personnel satisfaction, customer satisfaction, and company reputation.	The research highlights the impact of traditional TQM dimensions on company profitability and increases the understanding of the ability of new dimensions to help old dimensions	The publication expands the view of TQM's impact potential from performance improvement to sustainable business improvement through soft TQM.

normally affects in Finnish SMEs and to generate ideas on how to increase the effectiveness.

improve profitability.

4.2 The results of the study reflected in the research questions

4.2.1 What factors constitute the TQM of SMEs? How does certification affect TQM?

As stated earlier, although the TQM philosophy was born in the 1950s, there is no common view of its content and application. However, this deficiency is mitigated by the quality criteria aimed at comprehensive quality thinking and the quality standard ISO 9001, renewed in 2015, according to which companies can certify their quality systems. To have a solid foundation for the research, Publication I aims to define the comprehensive TQM dimensions using a large number of previous TQM studies spread over a long period, as well as performance improvement studies and EFQM criteria. In addition, Publication I focuses on reporting on the effects of certification on TQM dimensions.

Regarding Research Question 1, “What factors constitute the TQM of SMEs?”, in a comprehensive literature review, the issues defined as traditional dimensions were identified as follows: Management/Leadership, Customer Focus, Personnel, Processes, Procurement and Materials, Products and/or Service, and Continuous Improvement. The dimensions of traditional TQM were expanded with aspects affecting performance produced by literature research as follows: Risk Management, Stakeholder Management, Digitalization, and System Deployment. These traditional dimensions are presented and justified in Table 7.

Table 7 TQM traditional dimensions

TQM dimensions	Literature supporting selection	Dimension details	A brief introduction
Management/Leadership	Saraph et al., 1989; Flynn et al., 1994; Badri et al., 1995; Powell, 1995; Black et al., 1995–1996; Ahire et al., 1996; Grandzol and Gershon, 1998; Quazi et al., 1998; Dow et al., 1999; Rao et al., 1999; Rahman, 2000; Yusof et al., 2000; Wilson et al.,	<ol style="list-style-type: none"> 1. Organizational awareness of goals 2. Monitoring the achievement of goals 3. Goal metrics and awareness of goals/goal metrics 	The goal of TQM is to constantly develop the company's operations in all areas, and the management's responsibility is to create a company culture that promotes development (Dreyfus et al., 2004). The top management sets the necessary goals and supports the organization in implementing the programs drawn up to achieve the goals (Mehmood et al., 2014). Understanding the expectations and requirements of customers and

	2000; Prajogo et al., 2003; Dreyfus et al., 2004; Parast et al., 2006; Sila, 2007; Sadikoglu et al., 2010; Mehmood et al., 2014; Toke & Kalpande, 2020; Tajouri 2023; Ali and Waheed 2024; EFQM, 2019.	<ol style="list-style-type: none"> 4. Management feedback on success 5. Clarity of responsibilities and authority 6. Management support to achieve goals 7. Quality of internal cooperation 8. Problem-solving 9. Equal partnership 10. Supporting initiatives 11. Clarity of strategy 	stakeholders is an essential part of management. Management must integrate the company's operations and stakeholders' expectations. In addition, the management must ensure appropriate management at different levels of the organization as well as the participation and motivation of the personnel (Sadikoglu and Zehir, 2010). ISO 9001 requires that the management holds the necessary management reviews to ensure system functionality. In implementing TQM through ISO 9001, the most important dimension is management (Amaruddin, 2021).
Customer Focus	Flynn et al., 1994; Powell, 1995; Black et al., 1995–1996; Ahire et al., 1996; Grandzol et al., 1998; Quazi et al., 1998; Dow et al., 1999; Rao et al., 1999; Rahman, 2000; Wilson et al., 2000; Prajogo et al., 2003; Dreyfus et al., 2004; Parast et al., 2006; Sila, 2007; Sadikoglu et al., 2014; Toke & Kalpande, 2020; Ali and Waheed 2024; EFQM, 2019.	<ol style="list-style-type: none"> 12. Customer satisfaction assessment procedures 13. Customer satisfaction 14. Customer satisfaction analysis 15. Action plans to improve customer satisfaction 	The goal of TQM is to achieve customer satisfaction and improve company performance (Dreyfus et al., 2004). According to Sila (2007), achieving customer needs is essential to developing a company's performance; therefore, continuous evaluation of customer satisfaction should be part of monitoring success.
Personnel	Saraph et al., 1989; Flynn et al., 1994; Badri et al., 1995; Powell, 1995; Black et al., 1995–1996; Ahire et al., 1996; Grandzol et al., 1998; Quazi et al., 1998; Dow et al., 1999; Rao et al., 1999; Rahman, 2000; Yusof et al., 2000; Wilson et al., 2000; Prajogo et al., 2003; Parast et al., 2006; Sila, 2007; Anand et al., 2009; Talib et al., 2013; Sadikoglu et al., 2014; Ahmed et al., 2020; Toke & Kalpande, 2020; Tajouri, 2023; Ali and	<ol style="list-style-type: none"> 16. Personnel knowledge of opportunities to influence customer satisfaction 17. Mapping of training needs 18. Training programs to achieve goals 19. Handling educational success 20. Level of personnel competence 	Mehmood et al. (2014) identify employees as the company's most important resource in improving productivity and performance. To ensure the effectiveness of their staff, companies need to provide ongoing training for their organization. Sadikoglu et al. (2010) emphasize that the training required is comprehensive and must focus on technical skills, problem-solving, work methods, and managing customer requirements. Anand et al. (2009) state that to get a result, training must be accompanied by the right management procedures. Training can help implement continuous improvement (Talib et al., 2013). Ahmed and Idris (2020) report that TQM has a positive effect

	Waheed, 2024; EFQM, 2019.	21. Level of personnel motivation	on employee satisfaction. The most important factor they highlighted was the empowerment of employees.
Processes	Saraph et al., 1989; Flynn et al., 1994; Badri et al., 1995; Powell, 1995; Black et al., 1995–1996; Ahire et al., 1996; Grandzol et al., 1998; Quazi et al., 1998; Rao et al., 1999; Yusof et al., 2000; Rahman, 2000; Wilson et al., 2000; Prajogo et al., 2003; Parast et al., 2006; Sila, 2007; Sadikoglu and Zehir, 2010; Talib et al., 2013; Sadikoglu et al., 2014; Toke & Kalpande, 2020; Ali and Waheed, 2024; Tajouri, 2023; EFQM, 2019.	22. Process efficiency 23. Measuring success and performance 24. Process performance information 25. Competitiveness of processes compared to competitors 26. Opportunities to improve processes 27. Self-assessment of process performance 28. Finding areas to improve by comparing to competitors	The purpose of process management is to improve the performance of processes by using available resources as effectively as possible. Improving performance should, in turn, better productivity, efficiency, and quality. A positive correlation exists between quality and process control (Talib et al., 2013). Sadikoglu and Zehir (2010) state that process management includes problem prevention and various proactive approaches to improve quality management. In addition, efforts are made to improve the production quality by minimizing variation.
Procurement and Materials	Saraph et al., 1989; Flynn et al., 1994; Badri et al., 1995; Powell, 1995; Black et al., 1995–1996; Ahire et al., 1996; Quazi et al., 1998; Dow et al., 1999; Rao et al., 1999; Rahman, 2000; Yusof et al., 2000; Parast et al., 2006; Sila, 2007; Sadikoglu and Zehir, 2010; Talib, 2013; Toke & Kalpande, 2020; Tajouri, 2023; EFQM, 2019.	29. Procurement efficiency 30. Material deficiencies 31. Value of inventories 32. Quality of suppliers 33. Identity of materials	Long-term supplier relationships allow us to create a mutually beneficial relationship in which we act as partners. In an advanced relationship, TQM is usually worked on to minimize costs, and buyers help suppliers improve their quality. In these cases, quality is more important than price when choosing suppliers (Sadikoglu and Zehir, 2010). Talib et al. (2013) have shown that long-term relationships between a buyer and a supplier improve a company's performance. According to Kebede Adem (2021), suppliers' quality management has a positive effect on companies' operations.
Products and/or service	Saraph et al., 1989; Flynn et al., 1994; Badri et al., 1995; Ahire et al., 1996; Grandzol et al., 1998; Quazi et al., 1998; Rao et al., 1999; Dreyfus et al., 2004; Sila, 2007; Tajouri, 2023; EFQM, 2019.	34. Competitiveness of products/services 35. Product price/quality ratio 36. Customer complaints	With TQM, companies invest in activities that improve the quality of products and services. This activity aims to improve customer satisfaction and operational performance (Dreyfus et al., 2004). Sila (2007) also states that cheap and high-quality products and services play an important role in improving the customer experience.

		<p>about products/services</p> <p>37. Product/service development activities</p> <p>38. Progress of products/services compared to competitors</p>	
Continuous Improvement	<p>Black et al., 1995–1996; Grandzol et al., 1998; Yusof et al., 2000; Talib, 2013; Sadikoglu et al., 2014; Mehmood, 2014; Toke & Kalpande, 2020; EFQM, 2019.</p>	<p>39. The overall level of continuous improvement in the system</p> <p>40. The level of operational development</p> <p>41. Control of corrective actions</p> <p>42. Informing personnel of changes</p> <p>43. Rewarding personnel for successful projects</p>	<p>Talib et al. (2013) and Mehmood et al. (2014) state that continuous improvement is an endless development process that enhances the ability of processes to turn given inputs into products or services required by customers. By investing in continuous improvement, a company can reduce variability in its results; it has proven to be an effective action for improving performance (Talib et al., 2013). Continuous improvement can be considered an important part of the business as Mehmood et al. (2014) state that it is the part of TQM that guides leadership, achieving goals, meeting customer requirements, and improving performance.</p>

A review of the literature highlighted dimensions that are essential to the success and performance of companies but have not been extensively present in previous TQM studies. These new TQM dimensions are presented and justified in Table 8.

Table 8 New TQM dimensions

New TQM dimensions	Literature supporting selection	Dimension details	A brief introduction
Risk Management	<p>Moore et al., 2000; Fatemi et al., 2002; Gilmore et al., 2004; Ellegaard, 2008; Altman et al., 2010; Sukumar, 2011; Thun et al., 2011; Wilson et al., 2013; Falkner, 2015; Tse et al., 2019; EFQM, 2019.</p>	<p>44. Identification of risks to operations/products</p> <p>45. Maintenance of risk assessments</p> <p>46. Monitoring of corrective actions related to the risks</p>	<p>The goal of risk management is to prevent possible risks that cause accidents and losses from occurring (Fatemi et al., 2002). Succeeding in a competitive market requires quality risk management (Tse et al., 2019). Ellegaard (2008) points out that usually SMEs plan their operations defensively to manage risks. Thun et al. (2011) report that SMEs take more corrective measures than invest in prevention. Training to reduce the</p>

		47. Reducing risks to operations/ products	level of risk is a significant weakness in SMEs (Sukumar et al. 2011). Risks must be identified and managed with systematic measures and monitoring (Falkner et al. 2015). Risk management has been increasingly emphasized in planning attention and a separate ISO 31000 standard has been developed for its systematic implementation.
Stakeholder Management	Frooman, 1999; Berman et al., 1999; Whysall, 2000; Preble, 2005; EFQM, 2019.	48. Stakeholder identification 49. Identification of stakeholder expectations and requirements 50. Objectives to meet stakeholder requirements 51. Action plans to meet stakeholder requirements 52. Monitoring the implementation of stakeholder requirements	For the success of businesses, companies must be able to meet their stakeholders' expectations and requirements in an ethically sustainable way. According to Whysall (2000), stakeholders live and operate in growing networks as technology advances. In addition to striving to meet the stakeholders' expectations, companies need to ensure that their stakeholders act in a way that does not harm the company and its reputation. Poorly managed stakeholder management can lead to financial losses or a decline in a company's valuation in a tightening market (Preble, 2005).
Digitalization	Kotarba, 2017; Muro et al., 2017; Parviainen et al., 2017; Joensuu-Salo et al., 2018; Meissner, 2018; Martín-Peña et al., 2019.	53. Exploiting the opportunities offered by digitalization 54. Digitalization and shop floor management in operating and developing internal processes through digitalization 55. Level of utilizing digitalization 56. Identification of stakeholder requirements in the field of digitalization	Digitalization has been identified as an opportunity to meet the challenges of improving productivity while offering SMEs flexible operating models to meet customer needs (Dutta, Kumar, Sindhvani and Singh (2021). The European Commission has also emphasized the important role of digitalization. Alongside process-like operations, it is essential to develop digitalization and take advantage of the opportunities it brings to achieve the desired level of performance (Kotarba, 2017). Parviainen et al. (2017) state that digitalization is one of the key tools for improving performance and provides new business opportunities. According to Yosufzai and Siddiqui (2023), digitalization improves TQM performance by increasing organizational flexibility.
System Deployment	Jeroen et al., 2001; Gotzamani et al., 2002; Hansson et al., 2002; Chow-Chua et al., 2003; Terziowski et al., 2007; Zink, 2007; Poksinska et	57. Adherence to ratified practices 58. Effectiveness of the implementation	All companies do not obtain the desired results with TQM (Hansson et al., 2002). One reason is the poor implementation of the TQM procedures. Zink (2007) reports a lack of commitment and

	al., 2006; Zeng et al., 2007; Prajogo et al., 2012; Mosadeghrad, 2014.	of agreed practices 59. Monitoring compliance with ratified practices 60. Effectiveness of practices 61. Staff awareness of the importance of adherence to practices	poor management involvement as well as poor strategic vision as reasons for failure. Mosadeghrad (2014) cites a poor TQM plan and a poorly designed deployment process as reasons for failure.
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Regarding RQ 2, “How does certification affect TQM?”, the functionality of the dimensions described above was investigated in certified and uncertified companies. Findings showed that when forming one group of all the participating companies, the certification had a statistically significant effect on the following dimensions: Customer Orientation, Processes, Risk Management, Continuous Improvement, and Digitalization. When comparing the effects of certification in industrial companies, it was found that certification had a statistical effect on the following dimensions: Customer Orientation, Personnel, Processes, and Continuous Improvement. Considering only service companies, it is found that certification has no effect on any TQM dimension. When forming a comparison group of small (5–49 employees) companies, it is found that certification has a positive effect on Processes and Continuous Improvement. In medium-sized companies (50–250 employees), certification has no effect on any TQM dimension.

In addition, the results of the study show that certification has modest effects on different types and sizes of companies. In industrial companies, certification had a positive effect on four dimensions, but in service companies, certification had no effect on the examined dimensions. When classifying companies according to size, certification had an effect on two dimensions in the size category 5–49 employees; however, in larger companies, certification did not affect any dimension. Thus, the research does not provide an all-encompassing unequivocal answer about the effects of certification on TQM. Consequently, company managers should not rely too much on the positive effect of certification but identify the dimensions relevant to their own business, focus on their functionality, and ensure the effective implementation of all agreed procedures.

4.2.2 What are the effects of TQM on the economic dimension of sustainability performance?

Publication III was intended to investigate the effects of traditional TQM and control variables on the profitability of SMEs. In addition, the study investigates whether the new TQM dimensions, that is, Risk Management, Digitalization, Stakeholder Management, and System Implementation, facilitate the impact of traditional TQM dimensions on profitability.

The final result of the study showed no direct relationship between TQM dimensions and profitability. Subsequently, the relationship between new dimensions and traditional TQM was investigated. The results showed the following:

A statistically significant relationship exists between the TQM dimensions of Continuous Improvement and Risk Management. Risk Management and profitability also have a statistically significant relationship; thus, Risk Management facilitates the relationship between Continuous Improvement and company profitability.

A statistically significant relationship exists between the TQM dimensions of Personnel and Digitalization, but the latter has no significant relationship with company profitability; thus, Digitalization does not facilitate the relationship between TQM dimensions and firm profitability.

The TQM dimensions of Management/Leadership, Customer Focus, and Continuous Improvement have a statistically significant relationship with Stakeholder Management. There is also a statistically significant relationship between Stakeholder Management and profitability; thus, Stakeholder Management facilitates the relationship between Management/Leadership and company profitability, Customer Focus and company profitability, and Continuous improvement and company profitability.

The TQM dimensions of Management/Leadership, Processes, Procurement and Materials, Products and Services, and Continuous improvement have a statistically significant relationship with the dimension of System Deployment. However, System Deployment is not significantly related to firm profitability; thus, the results do not support the idea that System Deployment facilitates the relationship between TQM dimensions and company profitability.

The results show that traditional TQM does not have a statistically significant effect on the company's profitability. The new dimensions facilitate the relationship between traditional dimensions and profitability in such a way that Risk Management facilitates the relationship between Continuous Improvement and profitability. Stakeholder Management facilitates the relationship between Management/Leadership, Customer Focus, Continuous Improvement, and profitability. Digitalization and System Deployment do not facilitate the relationship between traditional TQM and profitability.

4.2.3 What are the effects of TQM on the environmental dimensions of sustainability performance?

Publication IV aimed to find out which factors of soft TQM affect the environmental sustainability of Finnish SMEs, taking into account the company's business, company size, and possible management system certification. The study shows that soft TQM affects environmental sustainability as follows. Business management systems and HR practices positively affect environmental sustainability. Notably, Constantly evolving

processes, Advanced procurement procedures, Stakeholder identification, and competitive products do not affect environmental sustainability.

4.2.4 What are the effects of TQM on the social dimension of sustainability performance?

Publications II and IV focus on reporting the impact of TQM on social sustainability. In this research, social sustainability refers to all issues related to people in the hands of a company, such as equality, treatment of personnel and customers (their satisfaction), and compliance with labor legislation.

The results of Publication II show that among the following TQM dimensions, Customer Orientation and Product Management affect customer satisfaction. The TQM dimensions of Management/Leadership, Customer Orientation, Personnel Management, and Risk Management affect personnel satisfaction. The results show that the dimensions of Customer Orientation and Risk Management have a negative effect on employee satisfaction. Notably, the control variables do not affect customer satisfaction and personnel satisfaction.

The results of Publication IV show the effect of TQM on overall social sustainability. According to the results, Business management systems positively affect social sustainability. However, HR practices, Constantly evolving processes, Advanced procurement procedures, Stakeholder identification, and competitive products do not affect social sustainability.

5 Discussion

TQM dimensions and the impact of certification on them

Numerous previous studies (e.g., Kaynak, 2003; Hansson and Eriksson, 2002; Kumar et al., 2009; Sadikoglu and Zehir, 2010; Valmohammadi, 2011; Al-Dujaili, 2013; Gupta et al., 2023) have reported that TQM has a significant impact on the performance and well-being of companies. However, no consensus exists on TQM content and its implementation (Calvo-Mora et al., 2020; van Kemenade and Hardjono, 2019). Based on the above, the research was determining TQM content, taking into account its traditional dimensions, EFQM content, the requirements of the quality standard, and the procedures highlighted in the literature that are missing from traditional TQM. When considering traditional TQM studies, findings showed that the most common dimensions used were Management/Leadership, Customer Focus, Personnel, Processes, Procurement and Materials, Products, and Continuous Improvement. When considering the EFQM criteria and other studies investigating performance, findings show that traditional TQM does not take into account important elements of TQM, such as Risk Management, Stakeholder Management, Digitalization, and System Deployment.

However, according to Modgil and Sharma (2017), the matter has been clarified by introducing quality award criteria. Moreover, the certified ISO 9001 quality system can be considered as the first step toward TQM implementation (Biazzo and Bernardi, 2003). Nowadays, this idea is also supported by the observation that the 2015 quality standard update brings even more TQM elements to the certified systems (Pelantová and Šlaichová, 2017). Consequently, the impact of certification on company performance and responsibility must be part of the research. To illustrate the results, the effects of the certification are tabulated in Table 9 by company group.

Table 9. The impact of certification on TQM dimensions in SMEs

Dimension	All companies	Industrial companies	Service companies	Small companies (5–49)	Medium size companies (50–250)
Management/Leadership					
Customer Focus	(*)	(**)			
Personnel		(*)			
Process	(**)	(*)		(**)	
Procurements and Materials					
Product/Service					
Risk Management	(*)				
Continuous Improvement	(**)	(*)			

Stakeholder Management	
Digitalization	(*)
System Deployment	

Significance: * $0.01 < p \leq 0.05$; ** $0.001 < p \leq 0.01$; *** $p \leq 0.001$

Considering all the companies that participated in the study, findings show that certification has an impact on the dimensions of Customer Focus, Process, Risk Management, Continuous Improvement, and Digitalization. This result is expected because Customer Focus, Process, Risk Management, and Continuous Improvement are key parts of the ISO 9001 standard. Digitalization has been raised as an essential factor for improving performance (e.g., Kotarba, 2017; Muro et al., 2017; Joensuu-Salo et al., 2018; Meissner, 2018; Martín-Peña et al., 2019; Dutta et al., 2021; Yosufzai and Siddiqui 2023). This result may be because the ISO 9001 standard emphasizes the importance of collecting information, and the certifiers can pressure companies to constantly improve procedures; in such cases, companies think that there is plenty of room for improvement in the existing procedures. When there is no such external pressure in uncertified companies, a view on the issue is formed based on internal opinions. Notably, internal opinions may be over-optimistic and lead to the fact that important development targets for the company are not even identified in the matter in question.

The results of industrial companies show that certification has a statistically significant effect on the dimensions of Customer Focus, Personnel, Process, and Continuous Improvement. Surprisingly, certification has no effect on the dimension of Risk Management, even though this dimension was included as a new requirement in the latest update of the standard in 2015. Consequently, Risk Management is assumed to work more effectively in certified companies than in uncertified companies. This observation raises the question of the level and accuracy at which certifiers examine companies' systems.

In small companies, certification has a statistically significant effect only on the Process dimension (Rahman, 2000). However, certification has surprisingly no effect on other dimensions in small companies. As Lopez-Perez et al. (2017) have stated, it is easier for large companies to acquire the resources needed for development. Consequently, especially in small companies, the requirements of certification, performance of audits, and writing deviations would significantly affect the level of TQM dimensions, because implementing them is not the normal activity of small companies.

In service companies and medium-sized (50–250 people) companies, certification has no effect on the selected TQM dimensions. Medium-sized companies may already have their own resources to develop their operations, and if the certifier approaches the companies in question with the minimum requirements of the standard, the latter would have already developed their operations beyond these requirements, and certification has no effect on

the procedures of the companies in question. For service companies, the likely answer to the fact that certification has no effect on TQM dimensions is that the certifiers are satisfied with the modest procedures that service companies have already achieved due to the competitive situation.

The results show that certification does not affect the dimensions of Management/Leadership, Procurement and Materials, Products, Stakeholder Management, and System Deployment in any company group. It is worrying that certification does not affect the Management/Leadership dimension, even though the standard according to which the ISO 9001 certificate is applied is called the quality management standard. The reason that certification does not have a positive effect on the Management/Leadership dimension may be that there are plenty of supported development projects in Finland that aim to improve performance but do not necessarily lead to certification.

The certification also has no effect on the Procurement and Materials dimension in any company group. The quality standard (ISO 9001) requires certified companies to provide evidence of supplier evaluation and reevaluation according to defined criteria; however, the outsourced processes must be of high quality. The companies may survive the certification requirements by justifying to the certifier that no complaints have been written to the suppliers; thus, the procedures related to the purchase and purchased products are sufficient. This would result in certification having no effect on this dimension in any business group.

According to the study, certification does not seem to have an effect on the Products/Services dimension in any company group. This is surprising because the quality standard ISO 9001 emphasizes the delivery of products/services to customers that meet customer requirements. It was difficult to imagine that uncertified SMEs would reach the quality level of certified companies in the abovementioned matters if the latter had effectively implemented standard requirements. This leads to the idea that companies can get a certificate with poorly implemented procedures that do not improve their performance (e.g., Poksinska, 2010).

According to the study, the certification of the Stakeholder Management dimension also has no effect, even though the dimension in question is connected as part of the latest ISO 9001 standard update. The mentioned update requires identifying the essential stakeholders of the company and their requirements. However, the update does not require the company to have any kind of action program to meet the stakeholders' requirements, and it does not even require monitoring the achievement of the requirements. Thus, the requirement in question does not trigger measures for companies that want the certificate with minimal effort.

The result that the certification does not have a statistically significant effect on the dimension of System Deployment is very surprising considering the situation where the certifiers' task is to ensure the compliance of the prepared procedures with the standard

and that the company follows the prepared procedures. The result leads to the idea that the certificate can be obtained by describing existing procedures, without changing the quality and practical implementation of these procedures (Poksinska, 2010).

Several conclusions can be drawn from the results of the study. First, the result may mean that uncertified Finnish SMEs have very little self-criticism toward their own activities; the companies think that the introduction of all agreed procedures is sufficient and, therefore, development opportunities may go undetected. However, in certified companies, the improved procedures are not optimally utilized, and they are critical for the implementation in certified companies; thus, the assessments of certified and uncertified companies on the level of implementing the procedures converge. Third, certifiers do not examine the introduction of procedures in depth but issue certificates to companies whose procedures are not put into practice. However, it is clear that even if companies have good procedures, if they have not been effectively implemented, their impact on the company's performance will be modest. Consequently, the efficient implementation of the system is emphasized by, for example, Gotzamani et al. (2002), Chow-Chua et al. (2003), Terziovski and Power (2007), Jeroen et al. (2001), Poksinska et al. (2006), Zeng et al. (2007), and Prajogo et al. (2012).

The impact of TQM on the company's sustainability performance

As the first dimension of sustainability performance, the research investigated the effect of TQM on the profitability of Finnish SMEs. The results show that traditional TQM dimensions do not have a direct positive effect on profitability; thus, it differs from the results of previous studies such as Valmohammadi (2011), Barker and Cagvin (2013), and Boulter et al. (2013) and Gupta et al. (2023). One particular reason for this result was identified as certified companies (39% in the survey). In these companies, the procedures are excellent, even though the auditor only verifies the existence of the required procedures without making a statement about their effectiveness and impact on profitability. These beliefs can lead to a situation where the quality of the practices of a poorly profitable firm can be overestimated. This misunderstanding can, in turn, lead to a situation where management overestimates the company's practices, even though they do not improve its profitability at all.

Examining whether the dimensions of extended TQM facilitate the impact of traditional TQM on profitability, Risk Management is found to facilitate the relationship between Continuous Improvement and profitability. Risk Management supports the achievement of profitability because according to Moore, Culver, and Masterman (2000), its purpose is to minimize the financial losses experienced by companies. However, properly implemented continuous improvement can reduce the probability of the risks identified in risk assessments. Properly functioning risk management requires systematic operating models (Falkner and Hiebl, 2015). Successful risk management can lead to effective continuous improvement.

Stakeholder Management facilitates the relationship between Management/Leadership and company profitability, Customer Focus and company profitability, and Continuous Improvement and company profitability. The study shows that the dimension of Stakeholder Management has a significant impact on the company's profitability via several TQM dimensions. This observation is also supported by Preble (2005), who states that poorly managed stakeholder relations have a negative impact on the company's profitability. In addition, with the help of well-implemented Stakeholder Management, companies can get the best benefit from the practical implementation of management (Mehmood, Qadeer, and Ahmad, 2014), identification of customer needs and implementation of requirements (Sila, 2007) and effective implementation of development projects to support profitability (Talib et al., 2013; Mehmood et al., 2014). The result of the study on the broad impact of Stakeholder Management on profitability is significant because it shows that companies cannot afford to turn inward but must act as an active part of the operational network formed by their stakeholders to ensure the growth of their own profitability. It is expected that the requirement of Section 4.2 of the ISO 9001 standard for understanding the needs and expectations of stakeholders and the guidelines of Criterion 3 of EFQM will start to produce results in the future. However, this requires that companies and certifiers are not satisfied with just listing stakeholders and their requirements, but companies should have action plans to meet the requirements and metrics that help monitor the progress of meeting such requirements.

Digitalization does not facilitate the relationship between traditional TQM dimensions and profitability. The result contradicts previous studies such as Abou-Foul, Ruiz-Alba, and Soares (2020) and Kharlamov and Parry (2020); Dutta et al. (2021) and Yosufzai and Siddiqui (2023) as the understanding of digitalization in Finnish SMEs may vary greatly. Companies that have started using digitalization recently may think that they are excellent users because their knowledge of the possibilities is incomplete. Companies that have been using digitalization for a longer period understand that the possibilities are almost limitless, and they still have plenty of work to do in utilizing digitalization. This bias can lead to a situation where a company that is starting to utilize digitalization values the quality of its procedures higher than a company that is already well-advanced in utilizing the possibilities of digitalization. The situation in question means that the level of implementation of digitalization-related procedures by companies varies, either due to ignorance or indifference; thus, the realization of digitalization-related benefits is at an insufficient level in Finnish SMEs. This is something that SME managers should focus on in the future.

This study shows that System Deployment has a direct connection to the traditional TQM dimensions Management/Leadership, Processes, Procurement and Materials, Products/Services, and Continuous improvement. However, System Deployment does not facilitate the relationship between TQM dimensions and profitability. According to this study, the System Deployment dimension has no impact on profitability and does not support traditional dimensions to achieve better profitability. This result contradicts previous studies that emphasize the importance of System Deployment for TQM effectiveness (Oakland, 2011; Kumar et al., 2009; Corredor and Coni, 2010;

Valmohammadi, 2011). This finding leads to the assumption that the management of SMEs assumes that the procedures are well implemented after they have been agreed upon once. This idea can also be supported by certification, after which everything is assumed to work without deviations when the system has been externally audited. This result reveals a very dangerous flaw in Finnish SMEs. Company managers should be very critical when evaluating the company's operating methods, and in all projects, the level of implementing changes and the impact of changes on profitability should be reviewed. Nowadays, several development projects that even receive various subsidies are being carried out in SMEs, but their impact on profitability has not been investigated.

Economical sustainability is the lifeblood of all companies (Dyllick and Hockerts, 2002). However, nowadays, companies cannot ignore the environmental factors and social aspects related to their operations environmental (Fangqi, Irfan and Baloch 2023) and social aspects (Dyllick and Hockerts, 2002). This joining of economy, environment, and sociality is called TBL thinking (Shahzad et al., 2020; Tseng et al., 2015; Hussain et al., 2018; Vifell and Soneryd, 2012). According to previous studies (e.g., Aboelmaged, 2018; Bakos et al., 2020), issues related to management have an impact on both environmental and social sustainabilities. In addition, Ooi (2014) and Chen et al. (2020) reported on the effectiveness of TQM in developing sustainability performance; thus, the result obtained in the study shows that soft details related to management and personnel have a connection with environmental sustainability, and soft details related to management affect social sustainability is in line with previous studies. Based on the above, regarding the procedures related to management, the result is expected, because the company management has all the tools at its disposal to guide the company in the desired direction. Managers of SMEs should pay even more attention to this issue because they are the ones who show the direction of the company's development.

As already stated earlier, previous studies have found that TQM has a positive effect on personnel satisfaction (Boselie and van der Wiele, 2001; Ooi et al., 2008; Nourae, 2014; Kabak et al., 2014; Arunachalam and Palanichamy, 2017; Al-Damen, 2017), and customer satisfaction (Beheshti and Lollar, 2003; Terziovski and Power, 2007; ul Hassan et al., 2012; Topalovic, 2015), which are essential issues in social sustainability.

Regarding personnel satisfaction, the research shows that management/leadership support and personnel development are positively related to personnel satisfaction. However, Customer Focus and risks of the operation, are negatively related to personnel satisfaction. The observation is quite understandable because the dimension of Management and Leadership, Personnel Management, and Risk Management has a direct connection to the staff's experience of how they are managed, how they are taken into account, and how the company prepares for its risks, which affects the staff's sense of security. Emphasizing Customer Focus in SMEs may lead to a situation where personnel feel they have to implement overservice or overquality to ensure customer satisfaction. The study also shows that increasing the level of Risk Management has a negative effect on personnel satisfaction, as the better the personnel are aware of the risks related to the company, the more insecure the personnel feel about its survival. These phenomena have

not been reported in previous studies, and company management must make sure that when developing the company's procedures, they support each other and do not cause backlash. Company management must also check that it has appropriate procedures and measurement capabilities to ensure that the various dimensions and measures have a positive impact on the results that are important to the company.

Customer Focus and product/service development, are positively related to customer satisfaction. As previously stated, good customer satisfaction is essential for the company, because it has the opportunity to lead to long customer relationships, and the company does not have to excessively use its resources to find new customers (Moshan et al., 2011; ul Hassan et al., 2012; Topalovic, 2015). The research results are quite reasonable, as it is assumed that customer satisfaction is influenced by the quality of the company's operations in the customer interface and the kind of products or services the company can produce for its customers. The result highlighted by the study is consistent with, for example, Ooi et al. (2010), ul Hassan et al. (2012), Topalovic (2015), and Wantara and Tambrin (2019). The dimensions affecting customer satisfaction were expected, but nine dimensions (Management/Leadership, Personnel, Processes, Procurement and Materials, Continuous Improvement, Risk Management, Stakeholder Management, Digitalization and System Deployment) were not found to have a positive effect on customer satisfaction, unlike, for example, Garcia-Alcaraz et al. (2019) and Jun and Cai (2010). The result shows that in terms of customer satisfaction in Finnish SMEs, TQM implementation may be superficial; companies miss out on a significant amount of profit potential, taking into account the knowledge that customer satisfaction has an impact on long-term customer relationships and, thus, on the profitability of companies (Yeung et al., 2002; Wang et al., 2004; Moshan et al., 2011).

One of the reasons that only management and personnel-related dimensions are connected to social sustainability in SMEs may be that stakeholders and larger client companies do not set requirements for SMEs to implement sustainable business; thus, companies lack external pressure to focus on the matter in question (Cassells and Lewis, 2011). The absence of external pressure may be the reason that even continuous improvement does not have a statistically significant effect on environmental or social sustainabilities, although, for example, Mehralian et al. (2016) specifically state that continuous improvement allows a company to develop its operations taking into account the requirements of customers and stakeholders. However, companies have to think about their operations in an economic sense, and it can be difficult for SMEs, in particular, to see the benefits of measures aimed at sustainability after the so-called easy measures have been taken (Madsen and Ulhøi, (2016).

6 Conclusions

This study aimed to increase understanding of "How to manage sustainability performance through the TQM of SMEs." The research includes related publications, and based on the results, a reasoned view of the impact of TQM and certification of Finnish SMEs on the companies' personnel satisfaction, customer satisfaction, and financial, environmental, and social sustainability. The study dealt with TQM much more extensively than previous studies. To carry out the research, the essential TQM dimensions and their content were determined for SMEs.

The research brings several new perspectives to the TQM and sustainability literature. First, it justifiably expands TQM content and is not satisfied with dealing with the issue through old, pre-established perspectives. Second, the study shows how the dimensions of extended TQM support traditional TQM in improving profitability. Third, the research shows the priorities of TQM that have a significant impact on environmental and social sustainability. Fourth, the study shows the effects of certification, the company's branch (industry/service), and its size on TQM elements and sustainability performance.

Fifth, the study provides foundational support for TQM and sustainability studies from various established theories. In the future, businesses are likely to increasingly network, leading to operations influenced by Resource Dependence Theory, as described by Jiang et al. (2023). However, such activity does not commence or expand without guidance; rather, it necessitates dynamic capabilities for support, as described by Arranz et al. (2020) and Tran (2022). These capabilities enable effective implementation of innovations and TQM.

Theoretical implications

This study gathers together numerous traditional views on TQM and adds to them the latest views raised in the literature on priorities related to company development, taking into account the issues highlighted by EFQM and the renewed quality standard ISO 9001. Thus, the study creates a reformulated perspective on TQM and serves as an excellent basis for matters related to the development of SMEs. The research forms a comprehensive and innovative overall picture of the priorities that SMEs should utilize when developing their operations and highlights the influencing factors of soft TQM when investing in sustainability performance. With its comprehensiveness, the structure of this study also serves future studies that show a desire to renew the traditional TQM structure that has been in use for decades.

The research opens completely new perspectives on the impact of different things, focusing on sustainability performance. For example, previous studies emphasize the importance of the ISO 9001 system to company performance. This study shows that the certified ISO 9001 system in Finnish SMEs has no effect on economic, environmental, and social sustainability. It is interesting to observe how modest the impact of certification

is on matters relevant to the company's performance and sustainability. This may be due to the previously reported observation that continuous improvement has remained low even after certification (Dick, 2000; Terziovski and Guerrero, 2014; Shafiq et al., 2014). This study opens a new perspective for both business managers and researchers to look at sustainability performance, combining the requirements of traditional TQM, EFQM, ISO 9001 and the effects of certification for companies. The research forms a comprehensive view of developing companies, which company managers, researchers and consultants can use when looking for the most effective operating models for companies.

Managerial implications

The study gives company managers a comprehensive summary of possible investment targets when they are considering measures to develop sustainability performance. The study emphasizes that there are no shortcuts to achieving results, but the company management must ensure the implementation level of all development measures. The company itself is responsible for the quality of the development work, and it cannot be outsourced to, for example, consultants or auditors. It is particularly dangerous to imagine that a certified quality system would automatically increase the efficiency of the company's operations and improve the level of sustainability performance. With regard to the development measures, company management should plan detailed action programs, monitoring systems, and metrics that can reliably determine the real impact of possible changes.

Company management must consider the effects of management and personnel-related issues on environmental sustainability, social sustainability, and employee satisfaction. In addition, the management should react to the information that the essential elements of customer satisfaction are Customer Focus and Product Management. When the management examines the processes of their company, they must also understand the significant role of Risk Management and Stakeholder Management in developing the company's performance. The importance of the issues in question is great because research shows that Risk management facilitates the relationship between Continuous Improvement and profitability, and Stakeholder Management facilitates the relationship between Management/Leadership and firm profitability, Customer Focus and firm profitability, and Continuous Improvement and firm profitability.

Looking at the results of the research from the perspective of both companies and society, taking into account the TBL approach of TQM, it can be stated that TQM has not been implemented comprehensively and deeply in Finnish SMEs. This leads to inefficiency in the use of resources and does not allow maximum results when developing functions and at worst gives an advantage to competitors. Only company management has a direct influence on eliminating this problem.

Limitations

The study contains several limitations, some of which may be the subject of future studies. First, data were collected from Finnish SMEs. Thus, the details are not internationally comparable, as the quality culture of companies and the quality awareness of company managers may vary in different countries. Thus, if such comparability is desired, a similar study should also be carried out outside of Finland. Another limitation concerns the companies studied. Companies are most likely at different levels in applying TQM. This may cause a phenomenon where companies at the beginning of development consider themselves as already advanced users of TQM, while companies that have been applying TQM for some time have found that there is still a long way to go to excellence. Biases related to this understanding of companies' TQM may cause inconsistencies in companies' responses. To eliminate this problem in further studies, companies should be grouped according to their TQM levels, which would improve the comparability of the results. Third, the social sustainability and environmental sustainability of companies can include many details, some of which work at an acceptable level, but the implementation of other factors needs improvement. In these situations, the respondents had to take a stand on the overall functionality, which could lead to differences in evaluating the respondents. To eliminate this problem, the realization of social and environmental sustainabilities should be evaluated as pre-defined entities; in such cases, the final result of the evaluation could be more uniform.

Furthermore, since this study is designed to be carried out from a quantitative perspective, it may cause limitations on interpreting the final results. Therefore, incorporating qualitative and potentially mixed methods could broaden the study's perspective. This point can also serve as a recommendation for further research, which will be discussed in the following section.

Suggestions for further research

Not all the results of this study are in line with previous studies carried out in other countries. A very large deviation from previous literature is caused by the impact of certification (ISO 9001) on company performance. Previous studies emphasize the positive effect of certification, but based on this study, the effect of certification in Finnish companies is non-existent. In the future, it would be interesting to understand whether certified companies leave the development work at such a level that it meets the minimum requirements of certification or whether there are operational models in Finland that raise the level of the processes of uncertified companies to the same level or higher than those of certified companies. Such operating models can be, for example, low-cost operational development subsidies aimed at SMEs.

The application of TQM at different levels by companies should be raised as a second research target for the future. For the optimal comparability of the results obtained from the survey, the researchers should gather the companies based on the level of application

of TQM into, for example, three groups. Such actions would provide more understanding of how the level of TQM application affects sustainability performance and to what extent the company's own opinions about such levels affect the end result. This study would also reveal possible reasons why System Deployment's impact is less than expected for SMEs' sustainability performance development.

Third, in the future, we should investigate the reasons why, according to this study, the effect of Digitalization, which is widely emphasized today, is small in Finnish SMEs. The reason for this unexpected result may be that, especially for SMEs, the term digitalization can mean completely different things, and company managers may not have understood the opportunities offered by digitalization. In this case, even modest operating models may receive excellent evaluations from the management. A case-by-case investigation of the matter in question would require case studies in pre-selected companies.

This study has focused on the interactions between TQM and sustainability performance, but the fourth future research target is the identification of mechanisms that significantly affect sustainability performance outside of TQM and the evaluation of the mutual influence of these mechanisms.

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Publication I

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**The impact of certification on the elements of TQM exploring the influence of
company size and industry**

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QUALITY PAPER

The impact of certification on the elements of TQM exploring the influence of company size and industry

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Abstract

Purpose – This study examines whether certification improves the dimensions of total quality management (TQM) and whether the impact of certification is similar across companies of different sizes and industries. The benefits of certification for companies have been widely discussed in recent years. The general debate has been partly marked by the dispute about whether companies will benefit more from certification or the implementation of TQM. This debate has led to numerous studies on the benefits of certification; however, few studies simultaneously have examined traditional TQM issues and the requirements of the new quality standard, ISO 9001:2015, as well as the updated European Foundation for Quality Management (EFQM) criteria.

Design/methodology/approach – This study was conducted via a survey of Finnish SMEs and covered both industrial and service companies. The study comprehensively compared industrial companies with service companies and small companies with medium-sized companies.

Findings – In industrial and small enterprises, certification clearly has a positive effect on the dimensions of TQM, but a similar effect was not observed in medium-sized enterprises or in the service sector.

Originality/value – This is one of the first studies to examine the effect of certification on TQM in different types of SMEs while simultaneously considering EFQM and ISO 9001:2015 in Finland. The significant originality of this research lies in the formation of a comprehensive research framework for the dimensions of TQM.

Keywords Total quality management, TQM, Certification, EFQM

Paper type Research paper

Introduction

Numerous studies in the field of total quality management (TQM) practices have indicated a positive effect of these practices on the performance of companies (Ahire *et al.*, 1996; Adebajo and Kehoe, 1999; Kaynak, 2003; Hanson and Eriksson, 2002; Sadikoglu and Zehir, 2010; Al-Dujaili, 2013). Despite the continuous development of TQM research and the abundant literature in the field of TQM practices, the concept of TQM has not been defined in detail and compared with other performance-related procedures. For this reason, the latest research trends concerning quality management have focused on defining the paradigms and perspectives of TQM in order to intensify the academic debate and open new research lines to clarify the theoretical foundations of quality management and contextualize the findings obtained (Calvo-Mora *et al.*, 2020; van Kemenade and Hardjono, 2019). When considering prior studies, it can be recognized that the concept of TQM consists of various factors and forms and needs to be reorganized.



Therefore, this study was first accompanied by a comprehensive literature review to determine the basic factors of TQM. This was followed by the supplementation of the original factors with additional elements that emerged from the literature that were observed to influence the performance of companies. This extension means that the study fully covers not only the traditional TQM elements but also the requirements of the European Foundation for Quality Management (EFQM) and quality standard ISO 9001:2015. In this study, traditional TQM practices were extended to include stakeholder management, the use of digitalization, risk management and a review of the effectiveness of the implementation of ratified procedures. Stakeholder management and risk management are requirements of both the quality standard and EFQM. Also, [Polese et al. \(2019\)](#) emphasize stakeholder engagement and commitment because TQM includes building an environment in which all parties work to improve performance. Committing employees alone to improving performance is not enough, as customer focus and long-term supplier relationships also must be taken into account when improving quality. The promotion of digitalization is viewed as an important development throughout the EU, and the deployment of agreed-upon procedures is one of the issues to be ensured in certification. It also has been found that the new quality standard, ISO 9001:2015, places less emphasis on documentation, and more emphasis on stakeholder management, risk-based thinking and data management should help move toward TQM ([Fonseca, 2015](#)). Thus, ISO 9001 system certification could be expected to impact TQM dimensions.

Prior studies, such as [Biazzo et al. \(2003\)](#), have suggested that certification could be a first step toward TQM. Thus, this study will focus on the effects of certification on the dimensions of expanded TQM. This issue is relevant because even if companies are forced to apply for certification due to their customer requirements, in other words external motivation, they can still plan to develop their system placing the greatest emphasis on internal performance (i.e. internal, company-driven motivation). [Castillo-Peces et al. \(2018\)](#) have shown in their studies that internal motivation for the implementation of the ISO 9001 system produces a better outcome in terms of performance than external motivation. It has been demonstrated that TQM plays a significant role in firm performance ([Dubey and Gunasekaran, 2015](#); [Ahmed and Idris, 2020](#)). TQM's success and its organization-wide acceptance essentially are influenced by managerial commitment, which affects organizational diffusion of TQM through acceptance, routinization and assimilation ([Dubey et al., 2018](#)). Due to TQM's complexity and indeterminacy, it is necessary to examine how TQM performance can be maximized and whether certification, described as the first TQM step, impacts TQM dimensions' effectiveness.

The benefits of certification have been thoroughly discussed, and several studies have been conducted. For example, [Leung and Chan \(1999\)](#) showed the general benefit of the certificate, [Shafiq et al. \(2014\)](#) reported the positive impact of certification on firm profitability. [Gotzamani and Tsiotras \(2002\)](#), in turn, suggested that certification provides operational benefits to a company. Several studies have shown that ISO 9001 certification had positive effects on the performance of companies through various functions. While some studies suggest the positive impact of certification on management, image and quality culture ([Douglas et al., 2003](#); [Padma et al., 2008](#); [Gotzamani and Tsiotras, 2002](#)), others highlight that certification improves the efficiency of processes and supply chains ([Fernandes et al., 2017](#); [Georgiev and Georgiev, 2014](#); [Santos and Millán, 2013](#)). Additionally, working methods have been clarified due to certification. For example, the effects of certification on customer requirements identification, customer quality, customer satisfaction and management of the entire customer focus have been emphasized in many studies ([Zuckerman, 1995](#); [Caro et al., 2009](#); [Gotzamani and Tsiotras, 2002](#); [Padma et al., 2008](#); [Santos and Millán, 2013](#)). [Aba et al. \(2016\)](#) studied ISO 9001 certification's economic impact on US companies over a five-year period. Their study included companies' status a year before certification, during certification and three years after certification. Their research shows that certified companies' performance is better than that of non-certified companies throughout the study period. The researchers assumed that

certified companies' better performance compared with non-certified companies a year before certification is due to companies' implementation of TQM procedures.

The positive effects of certification on personnel, such as personnel management, training and employee competency, have been reported in prior studies (Curkovic and Pagell, 1999; Padma *et al.*, 2008; Zuckerman, 1995; Casadesús *et al.*, 2001). Additionally, improvements in supplier cooperation after certification have been observed (Georgiev and Georgiev, 2014; Prajogo *et al.*, 2012; Leung and Chan, 1999), as well as impacts on continuous improvement (Padma *et al.*, 2008; Santos and Millán, 2013). According to Santos and Millán (2013), the effect of certification on continuous improvement is the most important of the observed effects. However, Sciarelli *et al.* (2020) state that to ensure the implementation of a quality system, a comprehensive and value-based TQM framework should be designed that includes a mission and objectives to address performance goals.

Since ISO 9001 certification has gained a very strong foothold worldwide, as evidenced by the more than 880,000 certifications completed by the end of 2019 (ISO Survey), the question arises whether certification improves the expanded dimensions of TQM and whether the impact of certification is similar across companies of different sizes and industries. In light of this uncertainty, study aimed to examine the significant differences between certified and uncertified companies with respect to their success in the expanded dimensions emphasized by TQM in various contexts, such as industry and company size.

Definitions of key concepts

Certification

Certification means conformity assessment. Often, requirements are set out in the standards that guide companies toward achieving certification. The focus of certification might be, for example, rebuilding the entire management system in accordance with the ISO 9001 quality standard. The purpose of SFS-EN ISO 9001 certification is to increase trust in the organization's products and services and to increase trust throughout the supply chain. In a certification audit, the certification body assesses whether the object to be certified meets the certification requirements. After the requirements have been satisfied, the certification organization admits confers a certificate on the company, which shows that the organization meets the criteria used in the assessment. The validity of certification requires reassessments and periodic re-certification. (FINAS, 2016; SFS -EN ISO 19001, 2018).

TQM

TQM means total quality management; it consists of several parts and is generally thought to be a "management philosophy and mindset". It is perceived to develop organizations into world-class companies. TQM is said to help organizations that want to improve customer satisfaction, reliability, productivity and market share (Sharma and Gadenne, 2008). In the 1950s, Deming introduced the TQM quality philosophy adopted by the Japanese, which enabled Japanese manufacturers to make better progress in quality-related matters than American manufacturers (Fotopoulos and Psomas, 2008). With the success of the Japanese, American companies lost market share and investment in TQM expanded in the United States. The use of TQM received widespread attention, and by the late 1980s it had been implemented by numerous large American corporations (Powell, 1995 and Ahire *et al.*, 1996).

In contrast to certification, no common principles have been agreed upon for the implementation of TQM, and available guidance is quite vague (Gotzamani and Tsiotras, 2002). In order to outline TQM in this study, researchers' views on relevant issues related to TQM were sought from previous studies. The studies utilized were Tari (2005), Sila (2007), Zakuna *et al.* (2010) and Sadikoglu and Olcay (2014). Most views could be grouped under the following issues: management/leadership, data and reporting, customers, personnel,

Research	Management/ Leadership	Data and reporting	Customer	Personnel	Processes	Product/ service	Materials and suppliers	Continuous improvement	Other things
Saraph <i>et al.</i> (1989)	Role of top management, quality policy and quality department	Quality data and reporting		Training, Employee relations	Process management	Product/ service design	Supplier quality management		
Flynn <i>et al.</i> (1994)	Top management support	Quality information	Customer involvement	Workforce management	Process management	Product design	Supplier involvement		
Badri <i>et al.</i> (1995)	Role of top management, quality policy and quality department	Quality data and reporting		Training	Process management	Product /service design	Supplier quality management		
Powel (1995)	Top management commitment. Open and lean organization	Objectives and interest in data	Fulfilling customer requirements regardless of inputs	Training	Flexible manufacturing. Improving processes, Waste reduction. Efficiency		Ensure the supplier is able to produce the required products		TQM communication. Benchmarking. Zero mistake idea
Black and Porter (1985, 1996)	Corporate quality culture. Strategic quality management. External interface		Customer management. Customer satisfaction orientation	People management. Employee empowerment	Operational quality planning. Teamwork structures for process improvement		Supplier partnership	Quality improvement measurement systems. Communication of improvement information	
Ahire <i>et al.</i> (1996)	Top management commitment. Design quality management	Internal quality information usage	Customer focus	Employee involvement, training and empowerment	Statistical process control usage	Product quality	Supplier quality management. Supplier performance		

(continued)

Table 1.
Results of a literature
search on the content
of TQM

Table 1.

Research	Management/ Leadership	Data and reporting	Customer	Personnel	Processes	Product/ service	Materials and suppliers	Continuous improvement	Other things
Grandzol and Gershon (1998)	Leadership		Customer focus. Customer satisfaction	Employee fulfillment. Learning. Employee satisfaction	Process management	Product/ service quality		Continuous improvement	Internal/external cooperation. Public responsibility
Quazi <i>et al.</i> (1998)	Top management responsibility. Quality goals and policy. Role of the quality department	Quality data and reporting	Integrating customer requirements	Training. Role of the employee	Process management. Inspection policy. Quality related performance	Product/ service design	Partnership with supplier. Supplier selection and relationship. Supplier capability		
Rao <i>et al.</i> (1999)	Top management commitment	Quality information availability	Customer orientation	Employee training and involvement	Process design. Internal quality results	Product design	Supplier quality		External quality results. Quality citizenship
Yusof and Aspinwall (2000)	Management, leadership. Measurement and feedback			Education and training. Human resource development	System and process improvement tools and techniques		Supplier quality assurance	Continuous improvement process	
Parast <i>et al.</i> (2006)	Quality leadership. Strategic planning process of quality management	Quality information and analysis	Customer focus and satisfaction	Support of human resource development	Quality results. Quality assurance of products and services		Supplier quality		
Sila (2007)	Leadership	Information and analysis	Customer focus	Human resource management	Process management. Organizational effectiveness		Supplier management		Financial and market results
Sadikoglu and Olcay (2014)	Leadership. Strategic quality planning		Customer focus	Employee involvement. Training	Process management		Supplier quality management	Continuous improvement	Knowledge management

processes, product/service, material/suppliers and continuous improvement. The results are shown in Table 1. It can be seen from Table 1 that there was no consensus among the researchers on the content of TQM, as only the “Management/Leadership” column is represented in the views of each researcher.

In the twenty-first century, the division into soft and hard aspects has become more common in TQM. Vouzas and Psychogios (2007) stated that the above aspects are observable in several TQM definitions. Hard TQM can be understood as technical and refers to tools and techniques, while soft TQM can be understood as a more philosophical implementation of management models. Georgiev and Ohtaki (2019) state that soft TQM aspects are intangible and difficult to measure, while hard aspects are more like production techniques. Although in theory, the division seems simple, Vouzas and Psychogios (2007) stated that no consensus exists on how different things should be divided into soft and hard aspects.

Fotopoulos and Psomas (2008) present one solution by stating that aspects of soft TQM are long-term issues that need to be included in companies’ deployment plans for TQM projects. TQM’s hard aspects must support the exploitation of soft aspects. Fotopoulos and Psomas (2008) divided hard and soft aspects as follows:

- (1) Hard TQM: These include cause-and-effect diagrams, scatter diagrams, affinity diagrams, relationship diagrams, force-field analyses, run charts, control charts, quality function deployment, failure mode and effect analyses. According to the researchers, TQM’s hard aspects, which comprise different tools, cannot lead to desired results alone.
- (2) Soft TQM: These include commitment from top management, strategic quality planning, employee involvement, supplier management, customer focus, process orientation, continuous improvement, fact-based decision making and human resource development.

Fotopoulos and Psomas (2008) noted that for a company, soft TQM carries more weight than hard TQM and success in implementing continuous improvement, fact-based management and organizational involvement becomes particularly important.

The European Foundation for Quality Management (EFQM) model

Despite the fact that there is no consensus on the specific content of TQM, the European Foundation for Quality Management (EFQM) has developed a European multidimensional quality management model, the principles of which are derived from the TQM philosophy (Nabitz *et al.*, 2000), and it is the most widely used model in Europe for evaluating corporate TQM systems (Heras-Saizarbitoria *et al.*, 2011). The EFQM model is a set of systematically presented criteria that represent different organizational areas within firms (Ruiz-Carrillo *et al.*, 2005), and for this reason the EFQM model is better structured than traditional TQM. The EFQM model was updated in 2019 and is divided into three areas: direction, operation and results.

The EFQM model (2019) provides guidance for establishing a core mission, vision and strategy, as well as organizational culture, pioneering and leadership. Mission, vision and strategy are concretized into five tasks: (1) define the mission and vision, (2) identify and understand the needs of stakeholders, (3) perceive and understand the operating environment, the company’s capabilities and major challenges, (4) develop a strategy and (5) build a management system to guide the organization’s governance and performance. Organizational culture, pioneering and leadership are concretized into four tasks: (1) guide organizational culture and uphold values, (2) make all changes possible, (3) encourage creativity and innovation and (4) involve and engage stakeholders in the mission, vision and strategy implementation.

The operations of the EFQM (2019) model include stakeholder engagement, sustainable value creation, performance management and renewal. Stakeholder commitment is concretized into five target groups and tasks: (1) Customers—i.e. build sustainable customer relationships; (2) Personnel—i.e. attract and commit to develop and retain personnel; (3) Stakeholders who guide and regulate the economy—i.e. ensure and maintain ongoing support from these stakeholders; (4) Society—i.e. contribute to the development and mental and material well-being of society; and (5) Partner suppliers and subcontractors—i.e. build relationships and secure support for sustainable value creation. Creating sustainable value is concretized into four tasks: (1) assess design value and create value, (2) communicate and sell value, (3) produce value and (4) define and produce the overall experience. Performance management and renewal are concretized into five tasks: (1) direct performance and manage risks, (2) continuously assess the organization's readiness to meet future needs, (3) drive innovation and leverage technologies, (4) harness access to data and knowledge and (5) manage assets and resources.

The EFQM (2019) model includes the views of stakeholders as well as strategic and operational performance in its assessment of results. Thus, this study is a combination of a study of TQM, the factors of the EFQM (2019) model, and the studies presented in Table 2 related to risk management, stakeholder management, digitalization and systems deployment. A theoretical framework has been developed based on these components to study the effects of certification on the dimensions of TQM. The rationale for the theoretical framework is presented in the next section.

Theoretical framework

TQM dimensions

This section explains the TQM dimensions selected for this study. Prior studies of TQM classify the dimensions in a variety of ways. Thus, prior TQM studies were reviewed to determine the dimensions of TQM. A comprehensive framework was developed based on this review and describes the dimensions that TQM emphasizes in order to achieve higher performance. The TQM dimensions selected for the study and their identification are presented in Table 2.

Impact of certification on the TQM dimensions

As previously discussed in the background of the study, it has become clear that many studies have been carried out on certified quality systems. A wide range of benefits have been reported, and since this study compares the status of factors affecting the performance of certified and uncertified firms, findings from prior studies regarding the effects of certification on performance factors have been explored.

Douglas *et al.* (2003) examined more than 100 certified service and industrial companies in the UK and found that certification improved organizational consistency and management oversight. Padma *et al.* (2008) extensively studied the impact of ISO certification on organizational performance in the Indian industry, using management views as their source material. They considered the impact of certification on management engagement, customer focus development, quality process management, continuous improvement, measurement and control and personnel management. The target group of their study was small, medium and large companies. Their research showed a significant improvement in results across all issues and across all size companies. Leung and Chan (1999) examined the effects of certification on Hong Kong companies. They reported that the majority of respondents found certification useful. In their research, they highlighted shortening delivery times, volume growth, increased sales and improved communication with both customers and subcontractors as benefits of certification.

TQM dimensions	Literature supporting selection	Identification used in this study
Management/Leadership	Saraph <i>et al.</i> (1989), Flynn <i>et al.</i> (1994), Badri <i>et al.</i> (1995), Powel (1995), Black and Porter (1995, 1996), Ahire <i>et al.</i> (1996), Grandzol and Gershon (1998), Quazi <i>et al.</i> (1998), Dow <i>et al.</i> (1999), Rao <i>et al.</i> (1999), Rahman (2000), Yusof and Aspinwall (2000), Wilson and Collier (2000), Prajogo and Sohal (2003), Parast <i>et al.</i> (2006), Sila (2007), Sadikoglu and Olcay (2014), EFQM (2019)	Organizational awareness of goals; Monitoring the achievement of goals; Goal metrics and awareness of goals/goal metrics; Management feedback on success; Clarity of responsibilities and authority; Management support to achieve goals; Quality of internal cooperation; Problem solving; Equal partnership; Supporting initiatives; Clarity of strategy
Customer Focus	Flynn <i>et al.</i> (1994), Powel (1995), Black and Porter (1995, 1996), Ahire <i>et al.</i> (1996), Grandzol and Gershon (1998), Quazi <i>et al.</i> (1998), Dow <i>et al.</i> (1999), Rao <i>et al.</i> (1999), Rahman (2000), Wilson and Collier (2000), Prajogo and Sohal (2003), Parast <i>et al.</i> (2006), Sila (2007), Sadikoglu and Olcay (2014), EFQM (2019)	Customer satisfaction assessment procedures; Customer satisfaction; Customer satisfaction analysis; Action plans to improve customer satisfaction
Personnel	Saraph <i>et al.</i> (1989), Flynn <i>et al.</i> (1994), Badri <i>et al.</i> (1995), Powel (1995), Black and Porter (1995, 1996), Ahire <i>et al.</i> (1996), Grandzol and Gershon (1998), Quazi <i>et al.</i> (1998), Dow <i>et al.</i> (1999), Rao <i>et al.</i> (1999), Rahman (2000), Yusof and Aspinwall (2000), Wilson and Collier (2000), Prajogo and Sohal (2003), Parast <i>et al.</i> (2006), Sila (2007), Sadikoglu and Olcay (2014), EFQM (2019)	Staff knowledge of opportunities to influence customer satisfaction; Mapping of training needs; Training programs to achieve goals; Handling educational success; Level of staff competence; Level of staff motivation
Processes	Saraph <i>et al.</i> (1989), Flynn <i>et al.</i> (1994), Badri <i>et al.</i> (1995), Powel (1995), Black and Porter (1995, 1996), Ahire <i>et al.</i> (1996), Grandzol and Gershon (1998), Quazi <i>et al.</i> (1998), Rao <i>et al.</i> (1999), Yusof and Aspinwall (2000), Rahman (2000), Wilson and Collier (2000), Prajogo and Sohal (2003), Parast <i>et al.</i> (2006), Sila (2007), Sadikoglu and Olcay (2014), EFQM (2019)	Process efficiency; Measuring success and performance; Process performance information; Competitiveness of processes compared to competitors; Opportunities to improve processes; Self-assessment of process performance; Finding areas for improvement by comparing to competitors
Procurement and Materials	Saraph <i>et al.</i> (1989), Flynn <i>et al.</i> (1994), Badri <i>et al.</i> (1995), Powel (1995), Black and Porter (1995, 1996), Ahire <i>et al.</i> (1996), Quazi <i>et al.</i> (1998), Dow <i>et al.</i> (1999), Rao <i>et al.</i> (1999), Rahman (2000), Yusof and Aspinwall (2000), Parast <i>et al.</i> (2006), Sila (2007), Sadikoglu and Olcay (2014), EFQM (2019)	Procurement efficiency; Material deficiencies; Value of inventories; Quality of suppliers; Identity of materials
Products	Saraph <i>et al.</i> (1989), Flynn <i>et al.</i> (1994), Badri <i>et al.</i> (1995), Ahire <i>et al.</i> (1996), Grandzol and Gershon (1998), Quazi <i>et al.</i> (1998), Rao <i>et al.</i> (1999), EFQM (2019)	Competitiveness of products/services; Product price/quality ratio; Customer complaints about products/services; Product/service development activity; Progress of products/services compared to competitors

(continued)

Table 2. TQM dimensions selected for the study, literature related to their selection and their identification

TQM dimensions	Literature supporting selection	Identification used in this study
Risk Management	Moore <i>et al.</i> (2000), Fatemi and Luft (2002), Gillmore <i>et al.</i> (2004), Ellegaard (2008), Altman <i>et al.</i> (2010), Sukumar <i>et al.</i> (2011), Thun <i>et al.</i> (2011), Wilson and Altanlar (2013), EFQM (2019)	Identification of risks to operations/ products; Maintenance of risk assessments; Monitoring of corrective actions related to the risks; Reduction of risks to operations/ products
Continuous Improvement	Black and Porter (1995, 1996), Grandzol and Gershon (1998), Yusof and Aspinwall (2000), Sadikoglu and Olcay (2014), EFQM (2019)	Overall level of continuous improvement in the system; The level of operational development; Control of corrective actions; Informing staff of changes; Rewarding staff for successful projects
Stakeholder Management	Frooman (1999), Berman <i>et al.</i> (1999), Whysall (2000), Preble (2005), EFQM (2019)	Stakeholder identification; Identification of stakeholder expectations and requirements; Objectives to meet stakeholder requirements; Action plans to meet stakeholder requirements; Monitoring the implementation of stakeholder requirements
Digitalization	Kotarba (2017), Muro <i>et al.</i> (2017), Joensuu-Salo <i>et al.</i> (2018), Meisnera (2018), Martín-Peña <i>et al.</i> (2019)	The importance of digitalization, the changes it brings and harnessing the potential of digitalization to improve performance; Digitalization and shop floor management (SFM) in operation and development of internal processes through digitalization; Digitalization utilization rate and metrics; Identification of stakeholder requirements in the field of digitalization
System Deployment	Gotzamani and Tsiotras (2002), Chow-Chua <i>et al.</i> (2003), Terziowski and Power (2007), Jeroen <i>et al.</i> (2001), Poksinska (2006), Zeng <i>et al.</i> (2007), Prajogo <i>et al.</i> (2012)	Adherence to ratified practices; Effectiveness of the implementation of agreed practices; Monitoring compliance with ratified practices; Effectiveness of practices; Staff awareness of the importance of adherence to practices

Table 2.

Prajogo *et al.* (2012) examined the views of management in ISO 9001 certified companies in Australia and found that effective system implementation had a positive impact on the management of all processes. The positive effect also extended to more effective interactions with suppliers and customers. Fernandes *et al.* (2017) have conducted a very extensive literature review on the benefits of combining supply chain management and quality management. They reported that the implementation of a quality management system in parts of the supply chain improves the performance of the company. Georgiev and Georgiev (2014) stated after examining Bulgarian companies that the impact of ISO 9001 on company performance in areas such as internal processes, customers, suppliers and subcontractors was significant. Shafiq *et al.* (2014) studied the effects of ISO 9000 certification on the organizational performance of the textile industry in Pakistan. Their research showed that there was a statistically significant difference in the profitability of certified and uncertified companies.

Zuckerman (1995) stated that firms reported they had benefited from their quality system. The main benefits he highlighted were defining the company's capabilities, more precisely defining customer requirements, assuring the customer of order-based delivery, monitoring employee capabilities, outsourcing work, better tracking of purchase orders, achieving commercial advantage and reducing customer complaints.

Caro *et al.* (2009) examined customer perceptions of the quality of Spanish insurance companies. ISO 9000 certification made it possible to perceive and understand customer

quality, manage satisfaction and internalize the company's image. These issues were perceived by customers to be better in certified than uncertified insurance companies and were related to service quality and corporate image. [Gotzamani and Tsiotras \(2002\)](#) reported improvements in customer satisfaction in Greek companies after quality system certification. In addition to improved customer satisfaction, certification improved the company's quality culture and product quality. They also noted that certification offered companies other operational benefits.

[Curkovic and Pagell \(1999\)](#) stated that the system required training of all staff to improve quality, so companies increased the value of their most important resource. [Gotzamani and Tsiotras \(2002\)](#) stated that certification is rewarding for the entire company and, in addition, it improves employee morale and consideration for quality. They stated that certification also improves a company's quality culture. [Casadesús et al. \(2001\)](#) highlighted the positive effects of certification on personnel in their study of the Spanish industry. They also stated that the benefits of certification included improved procedures, clarification of responsibilities, increased trust, better commitment to work, improved job satisfaction and communication, as well as improved customer relationships and customer service.

[Santos and Millán \(2013\)](#) studied Portuguese certified companies and stated that the main benefits of certification were clearer work procedures, improved standardization, improved corporate image, increased customer confidence in company quality and improved customer satisfaction. They also reported that the development of continuous improvement procedures was the most important benefit of certification.

Based on the above, it can be concluded that prior studies have shown that certification improves the performance of companies, regardless of their geographical location, industry or company size. However, it should be acknowledged that some prior studies have also yielded opposing results. [Poksinska \(2010\)](#) stated that organizations may have a very different degree of maturity for standardizing their operations and because the requirements of ISO 9001 are general, an organization can claim to operate according to the standard and obtain a certificate without developing its operations.

[Christmann and Taylor \(2006\)](#) grouped certifications according to how firms adopted quality-related procedures. They call symbolic implementation cases where quality procedures are not in daily use. Deployment, where procedures are in daily use, researchers call these substantive implementation. Concluded by an external certification, based on audits of the third-party question arises as to the auditor's legitimacy and independence. Like [Poksinska \(2010\)](#), [Christmann and Taylor \(2006\)](#) also state that a company can obtain a certificate even if the system to be certified is separate from the practical operation. [Christmann and Taylor \(2006\)](#) also reported that companies that do not meet the standards' requirements may need to pass periodic certification inspections. Therefore, researchers believe that it is essential for companies to take a strategic approach toward adoption of standards by choosing a quality level that corresponds with their perceptions of costs and benefits.

[Rahman \(2000\)](#) investigated the effects of TQM quality management factors on Australian certified and uncertified SMEs. He showed in his study that of the quality management criteria, only process management was clearly more important for certified companies than for uncertified companies. All other quality management criteria were approximately the same in certified and uncertified companies. This also shows that certification does not automatically raise the level of quality management in a company.

[Boiral and Gendron \(2011\)](#) state that ISO audits do not focus on improving performance, but rather on adherence to a quality management system. Like [Christmann and Taylor \(2006\)](#), [Boiral and Gendron \(2011\)](#) highlighted auditors' professionalism and independence as potential problems, although ISO 19011 and ISO 17021 seek to manage this problem. They also report that decoupling auditing from practical operations may cause customers to

Methodology

The survey data were collected from Finnish SMEs through an Internet-based survey. When designing the survey, the TQM framework that emerged in the literature review was refined as previously described so that it was categorized in terms of (1) management/leadership, (2) customer focus, (3) personnel, (4) processes, (5) material/suppliers, (6) product/service, (7) risk management, (8) continuous improvement, (9) digitalization, (10) stakeholder management, (11) system deployment. For each of the 11 TQM dimensions, 4–11 items were constructed. The total number of items was 61. Answers to the items were asked on a Likert scale of 1–5, where 1 = strongly disagree and 5 = strongly agree. In addition, the survey included specific questions about the respondent's organizational status, the industry and size of the company.

The study was conducted in Finnish SMEs with a maximum number of employees of 250 and a turnover of less than EUR 50 million, and a balance sheet value of EUR 43 million, as defined by EU Commission Regulation No. 651/2014 for SMEs. However, only companies with more than five employees were included in this study although companies with less than five employees are also SMEs. Companies with less than five employees did not qualify for the study because these companies' practices are believed to overly reflect the CEO's approach and not the organization's overall impact. Responses from companies with more than 250 employees and less than 5 employees were removed from the dataset. A brief presentation of the study and its objectives was sent to the CEOs of 6,889 SMEs.

The survey utilized two reminder messages and resulted in 287 responses obtained from these companies' CEOs. Overall, the response rate was 4.2%. Of the respondents, 174 (60.6%) represented industrial companies, of which 88 were certified and 86 were uncertified. One hundred and thirteen responses were received from the service companies, which represented 39.4% of the responding companies. Of the service companies, 24 were certified and 89 were uncertified. In total, 112 of the companies were certified and 175 were uncertified.

Of the 112 certified companies surveyed, seven have had a certificate for one year, five for two years, two for three years, seven for four years, 11 for five years and 76 for more than five years. Three companies did not report how long their certificates have been valid. At the time of the survey, all certified companies have been forced to either build their system according to ISO 9001: 2015 or upgrade it to meet this standard's requirements. Considering that all TQM dimensions in this study are included in the ISO 9001 standard, except for digitalization, the real impact from certification on TQM dimensions and the requirements of the standard will be revealed in Finnish SMEs as a result of this study.

Data means were analyzed by a one-way analysis of variance (ANOVA). The analysis examined the differences between certified and uncertified companies, targeting (1) the entire dataset, (2) service companies and (3) industrial companies. In addition, the analysis examined the effects of certification on TQM dimensions in different company size classes and in the context of the number of employees.

Results

This section presents the data collected from the study described above. Results are presented as means and standard deviations of the sums of measures of the TQM dimensions in certified and uncertified companies. The *p* and *F* values from the analysis of variance are also included in the tables below. Further, the tables indicate the significance of each case in accordance with the criteria set out in the table.

Table 3 shows that when all the companies surveyed were grouped into certified and uncertified companies, there were significant differences in the levels of TQM dimensions in

TQM Dimension	Certified		Uncertified		<i>p</i>	<i>F</i>	Significance
	Mean	Std. dev	Mean	Std. dev			
Management	3.91	0.376	3.87	0.349	0.6159	0.2523	
Customer Focus	3.62	0.517	3.42	0.613	0.0302	4.7442	*
Personnel	3.59	0.426	3.45	0.431	0.0872	2.9459	
Process	3.69	0.486	3.47	0.475	0.0084	7.0404	**
Procurements and Materials	3.88	0.446	3.90	0.387	0.8003	0.0641	
Product/Service	4.00	0.403	4.06	0.331	0.3861	0.7534	
Risk Management	3.85	0.548	3.65	0.536	0.0300	4.7566	*
Continuous Improvement	3.72	0.568	3.48	0.560	0.0082	7.0777	**
Stakeholder Management	3.78	0.562	3.71	0.607	0.4202	0.6517	
Digitalization	2.99	0.959	3.25	0.828	0.0264	4.9827	*
System Deployment	3.89	0.521	3.81	0.408	0.3145	1.0155	

Note(s): Significance: * 0.01 < *p* ≤ 0.05; ** 0.001 < *p* ≤ 0.01; ****p* ≤ 0.001

Table 3. TQM in all studied companies: Comparing certified and uncertified firms

terms of customer focus (*), process (**), risk management (*), continuous improvement (**) and digitalization (*). In the significant TQM dimensions, with the exception of digitalization, the mean scores of certified firms were better than the mean scores of uncertified firms.

Table 4 shows that when industrial companies were grouped into certified and uncertified companies, there were significant differences in the levels of the TQM dimensions in terms of customer focus (**), personnel (*), process (*) and continuous improvement (*). In all of these aspects, certified companies received better mean scores than uncertified firms.

It can be seen from Table 5 that when service companies were grouped into certified and uncertified companies, there were no significant differences in the levels of the TQM dimensions. The results show that the mean scores of uncertified companies were even better in terms of management, product/service and digitalization propositions than the mean scores of certified companies. However, this difference was not statistically significant.

It can be seen from Table 6 that when companies in the size class 5–49 were grouped into certified and uncertified companies, there were significant differences in the levels of the TQM dimensions in terms of process (**) and continuous improvement (*). In both cases, certified companies receive better mean scores than uncertified companies. In responses to product/service and digitalization factors, the mean scores for uncertified companies were better than for certified companies. However, this difference was not statistically significant.

TQM dimension	Certified		Uncertified		<i>p</i>	<i>F</i>	Significance
	Mean	Std. dev	Mean	Std. dev			
Management	3.93	0.338	3.90	0.313	0.6941	0.1552	
Customer Focus	3.60	0.438	3.30	0.618	0.0061	7.7159	**
Personnel	3.55	0.411	3.31	0.393	0.0126	6.3599	*
Process	3.73	0.439	3.48	0.557	0.0228	5.2785	*
Procurements and Materials	3.84	0.408	3.91	0.366	0.4971	0.4630	
Product/Service	4.01	0.420	4.01	0.390	0.9877	0.0002	
Risk Management	3.80	0.453	3.61	0.511	0.0691	3.3467	
Continuous Improvement	3.73	0.542	3.45	0.530	0.0125	6.3701	*
Stakeholder Management	3.77	0.548	3.61	0.742	0.1849	1.7724	
Digitalization	2.93	0.970	3.08	0.914	0.3140	1.0199	
System Deployment	3.88	0.523	3.75	0.423	0.2123	1.5672	

Note(s): Significance: * 0.01 < *p* ≤ 0.05; ** 0.001 < *p* ≤ 0.01; ****p* ≤ 0.001

Table 4. TQM in industrial companies: Comparing certified and uncertified firms

Table 5.
TQM in service
companies: comparing
certified and
uncertified firms

TQM dimension	Certified		Uncertified		<i>p</i>	<i>F</i>	Significance
	Mean	Std. dev	Mean	Std. dev			
Management	3.81	0.522	3.87	0.369	0.6475	0.2102	
Customer Focus	3.70	0.831	3.56	0.585	0.4505	0.5734	
Personnel	3.71	0.484	3.61	0.430	0.5311	0.3949	
Process	3.55	0.659	3.48	0.412	0.6610	0.1934	
Procurements and Materials	4.00	0.600	3.89	0.413	0.5033	0.4510	
Product/Service	3.97	0.350	4.13	0.253	0.1905	1.7350	
Risk Management	4.00	0.897	3.72	0.550	0.1319	2.3042	
Continuous Improvement	3.68	0.692	3.54	0.593	0.4258	0.6389	
Stakeholder Management	3.83	0.632	3.83	0.468	0.9661	0.0018	
Digitalization	3.22	0.893	3.44	0.718	0.2746	1.2056	
System Deployment	3.98	0.558	3.90	0.357	0.5858	0.2987	

Note(s): Significance: * $0.01 < p \leq 0.05$; ** $0.001 < p \leq 0.01$; *** $p \leq 0.001$

Table 6.
TQM in small
companies: comparing
certified and
uncertified firms

TQM dimension	Certified		Uncertified		<i>p</i>	<i>F</i>	Significance
	Mean	Std. dev	Mean	Std. dev			
Management	3.93	0.208	3.88	0.315	0.5221	0.4112	
Customer Focus	3.55	0.467	3.36	0.610	0.0984	2.7549	
Personnel	3.52	0.367	3.45	0.423	0.4526	0.5662	
Process	3.70	0.271	3.45	0.448	0.0096	6.8280	**
Procurements and Materials	3.89	0.356	3.88	0.376	0.9502	0.0039	
Product/Service	4.05	0.283	4.07	0.339	0.8063	0.0602	
Risk Management	3.83	0.397	3.65	0.453	0.0665	3.4026	
Continuous Improvement	3.73	0.455	3.47	0.495	0.0130	6.2800	*
Stakeholder Management	3.78	0.556	3.72	0.580	0.5898	0.2915	
Digitalization	3.03	0.851	3.23	0.820	0.1480	2.1083	
System Deployment	3.98	0.346	3.81	0.393	0.0525	3.8030	

Note(s): Significance: * $0.01 < p \leq 0.05$; ** $0.001 < p \leq 0.01$; *** $p \leq 0.001$

It can be seen from Table 7 that when companies in the 50–250 size range were grouped into certified and uncertified companies, no significant differences were observed in the levels of the TQM dimensions. The results show that the mean scores of uncertified companies were better for the dimensions of customer focus, procurement and materials, product/service, digitalization and system deployment. However, this difference was not statistically significant.

Discussion

As prior research has proven, with TQM being a crucial determinant of company performance (Dubey and Gunasekaran, 2015; Ahmed and Idris, 2020), it is important to study the means through which TQM can be improved. This study examines whether certification improves TQM dimensions and whether certification's impact is similar across companies of different sizes and industries.

All companies

The results of all companies that participated in the study (Table 3) show that significant differences were found between certified and uncertified companies in the dimensions of customer focus (*), processes (**), risk management (*), continuous improvement (**), and

TQM dimension	Certified		Uncertified		<i>p</i>	<i>F</i>	Significance
	Mean	Std. dev	Mean	Std. dev			
Management	3.87	0.623	3.79	0.554	0.6898	0.1607	
Customer Focus	3.73	0.579	3.78	0.497	0.8047	0.0616	
Personnel	3.69	0.504	3.48	0.496	0.2361	1.4279	
Process	3.68	0.804	3.54	0.648	0.5232	0.4116	
Procurements and Materials	3.85	0.584	3.98	0.459	0.4948	0.4709	
Product/Service	3.94	0.574	4.05	0.293	0.4991	0.4615	
Risk Management	3.86	0.777	3.64	1.051	0.3412	0.9182	
Continuous Improvement	3.70	0.744	3.51	0.967	0.3803	0.7797	
Stakeholder Management	3.79	0.582	3.64	0.787	0.4572	0.5589	
Digitalization	2.94	1.131	3.37	0.896	0.0958	2.8508	
System Deployment	3.76	0.755	3.83	0.514	0.7286	0.1213	

Note(s): Significance: * 0.01 < *p* ≤ 0.05; ** 0.001 < *p* ≤ 0.01; ****p* ≤ 0.001

Table 7. TQM in medium-sized companies: comparing certified and uncertified firms

digitalization (*). Certified companies performed better than uncertified companies in the dimensions of customer focus, processes, risk management and continuous improvement. The mean score of uncertified companies was better than the mean score of certified companies for the digitalization dimension (*). In addition, it should be noted that uncertified companies scored better in the dimensions of procurement and materials, products/services and digitalization even though the differences in these dimensions were not statistically significant. The dimensions that attained statistical significance were not particularly surprising. With the exception of risk management and digitalization, all others are part of the seven quality management principles defined by ISO (Fonseca and Dominques, 2016; Anttila and Jussila, 2017). The low mean score for digitalization for certified companies can be explained by the fact that certifiers put pressure on companies to continuously improve data collection, storage and analysis, so the impression may be formed that company procedures are inadequate. Conversely, without external pressure, uncertified companies may feel that existing procedures are sufficient. A new requirement for the quality standard has also been the identification of stakeholders and the consideration of their requirements, so it seems strange that the mean scores for certified and uncertified companies in this area were not higher. The SD of the digitalization dimension is clearly the largest for all respondents in this study. This may be due to the fact that the exploitation of digitalization is still in its infancy for both certified and uncertified companies. Based on the seven quality principles of the 2015 (Fonseca and Dominques, 2016; Anttila and Jussila, 2017) updated standard, it seems a little strange that certified companies were not further ahead of uncertified companies in management matters (3.91 vs 3.87).

In summary, can be stated as echoed by Padma *et al.* (2008), Douglas *et al.* (2003) and Santos and Millán (2013), that certification benefits companies, although uncertified companies perform very well on several TQM dimensions. These findings, which include all industries and service companies with less than 250 employees, refute Rahman's (2000) research that declared that certification would only affect the processes dimension of TQM.

Industrial companies

The results of the certified and uncertified industrial companies (Table 4) show that there was a statistical difference in the TQM dimensions of customer focus (**), personnel (*), processes (*) and continuous improvement (*). This result is in line with prior studies. For example, Padma *et al.* (2008) reported an improvement of the mean scores of these elements after certification. For industrial companies, Prajogo *et al.* (2012) reported process efficiencies that

were also observed in this study. They extended their view of the impact of certification to suppliers and customers as had been previously explored in a study by [Leung and Chan \(1999\)](#). This study shows that the impact of certification extends only to customer focus and thus does not support the notion of impacts to suppliers.

The p value of risk management (0.0691) narrowly misses the threshold for statistical significance. [Fonseca et al. \(2016\)](#) stated that the use of risk-based thinking requires the identification of risks and opportunities that may affect the quality management system and the results it achieves. This drives organizations to manage the identified risks. Therefore, the results of this study are unsurprising. [Anttila and Jussila \(2017\)](#) stated that according to the new ISO 9001 standard, risk-based thinking is clearer than in previous versions of the standard. This means that risk-based management is easier to apply in practice, although statistical significance was not achieved in this study. According to [Medić et al. \(2016\)](#), the term “risk-based thinking” in ISO 9001: 2015 refers to quality planning, system implementation, system maintenance and continuous improvement. This requirement contributes to the implementation of a quality system that prevents nonconformities. For this reason, it is somewhat strange that the level of risk management in the comparisons did not achieve statistical significance.

The results for all companies, particularly the industrial companies, draw attention to the fact that the management dimension results are almost the same for certified and uncertified companies, although the updates to the standard specifically support the management dimension. This finding differs from the results of [Padma et al. \(2008\)](#). Their research also showed an increased level of management in connection with certification. Our study also does not support the observation reported by [Douglas et al. \(2003\)](#) on the effectiveness of management oversight. In the results of industrial companies, it should be noted that the areas of procurement and materials as well as digitalization received a better mean score for uncertified companies than certified companies. This seems strange, since the standard requires that certified companies have control over supplier-related procedures. On the other hand, the Finnish industry has been paying attention to materials and inventory management for years. There is no other apparent reason, other than the pressure from certifiers (described earlier), to explain the fact that the mean score for uncertified companies for digitalization was clearly higher than that for the certified companies. In the responses of both groups, the SD of digitalization was the highest of all the dimensions, which is explained by the fact that the issue is still relatively new and some companies are already at an advanced stage, while others are still in the planning stages.

Assessing the TQM dimensions of industrial companies as a whole, it can be concluded that certification is useful because four TQM dimensions can be shown to be statistically significant and the mean scores of these factors for certified companies were better than the mean scores for uncertified companies. Thus, the results of this study mainly support the views obtained from prior studies, such as [Douglas et al. \(2003\)](#), [Padma et al. \(2008\)](#), [Georgiev and Georgiev \(2014\)](#) and [Shafiq et al. \(2014\)](#).

Service companies

A comparison of the results of the certified and uncertified service companies ([Table 5](#)) shows that the mean scores showed no statistical significance for any of the TQM dimensions. This result is truly surprising because ISO 9001 requires procedures for management, customer relationship management, personnel, process management, procurement of materials, services, risk management, continuous improvement and stakeholder management. Some of these procedures should be documented in a certified system, which could be thought of as further improving their effectiveness. It is also noteworthy that uncertified companies had a better mean in the dimensions of management, product/service and digitalization. The p values of the service companies are clear; none of the factors have p values near 0.05, which

would reflect a clear difference in the answers given by certified and uncertified companies. This particular result for service companies differs significantly from prior studies, such as [Caro et al. \(2009\)](#), who reported positive results for certification in service companies, including improvements in customer quality and customer satisfaction. There is no justification for the idea that certification would benefit service companies, unlike industrial companies.

Industrial companies compared to service companies

Upon comparing the results of certified industrial companies with the results of certified service companies ([Table 4](#) vs [Table 5](#)), it was found that industrial companies were only superior in the dimensions of management, processes, product/service and continuous improvement. In all other TQM dimensions, service companies received better mean scores. Looking at the results of uncertified companies ([Table 4](#) vs [Table 5](#)), only in the management dimension is the mean score of industrial companies better than the mean score of service companies. In process the mean score is the same. The results show that the level of the TQM dimensions is clearly estimated to be higher in uncertified organizations than in certified companies. The findings of this study show that there is a greater difference in the TQM dimensions of certified and uncertified companies in the industry sector than in the service sector. This finding does not fully support the results of previous studies that reported that certification had a positive impact on company performance for both industries ([Douglas et al., 2003](#); [Prajogo et al., 2012](#)) and services ([Caro et al., 2009](#)).

The criteria for ISO 9001 certification are the same regardless of the company's industry, so it is interesting that so many TQM dimensions are perceived to be better in certified service companies than in industrial companies. It is equally interesting that the TQM dimensions of uncertified service companies are at such a high level that there was no statistical difference between certified companies, and that the TQM dimensions were perceived to be clearly better than in industrial companies. It should be noted that the mean scores of the system deployment dimension for both certified and uncertified service companies were higher than for industrial companies. This is likely to have influenced the positive perception of the TQM dimensions for service companies.

Small companies

Upon comparing the results of certified and uncertified small firms in the study, it was found that there were statistically differences in the results of the continuous improvement (*) and processes (**) dimensions. The mean scores for the certified companies were better than the uncertified companies in all other dimensions except product/service and digitalization. The results of the process and continuous improvement dimensions are expected in the sense that when building a quality system, these dimensions are priorities for development and they reflect the functionality of the system in which the certifiers are interested. These results support the idea that certification would have a positive impact on these TQM dimensions for small firms.

Medium-sized companies

Comparing the results of the certified and uncertified medium-sized companies, it can be seen that the mean scores showed no statistical significance for any of the TQM dimensions. This result also differs from expectations in the sense that of the 11 TQM dimensions, uncertified companies have better mean scores in five dimensions than certified companies. It is important to note that this is the only comparison group where the mean score of the system deployment dimension was better for uncertified companies than for certified companies.

This result is quite striking because certification specifically looks at the effectiveness of the implementation of existing practices, so the expected result was that implementation would receive a better mean score in certified companies than in uncertified companies. The results of this group of companies showed no evidence that certification would improve their TQM dimensions.

Considering the results of the study, grouped by company size, certification had a statistically significant effect for companies with 5–49 people, and there was no effect for companies with 50–250 people. The impact of certification is noticeable in the processes and continuous improvement dimensions. This result is partially parallel to a study conducted by [Rahman \(2000\)](#), in which he reported that certification only affected the processes of SMEs.

Conclusion

This study examined whether certification improved the level of expanded TQM dimensions and whether the impact of certification was similar across companies of different sizes and industries. This work contributes to research on TQM by studying different types of SMEs and forming a comprehensive research framework to assess the TQM dimensions, taking into account the revised quality standard ISO 9001: 2015 and the additional requirements of EFQM for traditional TQM. The results of this study have shown that certification improves the level of some TQM dimensions in industrial and small enterprises (5–49 people). In industrial companies, these elements were customer focus, personnel, processes and continuous improvement. In small businesses, the TQM dimensions that were positively affected by certification were processes and continuous improvement. According to our results, certification did not have a statistically significant effect on any TQM dimensions in service companies and medium-sized companies (50–250 people). This result shows that in these types of companies, certification does not automatically improve the TQM dimensions. In light of this information, it can be concluded that this study, at least to some extent, supports the prior literature on the benefits of certification.

As a novelty value, this study highlighted that the positive impact of certification on the performance factors of companies cannot be generalized; effectiveness depended on the type of company. As already reported, certification does not always automatically raise the level of TQM dimensions, so corporate management must ensure the effectiveness of developed functions' implementation. Thus, managers should focus on assessing the types and levels of the TQM dimensions in their company before expecting benefits from certification. This is especially true for service companies in which certification does not affect the level of TQM dimensions at all. Although companies should develop their systems and think about the development needs of their operations from an internal point of view, it must be remembered that sometimes the motivation for certification may be external, such as customer demand. Even in these situations, companies should consider how to obtain the maximum benefit from the certification for the company and not remain satisfied with obtaining certification and meeting their customers' requirements. This study provides a broader framework than normal TQM, providing completely new findings that include a statistically significant link between certification and risk management, as well as certification and digitalization. The results show that certification improves risk management level more often in industry than in service companies and more often in small companies than in medium-size companies. Surprisingly, certification's impact on digitization was negative. Furthermore, the results were the same and completely clear in all company groups.

Although previous literature on the subject almost invariably concluded that certification positively affects TQM dimensions, such a conclusion cannot be drawn from this study. It would seem that service companies and medium-size companies will not benefit from

certification at all. Particularly in these companies, management should ensure that certification processes are effective and do not become symbolic system implementations. Certifiers also should pay attention to the quality of the processes and not just follow the descriptions. The situation for certifiers is awkward because a single certification body cannot set other higher standards without losing its turnover. For this reason, the national accreditation body (FINAS in Finland) should set clearer definitions for certification bodies and individual certifiers for the level at which the requirements of the standard must be met to achieve certification readiness.

Although previous studies have emphasized the importance of auditors' experience and professionalism, audit rules related to certification reduce the importance of professionalism because they prohibit consulting in the context of auditing (ISO 17021-1). This is problematic because many of the standard's requirements are general, making it difficult for companies to understand what procedures they should implement, while the certifier is prohibited from consulting the client to find the best practice, even if he or she has clear views. This prohibition directs individual auditors to consider only process descriptions and instructions without taking any position on their effectiveness and efficiency within the company, while also accepting practices whose effectiveness is questionable. Although the consulting ban limits auditors, they still can submit development proposals to the company. However, development proposals' weight is not the same as the requirement for corrective action because companies are not required to develop their operations on the basis of development proposals. This causes problems in situations in which the company's certification motivation is external. As long as the consulting ban is in its current form and the experienced auditors' expertise cannot be utilized fully, the benefits of certification for the company will remain weak.

Exploitation of results

All SMEs can use this study's results to ensure that they have designed and implemented procedures that are appropriate and effective for all 11 dimensions of the TQM study. Certifiers can benefit from the research by focusing on training their own staffs, especially on those dimensions in which certification cannot make a statistically significant difference with non-certified companies. The training must be accompanied by procedures that enable the matter to be presented to SMEs in a non-consultative way. Accreditation bodies can benefit from research by reviewing training programs for certification bodies and ensuring that auditors are trained to review the requirements of the standard so that clients feel like they will benefit from certification. Educational institutions that train future quality managers and CEOs can leverage research by training students in the design and effective implementation of procedures that meet the standard's requirements. Consultants who train companies or help them build effective operating systems can emphasize their programs based on research findings so that low-impact TQM dimensions' impact is enhanced. Considering the use of the study presented above, it is clear that certified companies' future TQM levels will be higher than those of non-certified companies, and that a huge number of certified companies will get more value for their money.

Further research

In the future, researchers should ensure that the responses to the TQM dimensions reflect the views of the entire organization, as there is reason to believe that employees see practical issues differently than management. For this reason, it would be fruitful to consider how the views of employees could be better weighted than is the norm for current studies when assessing process performance. In addition, future research should better account for the fact that data from SMEs are significantly influenced by the type of company, so that results from

different types of companies can be distinguished from one another. As this study shows, it cannot be argued that certification has a positive impact on the TQM dimensions of all types of SMEs. There is already a wealth of information on performance issues in general. In the future, research should therefore focus on the individual elements of TQM dimensions, their structure and their impact. If future studies focus on the details of the TQM dimensions with an emphasis on insights obtained from employees, it is likely that the results will better describe the actual functioning of the TQM dimensions and provide more useful information to companies.

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**Enhancing customer satisfaction, personnel satisfaction and company reputation
with total quality management: combining traditional and new views**

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Enhancing customer satisfaction, personnel satisfaction and company reputation with total quality management: combining traditional and new views

Traditional
and new views
of TQM

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Abstract

Purpose – This study investigates the effect of total quality management (TQM) on customer satisfaction, personnel satisfaction and company reputation.

Design/methodology/approach – The study results rely on a structured survey conducted among an extensive sample of Finnish SMEs. In addition to the examination of the relationship between TQM and company performance in terms of customer satisfaction, personnel satisfaction and company reputation, the study takes a view on the possible effects of the industry, the company size and the certified quality system.

Findings – The results reveal that two TQM dimensions, namely Customer Focus and Product Management, were related to companies' customer satisfaction, whereas four TQM dimensions, namely Management/leadership, Customer Focus, Personnel Management and Risk Management, were related to personnel satisfaction. None of the TQM dimensions were related to company reputation. The control variables – the industry, the company size and the certified quality system – were not found to affect customer satisfaction, personnel satisfaction or company reputation.

Originality/value – Most previous studies have been based on traditional TQM classification and have not shown the effects of the latest TQM-related dimensions. Compared to previous studies, this work integrates risk management, digitization, system deployment efficiency and stakeholder management into TQM, which has not been implemented in any previous study. The roles of hard and soft TQM factors have been carefully considered in this study; thus, the study does not place too much emphasis on either direction but provides a balanced picture of the performance of the management systems studied. Although there are studies on the effects of TQM on personnel satisfaction, customer satisfaction and reputation, they are based on a much narrower definition of TQM than that in this study. The business environment is constantly changing, but only a few studies have been conducted to extend the TQM approach. This has led to duplication of studies, and the effects of performance-relevant procedures have not been extensively studied in the past as part of TQM. Therefore, the concept of this study brings significant added value to TQM research and returns the TQM concept to the overall level while considering the requirements of the ISO 9001:2015 and EFQM 2019 quality standards. The study also considers the effects of ISO 9001 certification and EFQM requirements.

Keywords Total quality management, Performance, Customer satisfaction, Personnel satisfaction, Company reputation

Paper type Research paper

1. Introduction

More than 880,000 certified quality systems can be found worldwide (ISO Survey). This indicates that the number of total quality management (TQM) systems is clearly higher than the number of certified companies since the construction of a certification, such as ISO 9000,



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usually starts with a quality system (Rahman, 2000). Numerous studies show that TQM and ISO 9001 certification have a positive effect on the performance of companies that have implemented them. In addition to these findings, there are indications that TQM affects personnel satisfaction (Boselie and van der Wiele, 2001; Ooi *et al.*, 2008; Kabak *et al.*, 2014; Arunachalam and Palanichamy, 2016; Babu and Thomas, 2021), customer satisfaction (Beheshti and Lollar, 2003; Ooi *et al.*, 2010; Hassan *et al.*, 2012; Topalovic, 2015) and company reputation (Beheshti and Lollar, 2003; Yusuf *et al.*, 2007; Mourougan and Sethuraman, 2017; Yousif *et al.*, 2017). These are essential issues because prior studies show that satisfied customers are loyal (e.g. Pattanayak *et al.*, 2017), and hence, companies do not have to invest unreasonably in finding new customers. Personnel satisfaction has a significant effect on business operations because, according to Pushpakumari (2008), there is a positive relationship between job satisfaction and employee performance. Vig *et al.* (2017) state that loss of reputation is one of the biggest risks for firms. In their research, they find that the reputation gained by products and services as well as leadership has an impact on the financial performance of companies.

Despite the above arguments, there is little reported information on the effects of TQM on customer satisfaction, personnel satisfaction and company reputation, taking into account in particular the importance of industry, company size and system certification. This study is the most extensive compared to the previous studies presented in the literature review. The study covers the requirements of the European Foundation for Quality Management (EFQM) and the standard SFS ISO 9001: 2015. The details of these procedures included in the study are stakeholder management and risk management, which are almost completely missing from previous studies. Moreover, linking digitalization and system deployment to TQM thinking is completely new as there is a lack of studies related to digitalization included in TQM dimensions. This study also examines the traditions of TQM, considering TQM's initial views on the content of functioning TQM. Unfortunately, in many TQM studies, these basics have been ignored. Prior studies use the traditional, rather narrow, definition of TQM. As the number of certified companies is considerable worldwide and imposes costs on companies, it is also expected to have a positive impact on the various activities of companies. For the first time, this study reveals the link between certification according to the new quality standard and extended TQM and customer satisfaction, personnel satisfaction and the company's reputation, which are important to a company's success.

This study aims to examine the effect of TQM on customer satisfaction, personnel satisfaction and company reputation by adopting a comprehensive view of TQM, including both traditional and more recently emergent views. The current study takes place through a framework in which, in addition to the expanded TQM view, the soft and hard elements of TQM are taken into account. More specifically, the study investigates which TQM dimensions affect customer satisfaction, personnel satisfaction and company reputation and the impact of certification, industry and company size in this relationship. The analysis is based on survey data of 271 respondents from SMEs working in the manufacturing and service sectors in Finland. The structure of the remaining of this article is as follows. First, the theoretical framework, covering theory underpinnings, main concepts and hypotheses, is revealed. Then, the research's methodology is described, after which a discussion of the results is presented. Finally, the conclusions of the research are presented.

2. Theoretical framework and hypotheses

2.1 TQM

This study focuses on the effects of TQM dimensions on customer satisfaction, personnel satisfaction and company reputation in Finnish small and medium-sized enterprises (SMEs). TQM builds its objective of organizational effectiveness on the following interconnected

factors: quality, people, organizations and management (Hackman and Wageman, 1995). The goals of TQM are to increase customer satisfaction, quality products and services and to reduce costs. These goals have raised the profile of TQM among business strategies (Tasleem *et al.*, 2016). According to Brown (2013), TQM aims to continuously improve operations by focusing on process-related functions and their development. Tang (2019) finds that TQM's goal is to help organizations achieve their goals, understand customer needs and expectations, implement process monitoring and standardize companies' operations. There is evidence that TQM has positive effects on organizational performance (Al-Dhaafri and Al-Swidi, 2016; Shafiq *et al.*, 2019). TQM improves company performance by influencing operational, economic, social and sustainability issues. TQM normally improves companies' finances by contributing to the reduction of any kind of loss, for example, the cost of redoing (Abu-Alain, 2018). It is important to note that the ISO 9001 standard includes several issues relevant to TQM, such as management, processes, personnel, customer satisfaction and continuous improvement. Hietschold *et al.* (2014) and Mitreva *et al.* (2016) state that certification is only the first step toward TQM.

Although several studies have highlighted the positive effects of TQM on performance, it has also been suggested that TQM does not always lead to the best possible outcomes because of the risk of stiffening innovation processes (Khalfallah *et al.* 2022). For this reason, Kaur *et al.* (2013) recommend the implementation of TQM in combination with other procedures, such as total productive maintenance. Qasrawi *et al.* (2017) note that in most companies, the implementation of TQM can be considered a complete failure. Failures have led to the identification of key success factors associated with TQM. According to Abovassin *et al.* (2011), to succeed in TQM, a company must invest in planning, benchmarking, teamwork and efficient use of resources. Elhuni and Ahmad (2014) require companies to invest in issues relevant to their operations. Therefore, it is important to examine which dimensions of TQM contribute to company performance in order to highlight the right dimensions.

A comprehensive literature search was conducted to find appropriate TQM dimensions, which include both soft and hard TQM elements. Thus, this section first introduces the dimensions that prior research has traditionally suggested as forming TQM. These TQM dimensions are mapped in Table 1, and they are introduced in the text and defined on the basis of prior research. Traditional TQM dimensions are combined with new approaches to construct a comprehensive presentation of TQM dimensions. The comprehensive view of TQM dimensions utilized in this study was dismantled based on previous studies, EFQM and ISO 9001 data into items to be examined. These items were further classified as hard or soft elements of TQM.

2.2 Traditional approach to TQM dimensions

2.2.1 Management/leadership. A prerequisite for success is that top management is convinced of the benefits of an organizational culture that promotes the quality of processes and products (Dreyfus *et al.*, 2004). Support from top management enables the company to implement effective quality management programs, and management is responsible for setting goals to guide better performance (Mehmood *et al.*, 2014). Sadikoglu and Zehir (2010) state that an essential element of leadership is maintaining a clear view of customer requirements, and Garcia-Alcaraz *et al.* (2021) report that management plays a significant role in achieving customer satisfaction.

2.2.2 Data and reporting. Management should make decisions based on analysis to be able to anticipate and respond to changes in internal or external requirements. This requires that management have the ability to create reliable and high-quality information for all stakeholders to improve organizational performance. Business needs and strategy define the

Table 1.
Results of a literature
search on the content
of TQM

Research	1. Management/ leadership	2. Data and reporting	3. Customer	5. Personnel	6. Processes	7. Product/ service	8. Materials and suppliers	9. Continuous improvement	Additional dimensions	Total
Saraph <i>et al.</i> (1988)	X	X		X	X	X	X			6
Flynn <i>et al.</i> (1994)	X	X	X	X	X	X	X			7
Badri <i>et al.</i> (1995)	X	X	X	X	X	X	X			7
Powell (1995)	X	X	X	X	X		X			6
Black and Porter (1995, 1996)	X	X	X	X	X		X			6
Alhire <i>et al.</i> (1996)	X	X	X	X	X	X	X			7
Grandzol and Gershon (1998)	X	X	X	X	X	X	X			6
Quaza <i>et al.</i> (1998)	X	X	X	X	X	X	X			7
Rao <i>et al.</i> (1999)	X	X	X	X	X	X	X			7
Rahman (2000)	X	X	X	X	X	X	X			6
Yusof and Aspinwall (2000)	X	X	X	X	X		X			5
Prajogo and Sohal (2003)	X	X	X	X	X		X			5
Dreyfus <i>et al.</i> (2004)	X	X	X	X	X	X	X		Cooperation; benchmarking; statistical problem- solving	7 + 3
Sila (2007)	X	X	X	X	X	X	X			7
Sadikoglu and Zehir (2010), Sadikoglu and Olcay (2014)	X	X	X	X	X	X	X	X	Communication; statistical control/ feedback	7 + 2
Valmohammadi (2011)	X		X	X	X		X		Communication and quality information; tools and techniques	5 + 2

(continued)

Research	1. Management/ leadership	2. Data reporting	3. Customer	5. Personnel	6. Processes	7. Product/ service	8. Materials and suppliers	9. Continuous improvement	Additional dimensions	Total
Talib <i>et al.</i> (2013)	X	X	X	X	X	X	X	X	Quality system; benchmarking; quality culture; teamwork	8 + 4
Mehmood <i>et al.</i> (2014)	X		X	X				X		4
Long <i>et al.</i> (2015)	X	X	X	X	X				Strategic planning	4 + 1
Qasrawi <i>et al.</i> (2017)	X		X	X	X				Teamwork	4 + 1
Omar <i>et al.</i> (2018)	X	X	X	X	X		X			6
Singh <i>et al.</i> (2018)	X		X	X			X		Strategic planning and development	4 + 1
Chaudhry <i>et al.</i> (2018)	X		X	X	X				Strategic planning, information and analysis	4 + 2
Khalfallah <i>et al.</i> (2022)				X	X				Innovation product; innovation process; strategic quality planning; information and analysis	2 + 4

Table 1.

actions by which the necessary information is produced (Sadikoglu and Zehir, 2010). Dreyfus *et al.* (2004) states about the importance of knowledge that quality cannot be improved if process-related quality information does not exist and is not measured or monitored.

2.2.3 Customer. Talib *et al.* (2013) report that in order to succeed in meeting customer needs and expectations, a company must first identify them, after which processes can be directed to produce the desired products or services. There are two reasons for the importance of customer satisfaction. First, customer satisfaction shows whether a company is doing the right things for the customer, and second, whether they are doing these things in the right way.

2.2.4 Personnel. Mehmood *et al.* (2014) states that employees are the most important resource for any company as companies improve their productivity and performance. In order to become competitive, a company must train its personnel, and the training provided will further increase the company's competitiveness. Sadikoglu and Zehir (2010) emphasize that holistic quality training includes a number of technical skills and problem-solving methods, as well as new working methods and customer relationship management.

2.2.5 Processes. The purpose of process management is to systematically utilize all available resources to improve performance. Many previous studies show a clear positive correlation between process management and quality (Talib *et al.*, 2013). Because process management focuses on a company's operations by monitoring how operations are performed, it includes preventive and proactive practices to improve quality management and reduce variability to improve the quality level of production (Sadikoglu and Zehir, 2010).

2.2.6 Products/service. Dreyfus *et al.* (2004) states that TQM is a management system designed to continuously improve product quality to improve customer satisfaction and company performance. Sila (2007) also emphasizes the achievement of customer satisfaction through high-quality products and services. According to the author, affordable and high-quality products have a significant impact on the customer's experience.

2.2.7 Procurement and Materials. Buyers and suppliers using TQM work together to reduce costs and improve quality. By working with a single supplier for a long time, it is possible to establish a strong and mutually beneficial working relationship. Buyers should choose suppliers based on quality rather than price. Buyers should also work with suppliers to improve their quality (Sadikoglu and Zehir, 2010). Talib *et al.* (2013) also emphasize that previous studies show how a long-term collaboration develops a buyer-supplier relationship that directly affects competitiveness and performance. In addition, Jun and Cai (2010) emphasize the importance of a successful procurement process for customer satisfaction, especially in the service business.

2.2.8 Continuous improvement. Continuous improvement and innovation refer to an ongoing development process that improves the ability of processes to turn inputs into useful outputs (Talib *et al.*, 2013; Mehmood *et al.*, 2014). Development work helps to reduce process variability, thus improving performance. Continuous focus on the core dimensions that affect performance has been proven to be the best way to increase an organization's performance (Talib *et al.*, 2013). Mehmood *et al.* (2014) state that continuous improvement is the part of TQM that guides a company in its management, including the efforts of individuals to achieve set quality goals, meet customer expectations and improve company performance. Jun and Cai (2010) also show that continuous improvement plays an essential role in customer satisfaction.

Table 1 shows what issues have been included in previous studies when addressing the effects of TQM. The data are sorted in the table in chronological order.

2.3 Novel approach to TQM dimensions

2.3.1 Risk management. Moore *et al.* (2000) state that the main goal of risk management is to protect the organization from financial losses. Sukumar *et al.* (2011) note that SMEs rarely

provide risk management training to their employees, although human error and neglecting to follow instructions may present a high risk to the SME. Lack of information on IPR protection may also increase the level of risk associated with SMEs. The ISO 9001: 2015 standard also requires companies to provide evidence of the risk management system before their quality system can be certified.

2.3.2 Stakeholder management. The hallmark of good management is that management understands how closely the company is connected to its stakeholders and identifies the strategies used by stakeholders in pursuing their own goals (Frooman, 1999). The EFQM (2019), which can be seen as a European TQM model, also urges companies to engage their key stakeholders. The EFQM identifies customers, personnel, financial stakeholders, regulatory stakeholders, society, suppliers and subcontractors as stakeholders with whom engagement is important. Moreover, in a system built according to the ISO 9001: 2015 standard, stakeholders and their requirements must be identified before certification.

2.3.3 Digitalization. Kotarba (2017) has stated that increasing productivity is required in all business sectors. One of the engines of growth has been identified as digitalization (Sehlin et al., 2019; Ukko et al., 2020), which the European Commission has also included in its 2020 strategy. In his research, Kotarba (2017) discusses the development of digitization extensively and states that although the process-like approach is strongly reflected, it is important to develop digitalization and its measurement along with business development to achieve the desired benefits. Parviainen et al. (2017) state that digitalization is a process of implementation: thinking of existing functions from a new perspective, utilizing the tools provided by emergent technology.

2.3.4 System deployment. Although much has been written about the positive effects of TQM, Hansson and Eriksson (2002) state that not all firms achieve the desired results with TQM. They report that the generally accepted reasons for failure are the vague requirements of TQM and the failed implementation of the system due to a poorly managed TQM project. Also, Mosadeghrad (2014) cites an inefficient TQM package, poor TQM deployment procedures and an unsuitable environment for deployment as the main reasons for failure.

2.4 Comprehensive view of TQM dimensions

Table 2 presents a comprehensive view of TQM dimensions, including both traditional and novel approaches presented in earlier sections. As shown, not all dimensions used in previous studies are treated as separate dimensions in this study. Although studies have been conducted on the effects of TQM on personnel satisfaction, customer satisfaction and reputation, they are based on a narrower definition of TQM than that of this study, which, based on careful analysis, selected 11 dimensions divided into 61 topics. The cases were balanced so that 34 cases were under soft TQM and 27 cases were under hard TQM. The respondent did not have to think about what things should or could be compared to competitors, so to harmonize responses, benchmarking was linked to processes and products. Some studies have highlighted benchmarking, which in this study has been interpreted as a single technology, not as an actual TQM dimension, so it is linked to process improvement and TQM dimensions related to products or services. Data and reporting that occur in previous studies have also been treated as a single technique and have been addressed in the statements of the management/leadership and process management dimensions. In addition, in terms of performance, data and reporting are important in the listed dimensions. Achieving organizational collaboration is a matter of leadership skills, so this was combined with the management/leadership dimension. The purpose of balancing the order and location of the dimensions and items was to minimize the potential effects of the common method bias already identified in the design stage. In addition, compared to previous studies, this study integrated risk management, digitization, system deployment efficiency and stakeholder management into TQM, which has not been implemented in previous studies.

Dimensions Traditional (T)/New (N)	Content of the items used in this study; S = soft item; H = hard item		Cronbach $\alpha > 0.7$
Management/ Leadership (T)	(1)	Organizational awareness of goals (S)	0.879
	(2)	Monitoring the achievement of goals (S)	
	(3)	Goal metrics and awareness of goals/goal metrics (S)	
	(4)	Management feedback on success (S)	
	(5)	Clarity of responsibilities and authority (S)	
Customer Focus (T)	(12)	Customer satisfaction assessment procedures (S)	0.691
	(13)	Customer satisfaction (S)	
Personnel (T)	(16)	Personnel knowledge of opportunities to influence customer satisfaction (S)	0.781
	(17)	Mapping of training needs (H)	
	(18)	Training programs to achieve goals (H)	
	(19)	Handling educational success (S)	
	(20)	Level of personnel competence (S)	
Processes (T)	(22)	Process efficiency (H)	0.829
	(23)	Measuring success and performance (H)	
	(24)	Process performance information (S)	
	(25)	Competitiveness of processes compared to competitors (S)	
Procurement and Materials (T)	(29)	Procurement efficiency (H)	0.730
	(30)	Material deficiencies (H)	
	(31)	Value of inventories (H)	
Products (T)	(34)	Competitiveness of products/ services (S)	0.729
	(35)	Product price/quality ratio (S)	
	(36)	Customer complaints about products/services (H)	
Continuous Improvement (T)	(39)	Overall level of continuous improvement in system (S)	0.804
	(40)	The level of operational development (S)	
	(41)	Control of corrective actions (H)	
Risk Management (N)	(44)	Identification of risks to operations/products (H)	0.819
	(45)	Maintenance of risk assessments (H)	
	(47)	Reduction of risks to operations/products (H)	

Table 2.
Content and reliability
of the used measures

(continued)

Dimensions Traditional (T)/New (N)	Content of the items used in this study; S = soft item; H = hard item		Cronbach $\alpha > 0.7$
Stakeholder Management (N)	(48) Stakeholder identification (S)	(51) Action plans to meet stakeholder requirements (H)	0.891
	(49) Identification of stakeholder expectations and requirements (S)	(52) Monitoring the implementation of stakeholder requirements (H)	
	(50) Objectives to meet stakeholder requirements (S)		
Digitalization (N)	(53) Exploiting the opportunities offered by digitalization (H)	(55) Level of utilization of digitization (H)	0.834
	(54) Digitalization and shop floor management (SFM) in operation and development of internal processes through digitalization (H)	(56) Identification of stakeholder requirements in the field of digitalization (S)	
System Deployment (N)	(57) Adherence to ratified practices (H)	(60) Effectiveness of practices (H)	0.844
	(58) Effectiveness of the implementation of agreed practices (H)	(61) Personnel awareness of the importance of adherence to practices (S)	
	(59) Monitoring compliance with ratified practices (H)		

Table 2.

2.5 Hypothesis development

2.5.1 TQM and customer satisfaction. Previous research has shown that as competition intensifies, TQM's role in product design, performance development and customer focus management grows. Customer satisfaction is one of TQM's most important goals, and it requires jointly agreed upon procedures and the organization's commitment to those procedures. With the success of developing its operations, a company can achieve excellence over its competitors through customer satisfaction (Sheikholeslam and Emamian, 2016).

Previous studies have reported positive results on the effects of different TQM dimensions on customer satisfaction (e.g. Beheshti and Lollar, 2003; Ooi *et al.*, 2010; Hassan *et al.*, 2012; Topalovic, 2015). Topalovic (2015) studies the effects of TQM in the banking industry using commitment of top management, courtesy, responsibility and tangible elements as TQM dimensions. He shows that all other dimensions of TQM have a positive impact on customer satisfaction except tangible elements. He also reports that by increasing the range of services offered, banks are able to improve customer satisfaction and customer loyalty.

Hassan *et al.* (2012) study 171 Pakistani industrial companies. As TQM dimensions, they use employee involvement, commitment to quality, fact-based management, customer focus, process monitoring and control, continuous improvement orientation and incentive and recognition system. Their research concludes that the successful implementation of TQM improves organizational performance, which is most likely to be reflected in customer satisfaction and quality, among others. Similarly, Ooi *et al.* (2010) study the connection between TQM practices and customer satisfaction and also TQM and service quality in Malaysian SMEs. Their TQM dimensions are strategic planning, leadership, customer focus, information and analysis, human resource focus and process management. This research shows that all TQM dimensions with the exception of human resource focus have a significant positive impact on customer satisfaction and service quality. In addition, they emphasize that customer focus as well as information and its analysis are heavily connected to service quality and customer satisfaction.

EFQM emphasizes the following customer satisfaction management procedures in EFQM [section 3.1](#): identifying customer groups, managing customer relationships, creating sustainable value for customers, understanding the needs of customer segments and interacting with customers. In addition to procedures, EFQM handles the results as customer insights, which can focus on, for example, customers' perceptions of the company, the commitment of the personnel, the company's products and services, the company's reputation, sustainable value creation, deliveries and communication. ISO 9001:2015 has also made customer focus part of the system to be certified by requiring organizations to conduct a customer-centric operation (ISO 9001: 2015 section 5.1.2) and monitor customers' views on how well the organization has met its customers' expectations. Based on the preceding evidence, [H1](#) is proposed as follows:

H1. TQM has a statistically significant effect on customer satisfaction.

2.5.2 TQM and personnel satisfaction. Previous research on the positive effects of TQM on employee satisfaction (e.g. [Boselie and van der Wiele, 2001](#); [Ooi et al., 2008](#); [Kabak et al., 2014](#); [Arunachalam and Palanichamy, 2016](#); [Iqbal and Asrar-ul-Haq, 2018](#); [Sanjaya, 2018](#); [Ahmed and Idris, 2020](#); [Babu and Thomas, 2021](#)) has been conducted using a variety of TQM dimensions. [Boselie and van der Wiele \(2001\)](#) study the effects of the combined factors of human resource management (HRM) and TQM on individuals' satisfaction and intentions to change jobs. Based on an extensive literature review, they identify key research subjects, including the format of information delivery, insight into goals and objectives, work conditions, co-operation within business units, information sharing, leadership, customer focus and salary. The analysis reveals that the positive perception of individual employees of the company's HRM/TQM factors leads to good satisfaction and reduces the idea of changing jobs. In that study, employee satisfaction is most strongly supported by co-operation within business units, leadership and salary.

[Ooi et al. \(2008\)](#) study the influence of TQM dimensions on employee job satisfaction in Malaysian electronics companies. They divide TQM into the following dimensions: education and training, leadership and management commitment, customer focus, organizational culture and teamwork. Their research shows that the selected TQM dimensions have a positive and significant impact on employee satisfaction. [Arunachalam and Palanichamy \(2016\)](#) study the impact of TQM dimensions on Indian industrial personnel. They use as TQM dimensions training, employee empowerment, teamwork, customer focus, appraisal system, top management commitment, continuous improvement, employee involvement and organizational trust. The results of their study show that employee training, employee empowerment, appraisal system, top management commitment and continuous improvement explain both job satisfaction and commitment in a statistically significant way. [Kabak et al. \(2014\)](#) study the effects of TQM in Turkish service industries. As dimensions of TQM, they use employee relations and teamwork, employee training and education, employee reward and recognition, employee empowerment and quality culture. Their study shows that all selected TQM dimensions have an influence on job satisfaction. A result of the author's review is that there is an influence of TQM on employee satisfaction.

[Chaichi and Chaichi \(2015\)](#) and [Ahmed and Idris \(2020\)](#) report a positive effect of TQM on personnel satisfaction. [Sanjaya \(2018\)](#) analyzes the role of TQM in personnel satisfaction and organizational performance in Indonesia and uses top management commitment, implementation of TQM philosophy, customer management, supplier management, benchmarking, training, open organization, employee empowerment, zero-defects mentality, flexible manufacturing, process improvement and measurement as dimensions of TQM. His results show that TQM has a positive and significant effect on company performance and personnel satisfaction and that personnel satisfaction has a significant effect on company performance. Recognition, leadership and guidance, work environment,

working conditions and occupational safety are considered significant influencing factors for positive results (Sanjaya, 2018).

The EFQM highlights personnel-related practices in EFQM section 3.2 by considering employee needs, developing personnel to achieve goals, the importance of communication, caring for personnel, having a positive work atmosphere and ensuring competence. The EFQM also promotes the monitoring of the results obtained by established procedures in the “Results describing the views of the personnel” section, which shows the satisfaction of personnel with the chosen policies. ISO 9004: 2018 indicates the importance of personnel satisfaction by recommending continuous reviews of employee satisfaction levels in ISO 9004: 2018 section 9.2.2. Based on the preceding evidence, H2 is proposed as follows:

H2. TQM has a statistically significant effect on personnel satisfaction.

2.5.3 *TQM and company reputation.* There are some indications that TQM may also enhance a company’s reputation (Beheshti and Lollar, 2003; Yusuf *et al.*, 2007; Mourougan and Sethuraman, 2017; Yousif *et al.*, 2017). Yousif *et al.* (2017) investigate the effects of TQM in the field of health care. They use quality systems, medical and sanitary personnel, quality leadership, continuous improvement, relationships with suppliers and relationship with the patient as TQM dimensions, and one of the six hypotheses investigated is the positive impact of TQM on the reputation of the hospital. The researchers report that, with the exception of medical and sanitary personnel, all other dimensions have a positive impact on the reputation of hospitals.

Yusuf *et al.* (2007) study TQM practices in Chinese companies and find that in addition to influencing several performance elements such as customer satisfaction, market share, personnel, operations and products as well as services, TQM also has a significant positive impact on a company’s reputation. Researchers state that more than 68% of respondents report positive effects on the company’s reputation.

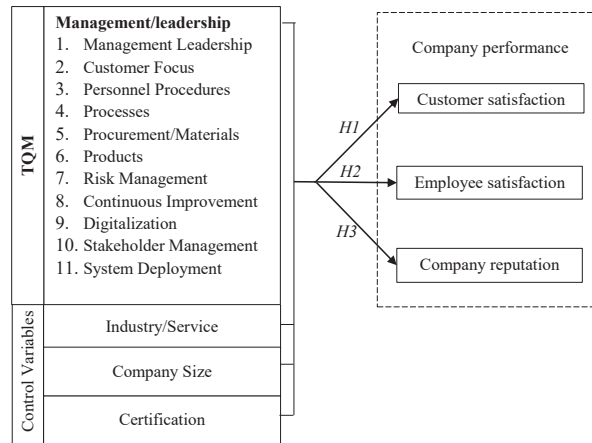
Some studies conclude that TQM has indirect implications for company reputation. Beheshti and Lollar (2003) state that quality significantly affects the value of industrial firms’ products. By improving the quality of its products, a company can influence its quality reputation while also increasing its market share. Mourougan and Sethuraman (2017) study the effects of TQM in service industries. They state that reputation depends on the qualitative performance of the company. Effective design leads to both improved product reliability and increased reputation. A reputation based on the reliability of products is sustainable because the reputation growth based on it is difficult to copy. The reliability of products or services leads to an increase in their reputation, which is part of a company’s reputation and market advantage. The good performance of products compared to those of competitors can create a strong positive reputation, which is likely to affect a company’s performance. As previously stated, the loss of reputation is one of the greatest risks for firms (Vig *et al.*, 2017). The EFQM considers the reputation of an organization as a measure of excellence in criterion 6. Based on the preceding evidence, H3 is proposed as follows:

H3. TQM has a statistically significant effect on reputation.

2.6 Summary and research framework

Based on the previous sections, a framework was designed for this study, as shown in Figure 1, covering a comprehensive range of TQM dimensions, separating this research from previous TQM studies. As previously noted, TQM affects customer satisfaction and service quality (e.g. Ooi *et al.*, 2010), as well as performance reflected through customer satisfaction (e.g. Hassan *et al.*, 2012) and product quality that improves customer satisfaction (e.g. Wantara and Tambrin, 2019). Although slightly different dimensions of TQM have been used in previous studies, it can be proposed that TQM also has a positive effect on

Figure 1.
Research framework
and hypotheses: the
effects of TQM and
control variables on
the issues under
investigation



personnel satisfaction, as described by [Boselie and van der Wiele \(2001\)](#), [Ooi et al. \(2008\)](#) and [Arunachalam and Palanichamy \(2016\)](#). Personnel satisfaction plays an essential role in companies. According to [Bin \(2015\)](#), there is a direct link between personnel satisfaction and commitment. Personnel satisfaction has a positive effect on business and increases profitability, while satisfaction increases personnel commitment. This is important because low commitment can lead to poor profitability, poor customer service and high employee turnover. [Jalagat \(2016\)](#) finds that job satisfaction, job performance and motivation interact. In terms of job satisfaction and performance in teamwork, higher job satisfaction leads to better performance. Finally, [Beheshti and Lollar \(2003\)](#), [Yusuf et al. \(2007\)](#), [Mourougan and Sethuraman \(2017\)](#) and [Yousif et al. \(2017\)](#) concluded in their TQM studies that TQM has a positive influence on a firm's reputation. A good reputation is important for companies. [Lee and Roh \(2012\)](#) show that company reputation has a significant effect on performance. [Hall and Lee \(2014\)](#) also report a positive effect between firm reputation and performance. They emphasize the importance of reputation in a company's success and regard it as a strategic competitive factor that must be considered by company management. [Li et al. \(2016\)](#) report that reputation has a significant effect on a company's performance, which is reflected in the company's growth opportunities.

Based on the above, this study considers customer satisfaction, personnel satisfaction and company reputation as important dimensions of company performance. Therefore, this study investigates the effect of TQM on company performance in terms of customer satisfaction, personnel satisfaction and company reputation. In addition, the framework includes the company's industry, company size and system certification as control variables.

3. Methodology

3.1 Sample and data gathering

The survey was executed among SMEs in Finland that had a maximum of 250 employees and a turnover of less than EUR 50 million according to the definition of SMEs. Only companies over five employees were accepted in this study. It was a requirement that the firm had more than five employees to ensure that the formal routines and processes of TQM take place.

A short summary of the research and its goals was forwarded to the top management of 6,889 randomly selected SMEs. In accordance with the focus of this study, the use of top management as a respondent is justified because it has the best knowledge of company operations and an understanding of how company operations are positioned relative to competitors. The study utilized two reminders and gained 271 useable responses, corresponding to 3.9% of the total mailing. All respondents were CEOs.

Of the responses, 163 (60.1%) came from industrial companies, of which 80 were uncertified and 83 were certified. A total of 108 responses came from service-oriented companies, which represented 39.9% of the responses. Of the service-oriented companies, 85 were uncertified and 23 were certified. Altogether, 165 of the companies were uncertified and 106 were certified.

3.2 Measures

The study's unit of analysis is the single respondent's comprehension of TQM dimensions and organizational performance (in terms of customer satisfaction, employee satisfaction and reputation). In this study, TQM is divided into 11 dimensions according. These 11 dimensions are the independent variables of the study. The dimensions are: management/leadership, personnel, customer focus, processes, product/service, procurement/materials, risk management, digitalization, continuous improvement, system deployment and stakeholder management. TQM was assessed with subjective measures. For each of the 11 TQM dimensions, several items needed to verify the TQM dimensions were designed. At the same time, the selected items were classified as belonging to either the soft or hard elements of TQM. A total of 61 items were designed, including 34 items classified as soft elements and 27 items classified as hard elements. The slight shift in focus to soft items is explained by the fact that all items in the management/leadership dimension were classified as soft in this study, although, for example, strategy and product/service development could have been classified as hard elements. The purpose of classifying the items used in the study into hard and soft elements was to ensure that the study forms a balanced analysis of the TQM system in which both elements are properly represented. This classification is shown in [Table 2](#). Reliability was tested using Cronbach's alpha values, which ensured the reliability of the constructs.

Three control variables were included. The company's industry was used as a control variable, as the focus of TQM is slightly different between industrial and service sectors. The industry control variable was measured by asking respondents whether the company was mainly an industrial company or mainly provides services. Company size was used in the study as the development of TQM grows as company size increases. Larger companies are assumed to have more resources available for development than small companies. The company size in this study was described by the number of employees, which varied between 5 and 250, making them SMEs. Certification is common in Finland, and companies invest considerably in it. Certification is used as a control variable, as it affects customer satisfaction, personnel satisfaction, or company reputation. The respondents were asked whether the company had a quality certificate.

Responses to the statements were given based on a Likert scale of 1–5 (5 = “strongly agree”, 1 = “strongly disagree”). In addition, the survey included specific questions about the organization, such as the existence of possible certification (measured as dummy variable yes or no), the industry of the business (measured as a dummy variable divided between service and industry) and the size of the company (measured as the number of employees). Respondents' perceptions of customer satisfaction, personnel satisfaction and the company's reputation were also added to the survey as dependent variables. These concepts refer here to organizational-level performance as comprehended by the single respondent. These responses reflect the degree to which the company representative assesses how the entire

company performs. It has been found that objective measures are more valid than subjective measures. However, the literature has shown that there is a high correlation and simultaneous validity between objective and subjective measures (e.g. Venkatraman and Ramanujan, 1987).

The exact items used in this study can be requested from the authors. The design of the items has taken into account the main principles highlighted by the study. The reliability of the collected data was checked using the Cronbach alpha coefficient. All but one of the Cronbach alpha coefficients were above 0.7. The Cronbach alpha value for customer focus is 0.691, which is 0.009 below the limit value of 0.70. The difference is so small that it is not necessary to consider the heterogeneity of the data or mutual correlations.

The selected items are grouped into either hard or soft items, as previously described. The division is by no means unambiguous, and even in this study, some items can be interpreted as belonging to both groups, depending on how the evaluator thinks about the matter.

3.3 Common method bias and non-response bias

Podsakoff *et al.* (2003) note that several researchers accept the idea that variance arising from research methods is a potential problem in behavioral research. Problems with common method bias may be due to the data being obtained from a single respondent, the use of a harmonized measurement procedure, or poor study design. The potential problem can be prevented by, for example, taking into account the study's temporal implementation and by differentiating the different measurement methods, emphasizing the anonymity of the answers and counterbalancing question order properly so that the logical progress of the research is not jeopardized (Podsakoff *et al.*, 2003).

Because in this study the same respondents were used as the sources for all gathered information, there was a risk that the common method bias would distort the results of the study. This potential problem was already addressed at the design stage of the study by conducting a very extensive literature review, which broadened the view of previous studies on the subject and developed detailed items for different dimensions. The survey ensured that the answers were given anonymously, so there was no need for respondents to respond to the items contrary to their own opinions. Respondents had the opportunity to choose the most suitable time for themselves, and it was not necessary to fill in all the answers at the same time. There was also no time limit for completing the questionnaire, so respondents were able to think about their answers before answering. The survey was targeted at individuals who were perceived as being in the best position to respond to the items. When designing the actual survey, the counterbalancing question order was taken into account to determine the correct order of presentation for the dimensions and items. This led, among other things, to the integration of issues related to the reporting and data analysis of traditional TQM into management and benchmarking into processes and products. The correct placement of the items provided a logical order of progression for the survey. Taking into account all the remedies taken, it can be proposed that the common method bias is not a factor in this study.

Non-response bias means uncertainty caused by non-response to the study. This uncertainty was tested by one-way ANOVA analysis, comparing responses in every dimension by carefully selected control groups. The control groups were selected based on the suggestion of Whitehead *et al.* (1993). They state that non-response bias can be examined by comparing the answers of the fully responded and the ones that did not fully respond to all items of the survey. For this reason, control groups were formed so that the first group consisted of responses that fully answered all the items and the second group consisted of responses in which some items had not been answered. The results of the one-way ANOVA ranged from $0.02 < p < 0.95$, when statistical significance is achieved if $p \leq 0.01$. The result of the analysis shows that non-response bias is not a factor in this study.

4. Results

This section presents the results of the correlation and regression analyses according to the research framework. The results show the effects of the TQM dimensions and control variables on customer satisfaction, personnel satisfaction and company reputation. Table 3 shows the correlations of the explanatory factors with the three control variables.

Table 3 shows that the number of employees has a small negative correlation between customer satisfaction, personnel satisfaction and reputation. In addition, there is a negative correlation between certification and customer satisfaction. The highest correlations with customer satisfaction are with system deployment and customer focus. With personnel satisfaction, the highest correlations are with management and system deployment. Reputation has the highest correlations with product and process.

Table 4 shows the results of the regression analysis. The results show that the explanatory power of TQM dimensions for customer satisfaction is almost 20%, for personnel satisfaction 20.5% and for reputation 12.3%. The result of the *F* test is 4.5480 ($p \leq 0.001$) for customer satisfaction, 4.7394 ($p \leq 0.001$) for employee satisfaction and 2.5868 ($p \leq 0.01$) for reputation, so all analyses are useful, and their significance clearly exceeds the limit of statistical significance.

Considering H1, it is revealed that the dimensions of Customer Focus and Products have a significant statistical explanatory power to customer satisfaction, and the *t*-value of both TQM dimensions is positive. The *p*-values for Continuous Improvement and System Deployment are approaching the limit of statistical significance but have not reached it. Of these dimensions, the *t*-value of Continuous Improvement is negative. The ability of other TQM dimensions to explain customer satisfaction is weak. It should be noted that the control variables certification, company size and company industry do not explain customer satisfaction at all. Thus, the results support H1 by indicating that customer satisfaction is positively affected by Customer Focus and Products development.

In H2, that is, in examining personnel satisfaction, it is found that the dimensions of Management/leadership ($p \leq 0.01$), Customer Focus ($p \leq 0.05$), Personnel ($p \leq 0.05$) and Risk Management ($p \leq 0.05$) are below the statistical significance limit value of 0.05. The results also show that Customer Focus, Risk Management *t*-values are negative. The *p*-value of the System Deployment approaches statistical significance but has not reached it. Thus, the results support H2 by indicating that personnel satisfaction is positively affected by Management/leadership, Personnel development. However, personnel satisfaction is negatively affected by excessive Customer Focus, Risk Management.

Explanatory factors	Correlation		
	Customer satisfaction	Personnel satisfaction	Reputation
Number of employees	-0.027	-0.035	-0.006
Industry/service	0.047	0.003	0.013
Certification	-0.008	0.033	0.035
Management/leadership	0.263	0.372	0.250
Customer focus	0.308	0.103	0.250
Personnel	0.204	0.303	0.204
Processes	0.278	0.252	0.260
Procurement/materials	0.216	0.100	0.210
Products	0.372	0.221	0.297
Risk management	0.198	0.143	0.238
Continuous improvement	0.210	0.271	0.248
Digitalization	0.201	0.237	0.179
Stakeholder management	0.275	0.227	0.244
System deployment	0.321	0.312	0.250

Table 3.
Correlations of
explanatory factors
with customer
satisfaction, employee
satisfaction and
reputation

Table 4.
Regression analysis
results

TQM dimensions	Customer satisfaction		Personnel satisfaction		Reputation	
	<i>t</i>	<i>p</i>	<i>t</i>	<i>p</i>	<i>t</i>	<i>p</i>
Intercept	7.261	4.606E-12	6.773	8.583E-11	6.441	5.810E-10
<i>Control variables</i>						
Number of employees	-0.166	0.868	0.667	0.505	0.451	0.651
Industry/service	0.025	0.980	-0.076	0.939	-0.471	0.637
Certification	-0.381	0.703	0.731	0.465	1.074	0.283
<i>Independent variables</i>						
Management/leadership	-0.417	0.676	3.297	0.001 (**)	-0.115	0.908
Customer focus	2.680	0.007 (**)	-2.358	0.019 (*)	1.282	0.200
Personnel	-0.878	0.380	2.005	0.045 (*)	-0.444	0.657
Processes	0.543	0.587	0.577	0.563	0.584	0.559
Procurement/materials	0.080	0.935	-1.398	0.163	0.578	0.563
Products	3.149	0.002 (**)	-0.386	0.699	1.868	0.062
Risk management	-1.023	0.307	-2.236	0.026 (*)	0.536	0.592
Continuous improvement	-1.698	0.090	0.143	0.886	0.105	0.915
Digitalization	0.913	0.361	1.172	0.242	0.473	0.636
Stakeholder management	1.585	0.114	0.609	0.542	0.924	0.355
System deployment	1.732	0.084	1.667	0.096	-0.126	0.899
<i>F</i>	4.548 (***)		4.739 (***)		2.586 (**)	
<i>R</i> ²	0.199		0.205		0.123	
Adjusted <i>R</i> ²	0.155		0.162		0.076	
Note(s): Significance *0.01 < <i>p</i> ≤ 0.05; **0.001 < <i>p</i> ≤ 0.01; *** <i>p</i> ≤ 0.001						

Considering H3, the results in Table 4 show that none of the selected TQM dimensions or control variables have a statistically significant explanatory power in terms of reputation. It should also be noted that the *t*-values for Management/leadership, Personnel, System Deployment are negative.

5. Discussion

This study investigates the influence of TQM on customer satisfaction, personnel satisfaction and company reputation. Thus, this study contributes to the TQM management literature by showing the effect of TQM by using soft and hard items of each dimension. These results are discussed next.

First, the study shows that customer satisfaction is explained by Customer Focus and Products development. The findings make sense as focusing on customers' needs and developing the best possible products and services for them are proven to be necessities to ensuring customer satisfaction. Thus, it can be stated that the study is in line with prior research as it supports the findings of Beheshti and Lollar (2003), Ooi et al. (2010), Hassan et al. (2012) and Topalovic (2015). The results of the effect of product/service development on customer satisfaction are also supported by Lin et al. (2011) and Wantara and Tambrin (2019). On the other hand, it is somewhat surprising that some other TQM dimensions, such as Management/leadership, Processes, Continuous Improvement, are not significantly related to customer satisfaction. For example, Garcia-Alcaraz et al. (2021) stress the importance of management and operators in achieving customer satisfaction. Jun and Cai (2010) identify continuous improvement and management of the procurement process as the most important criteria affecting customer satisfaction in service providers, but they are not relevant in this study.

The reason why expectations were not met very well may be that the issues examined are internal to companies that aim to improve performance and are also included in

the ISO 9001 requirements. In Finland, this standard has been used for almost 40 years in the internal development of companies, so its impact on external results is not noticeable even within the company. On the other hand, because there are thousands of certified companies in Finland and the focus of certification is on management, processes, problem handling and continuous improvement, it has also been possible to link these issues to certification and internal development rather than to improving customer satisfaction, although customer satisfaction also plays a significant role in the requirements of the standard.

Second, the study shows that personnel satisfaction is explained by Management/leadership, Customer Focus, Personnel, Risk Management. The results are in line with the studies of [Bosele and van der Wiele \(2001\)](#), [Ooi et al. \(2008\)](#) and [Kabak et al. \(2014\)](#). Comparing the results of this study to [Arunachalam and Palanichamy \(2016\)](#), both studies report a positive effect on personnel satisfaction in terms of management/leadership and personnel procedures. This result is reasonable as putting emphasis on personnel by developing their skills as well as supporting their daily work has long been proven to be a significant predictor of their satisfaction.

Moreover, [Sanjaya \(2018\)](#) notes that the implementation of TQM has a positive effect on personnel satisfaction. The current study shows that only the management/leadership and personnel activities of the selected dimensions have a statistically significant positive effect on personnel satisfaction, partially supporting the view of [Sanjaya \(2018\)](#). [Chaichi and Chaichi \(2015\)](#) report that in addition to empowerment and employee training, appraisal systems and compensation have positive effects on personnel satisfaction. This is consistent with the results of the current study, although the topic studied differed slightly.

According to [Ahmed and Idris \(2020\)](#), all aspects of TQM, namely top management commitment, employees' empowerment, training and education, teamwork and employees' involvement, have a direct and positive effect on personnel satisfaction, consistent with the results of the current study. Both studies show the importance of management/leadership in good personnel satisfaction. [Ahmed and Idris \(2020\)](#) also emphasize the importance of good personnel satisfaction in competing for employees in the future. Therefore, top management should identify carefully which procedures maximize the implementation of TQM principles.

However, the study also revealed that putting an emphasis on Customer Focus yields a negative effect on personnel satisfaction. This can be the result of a company's urge to put all emphasis on meeting customer needs and forgetting to take care of its employees. In this sense, customer focus may mean too much pressure for employees in terms of working tasks and go some way to explaining the negative impact on personnel satisfaction. The results also show a negative impact of risk on personnel satisfaction. This is a novel finding as no prior research has found such an effect. The reason for this negative effect could be the insecurity that risk management can cause in companies. If all possible risks interfering with the company operation are continuously detected, personnel may start feeling insecure in their work and have doubts about the future of the company. This type of uncertainty can in turn cause decreased personnel satisfaction. As noted earlier, [Sukumar et al. \(2011\)](#) has reported low risk management training for SMEs, which may also be one reason for this result. However, top management needs to pay attention to the balance of the different dimensions. Businesses must not allow heavy investment in one important area to adversely impact other, equally important, parts of the organization. Management should ensure that it has measurement information on the state and evolution of the various dimensions so that they can effectively manage their management system.

Third, the study shows that none of the TQM dimensions affected company reputation. In addition, none of the three control variables explain reputation in a statistically significant way. The result of this study considering the influence of TQM on reputation are thus in conflict with previous studies, such as [Beheshti and Lollar \(2003\)](#), [Yusuf et al. \(2007\)](#) and [Mourougan and](#)

Sethuraman (2017). The closest to statistical significance was found to be the product, which also has the highest correlation with reputation. Note that company reputation plays a significant role in companies' success when intensifying competition. This study shows that TQM and certification have no effect on company reputation in Finnish SMEs. The weak effect of TQM on reputation is explained by the fact that most Finnish SMEs serve as subcontractors to larger companies, in which case the most significant requirement is to deliver customers' specified products on time. As improving reputation is a long-term task, new TQM systems have not had time to show their strengths as reputation enhancers. The fact that certification does not affect company reputation but the quality standard ISO 9001: 2015 includes all the main points of TQM indicates that certifiers accept weak systems for certification and companies receive certification without proper evidence of improvement (Poksinska, 2010).

In this context, although TQM has a positive effect on company operations, its effect alone is usually insufficient, and a well-functioning innovation strategy can help to implement TQM and deliver results (Khalfallah *et al.*, 2022). Finnish SMEs may have too much confidence in the possibilities provided by TQM and certification, and thus, some of the benefits may not be received.

6. Conclusions

This study demonstrates the relationship between comprehensive TQM and customer satisfaction, personnel satisfaction and company reputation. The study contributes to the TQM literature by investigating the role of TQM in company performance by utilizing a comprehensive framework of contemporary TQM dimensions. The specific theoretical and managerial contributions are given below.

6.1 Theoretical implications

First, the study shows that TQM is positively connected to customer satisfaction as Customer Focus, Products development were significant determinants of customer satisfaction. Second, the study shows that two TQM dimensions, Management/leadership, Personnel development, are positively related to personnel satisfaction, whereas two TQM dimensions, excessive Customer Focus, Risk Management, are negatively related to personnel satisfaction. Third, the study concludes that TQM is not correlated to reputation. Finally, the results show that certification has no effect on customer satisfaction, personnel satisfaction or reputation. The results of the study also show that neither the number of employees in the company nor the company's industry has any effect on customer satisfaction, personnel satisfaction or company reputation.

Deming developed the basic ideas of TQM as early as the 1950s. In Europe, the EFQM has become a basic document describing TQM, consisting of five areas of procedural criteria and two result areas. The ISO 9001 standard, updated in 2015, has converged with the TQM idea by linking issues related to the organization's context and the handling of risks and opportunities to the requirements. These issues need to be addressed in nearly 1m certified systems worldwide. This study combines the dimensions of TQM that emerged from an extensive literature review with the requirements of EFQM and ISO 9001, creating a well-justified scope for examining the effects of TQM in future TQM studies.

6.2 Managerial implications

This study provides new insights for SME leaders to consider TQM-related elements in their own company development activities to ensure a holistic approach to continuous improvement. The results of the study show that a company's management should plan carefully what issues and procedures should be developed and that management should not

be confident that a company's TQM or certified system would be sufficient to correct the issues. Specifically, corporate management should consider the non-existent effect of a certified system. Once this fact has been identified, the management of SMEs should consider how they can increase the effectiveness of their certified quality system as it will involve annual costs in any case. Given the large number of certified systems, this finding is important worldwide, not just in Finland.

6.3 Future research directions

Future research focusing on a similar topic is recommended to find out why certification does not increase customer satisfaction, even though the requirement for certification may come from the customers themselves and the 2015 updates to standard ISO 9001 used for certification are in accordance with the TQM principles. Another area of future research highlighted is continuous improvement: its mechanism of action, why it has a modest impact on personnel satisfaction and why raising its level would appear to have a negative influence on customer satisfaction. A third recommendation for future research is the impact of customer focus and risk management mechanisms on personnel satisfaction as the *t*-values for these dimensions were found to be negative. In addition, where possible, surveys could be designed with either full or partial stakeholder representation as respondents. This perspective could provide additional insights into the current understanding. Future studies could also test the interconnections between TQM dimensions and additional procedures that could be used to enhance the effectiveness of TQM.

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Publication III

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Facilitating SMEs' profitability through total quality management: the roles of risk management, digitalization, stakeholder management and system deployment

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**Facilitating SMEs' profitability through total quality management:
The roles of risk management, digitalization, stakeholder management, and system
deployment**

Structured Abstract

Purpose - This study investigates the effect of total quality management (TQM) on small and medium enterprises (SMEs)' profitability by examining whether the new TQM dimensions of risk management, digitalization, stakeholder management, and system deployment, facilitate the impact of traditional TQM dimensions on profitability.

Design/methodology/approach - A structured survey of 271 Finnish SMEs divided into industry companies and service companies.

Findings - Risk management facilitates the relation between continuous improvement and company profitability. Digitalization does not facilitate the relation between TQM dimensions and company profitability. Stakeholder management facilitates the relation between management/leadership and company profitability, customer focus and company profitability, and continuous improvement and company profitability. System deployment does not facilitate the relation between TQM dimensions and company profitability.

Originality - Most prior studies are based on the traditional TQM classification. The TQM dimensions of this study are more comprehensive than previous studies and take into account the latest trends in business development. The findings of this study differ from most previous studies and provide a source of reflection for SME management on how TQM should be implemented so that it affects the company's profitability.

Keywords: total quality management; profitability; SME; digitalization; risk management; stakeholder management; system deployment

1 Introduction

TQM is a philosophy that also includes many principles that guide and promote companies' operations (Padma et al., 2008). TQM is thus considered a critical success factor for both the service and manufacturing industries (Nasim, 2018), especially when striving for excellence in customer satisfaction, reliability, productivity, and market share (Gadenne and Sharma, 2009). Additionally, TQM has been shown to support

organizational innovation (Singh and Smith, 2004), competitive advantage (Douglas and Judge, 2001), and corporate culture (Irani et al., 2004), which explain companies' willingness to invest in TQM adoption. Numerous previous studies indicating the positive effect of TQM implementation on companies' performance (e.g., Adebajo and Kehoe, 1999; Kaynak, 2003; Hansson and Eriksson, 2002; Kumar et al., 2009; Sadikoglu and Zehir, 2010; Valmohammadi, 2011), together with global, turbulent, and tightening markets, keep the TQM approach relevant for both researchers and practitioners. Despite the various positive impacts of a TQM approach, TQM's content and practical implementation are not tightly and comprehensively defined, although quality award criteria reduce this problem (Modgil and Sharma, 2017).

There are many studies about the effects of traditional TQM on company performance, but few focus on the effects of TQM on profitability, and the results are partly contradictory (e.g., Shafiq et al., 2019). Hence, the first aim of the study is to examine the impact of traditional TQM on a company's profitability and whether certification, the company's industry, and the company's size have a role in this interaction. The second aim is to examine whether traditional TQM affects a firm's profitability through extended TQM dimensions. The analysis is based on survey data from 271 respondents from small and medium enterprises (SMEs) operating in the service and manufacturing industries in Finland. To ensure reasonable targeting and adequate coverage for this study, we conducted an extensive literature review of previous TQM studies, and the traditional TQM elements were supplemented with additional elements affecting firm performance that emerged from the literature. This resulted in TQM dimensions covering not only traditional TQM but also stakeholder management, digitalization, risk management, and system deployment.

So far, in the studies on the profitability effects of TQM, the target group has most often been large companies. However, worldwide, most companies are SMEs, so it is essential to study the impact of TQM on them, in particular on their profitability. The coverage of previous studies has also been incomplete, as they do not take into account the requirements of the European Foundation for Quality Management (EFQM) and the Quality Standard ISO 9000 in their scope, but are most commonly based on the traditional understanding of TQM. By complementing the basic elements of TQM, we aim to ensure that the study covers not only traditional TQM, but also the requirements of EFQM and the ISO 9000 Quality Standard.

The structure of the paper is as follows. Next, we present the literature review, hypotheses development, and research model. Then, the study's methodology, results, discussion, and conclusions are summarized.

2 Literature review

2.1 TQM: general

TQM stands for total quality management, which consists of several components and is generally thought to be a management philosophy and mindset. TQM is associated with the concept of a high-quality organization, and TQM is believed to help companies that focus on improving their performance (Gadenne and Sharma, 2009). TQM is understood as both a philosophy and a set of guiding principles that continuously serve as the basis for improvement and are internalized by the organization (Padma et al., 2008). According to Nasim (2018), regardless of whether it is a service or a manufacturing business, TQM is known as one of the critical success factors. TQM theories are widely used in the search for competitive advantages and opportunities for success in a competitive market. Because TQM is seen as supporting business innovation (Singh and Smith, 2004) and competitive advantage (Douglas and Judge, 2001), as well as improving corporate culture (Irani et al., 2004), companies are willing to invest significantly in TQM implementation.

In addition to the goal of high quality, TQM also aims to continuously improve all processes, as the competitive advantage, once achieved, is not static (Milovanović, 2014). The ultimate purpose of TQM implementation is to serve customers with quality products or services that lead to increased productivity and lower costs (Psomas et al., 2014). Adebajo and Kehoe (1999) note that common factors influence the formation of culture, even though culture is firm-specific. Such culture-influencing TQM elements include management procedures, employee participation and empowerment, customer orientation, supplier collaboration, teamwork, and transparency. In addition, they note that action to change culture is almost certainly opposed in all organizations, so the work is not easy. However, it has been shown that organizations that successfully change their culture report improved performance.

Talib et al. (2013) state that TQM emphasizes the importance of quality culture in improving TQM performance so that the results achieved are permanent. When a new system is implemented in an organization, all employees in the organization must adapt to it. Employees are given training, and their roles change, leading to an overall cultural change in the organization. It is this change process that causes resistance in organizations; Adebajo and Kehoe (1999) mention that this is often seen at different levels of the firm. Nasim (2018) reports that TQM implementation not only increases the performance of a particular part of the organization but also leads to an increase in the overall performance of the business. Yusuf et al. (2007) state that performance growth depends on the effectiveness of TQM deployment. Oakland (2011)

also notes that increasing profitability requires continuous improvement of processes and effective implementation of TQM. To achieve results, TQM requires changes, especially in management and corporate culture. Changes need to be reflected within the company and between the company and its stakeholders. When successful, TQM promotes training, participation, teamwork, and communication that impact business performance (Milovanović, 2014). Failure to implement TQM is due to a lack of commitment from top management (Kaynak, 2003).

2.2 TQM: Traditional and new views

As stated earlier, TQM's content and practical implementation are not tightly or comprehensively defined (Modgil et al. 2017). To ensure correct targeting of this study, a comprehensive literature review was conducted, resulting in classification of the traditional TQM dimensions regularly referenced in previous studies. Table 1 shows that traditional TQM clearly includes seven main dimensions: management/leadership, customer focus, personnel, process management, product/service management, materials and suppliers, and continuous improvement.

- Management/leadership refers to the extent to which top management can guide the company in the implementation of quality management programs as well as set goals to direct enhanced performance (Mehmood et al., 2014).
- Customer focus refers to the acknowledgment that the company's success depends on how effectively it satisfies customer needs (Sila, 2007).
- Personnel highlights the role of personnel as a company's most important resource (Mehmood et al., 2014). It is necessary to develop people's skills and take care of their work satisfaction (Sadikoglu and Zehir, 2010; Ahmed and Idris, 2020).
- Process management concentrates on monitoring how company operations are executed (Sadikoglu and Zehir, 2010).
- Product/service management refers to the improvement of product and service quality to enhance customer satisfaction and performance (Dreyfus et al., 2004).
- Materials and suppliers refers to collaboration with buyers and suppliers to improve quality and reduce costs, among other factors (Sadikoglu and Zehir, 2010; Talib et al., 2013).
- Continuous improvement means implementing a development process that enhances the capability of processes to translate inputs into purposeful outputs (Talib et al., 2013; Mehmood et al., 2014).

In this study, in addition to traditional TQM, risk management, stakeholder management, digitalization, and system deployment were selected as TQM dimensions. These choices are justified as follows:

According to Vinni (2007), national quality award programs have clarified the TQM concept. The most commonly used frame of reference for this purpose is the Malcolm Baldrige National Quality Award (MBNQA). The European Foundation for Quality Management (EFQM) has created its own framework of reference, which is most commonly used in Europe. As the research focuses on Finland, it has utilized the EFQM's criteria to define the research's dimensions and to identify them. This identification is documented in Table 1.

A system that is certified according to ISO 9001 is often called the first step in TQM (Douglas et al., 2003 and Padma et al., 2008), so the requirements of the standard are also closely linked to this study according to Table 1.

The principal purpose of risk management is to protect the company from financial losses (Moore et al., 2000). The ISO 9001 requires a certified company to identify risks in order to: a) ensure that the system achieves the desired results, b) reinforce the desired effects, c) reduce the undesirable effects, and d) implement improvements. Once the risks have been identified, the design of risk-related measures and assessment of their efficacy are required. In addition, the necessary resources, responsibilities, and timetables must be taken into account when planning measures. The ISO 9001, therefore, requires managing a comprehensive chain from the identification of risks to their elimination.

The EFQM 2019 helps an excellent organization identify risks and assess their impact on strategic choices, strategy execution, and desired outcomes. The EFQM broadly addresses risk identification by identifying potential business-related risks related to culture, strategy, operations, finance, legislation, information technology, and information security. Based on the above criteria, risk management is one of the dimensions of TQM.

Regarding stakeholder management, the company is required to meet the expectations of ethical conduct related to its stakeholders (Whysall, 2000). Of course, every company has its own stakeholders. At a general level, ISO 9001 requires identifying system-relevant stakeholders and their requirements. In addition, the organization must monitor and review information about its stakeholders and their essential requirements.

When looking at stakeholders, EFQM has divided the stakeholder field into five main areas: 1) customers, 2) personnel, 3) economic stakeholders who regulate and operate the economy, 4) society, and 5) partners, suppliers, and subcontractors. For customers, EFQM's recommended policy is to build sustainable customer relationships. With regard to personnel, emphasis is placed on procedures that support the recruitment, commitment, development, and retention of personnel. In the third main area, EFQM connects, among others, the owners, investors, and financiers, as well as operating regulators such as ministries. In this main

area, the key policies are knowledge of expectations, participation, mutual benefit, and trust. In the fourth main area, EFQM highlights external parties such as environmental organizations. In this section, EFQM recommends an additional contribution to development and mental and material well-being as an operational strategy. The fifth main block includes partners, suppliers, and subcontractors. These are the bodies with which an organization works to carry out its core mission and strategy. In this main area, EFQM invests in the mutual knowledge of the information the different parties used to build relationships and create sustainable value. Based on the above criteria, stakeholder management belongs to TQM's dimensions.

When thinking about digitalization, the importance of operational and control functions will increase in the future. New technologies allow data to be collected and processed at a more detailed level than before, allowing for even more extensive data processing. Process controls of the future will be synergistic and enable the utilization of process-wide information as well as breaking the boundaries between control and operation (Isaksson et al., 2018). Simultaneously with the increase in servitization in the industry, digitalization has led to significant changes and specialization in value chains, which can create new business opportunities for companies (Martín-Peña et al., 2020). The development of digitalization enables the development of individual solutions based on customer needs, thus reducing the emphasis on manufacturing a single product (Davies, 2004). Parviainen et al. (2017) see digitalization as an enhancer of internal processes and efficiency, as well as a tool for delivering new services. Kotarba (2017) states that digitalization together with business development is necessary to achieve desired goals. Because digitalization continues to grow in importance in industry, we also chose it as one of the TQM dimensions.

As previous studies have found TQM's efficiency to depend on the efficiency of its implementation (Yusuf et al., 2007; Oakland, 2011; Abdullah et al., 2008; Kumar et al., 2009; Corredor and Coni, 2010; Valmohammadi, 2011). The ISO 9001 requires internal audits at the intervals planned in section 9.2 of the system in order to determine whether the system has been effectively implemented and maintained. In addition, the baseline data for the management review in section 9.3.2 requires information on system performance and effectiveness, including trends in process performance. Part D = Deployment of EFQM's RADAR assessment tool and focuses on evaluating direction analysis and activity analysis (EQFM Tables 1 and 2). Both of the points to be assessed comment on whether the procedures have been implemented effectively and in a timely manner in the relevant areas. Based on the above criteria, system development is one of the dimensions of TQM. Table 1 also shows arguments for the choices of dimensions and propositions, showing that they are part of modern TQM.

Finally, to ensure the correct targeting of the study, the choices were compared with the principles that Vinni (2007) reported. He states that TQM includes the following topics: 1) TQM as quality management, 2) TQM as systems management, 3) TQM as people management, 4) TQM as re-engineering, and 5) TQM as a new

management paradigm. The propositions of this study and how they relate to the principles that Vinni (2007) presented are reported below.

- TQM as quality management; propositions 1-11, 50
- TQM as systems management; propositions 12-14, 18, 22-39, 40-41, 43, 45, 48-49, 52-60
- TQM as people management; propositions 16-21, 46-47, 61
- TQM as re-engineering; propositions 15, 42, 44, 51

When discussing TQM as a new management paradigm, Vinni (2007) states that TQM now includes “hard” and “soft” aspects of quality management. Also in this study, these aspects have been identified as shown in Table 1. In addition, Vinni (2007) notes that TQM is a complex concept and its implementation is not straightforward. However, it is important to note that normally, TQM emphasizes the following priorities: a) customer orientation; b) commitment and leadership of senior management; c) planning and organization; d) using quality management techniques and tools; e) education and training; f) involvement and teamwork; g) measurement and feedback; and h) cultural change. The above priorities have been taken into account in the research dimensions or propositions as follows:

- customer orientation; propositions 12-16, 56
- commitment and leadership of senior management; propositions 1-6
- planning and organization; propositions 11, 29-32, 34-39, 48-51, 53-54, 56, 58, 60
- using quality management techniques and tools; propositions 22-28, 33, 40, 43, 45
- education and training; propositions 17-21
- involvement and teamwork; propositions 7-10, 61
- measurement and feedback; propositions 41, 52, 57, 57
- cultural change; propositions 42, 44, 46-47, 55

As stated earlier, despite TQM's positive effects, its content has not been described in detail. Padró et al. (2020) state that the requirements and/or descriptions of TQM are philosophical, making it difficult to interpret the requirements in practice. This requires each company to consider the TQM model that is best suited to improve its performance.

2.3 TQM and profitability

TQM has been found to have several positive effects on companies' operations and performance. This section reviews the results of previous studies on the effects of TQM on company profitability. Kaynak (2003) conducted a study with data from U.S. firms that demonstrated the positive impact of TQM on firms' financial performance. Barker and Cagvin (2013) show in their industrial sector studies the positive impact

of well-defined and implemented TQM on profitability growth. Boulter et al. (2013) examined the effects of TQM on the financial performance of European quality award winners by comparing the key financial indicators of firms with three international market indices as benchmark indices. They were also interested in whether the successful implementation of TQM is reflected in the performance of companies as positively as in North America. The researchers report that, despite the large differences between the United States and Europe, it is clear that winning a quality award, which means the high-quality implementation of TQM, strengthens companies' financial performance. Kumar et al. (2009) selected companies that were successful in the Canadian Quality Award competition as their research topic, which means that the level of implementation of TQM is high. They studied the impact of TQM dimensions on these companies' performance, reporting that TQM has a positive impact not only on all the dimensions studied but also on the company's profitability. York and Miree (2004) examined Baldrige Award winners in their study of the impact of well-implemented TQM on financial performance. As measures of economic performance, they used operating income, net sales, and cost of goods sold. They found that the financial results of the quality award winners before and after winning the quality award were better than those of the comparison group. This finding differs from the observation made by Hansson and Eriksson (2002) that the performance of Swedish quality award winners improved compared to competitors only after winning a quality award.

Most previous research seems to agree that TQM and firm profitability are interconnected (Kaynak, 2003; Barker and Cagvin, 2013; Boulter et al., 2013; Kumar et al., 2009; York and Miree, 2004; Hansson and Eriksson, 2002). Thus, we propose the following hypothesis:

H1. There is a direct relation between TQM dimensions and profitability.

Risk management has a significant impact on companies' profitability by hedging against financial losses caused by different types of damage (Moore et al., 2000). SMEs tend to implement a defensive risk management strategy with an emphasis on, for example, finding reliable partners (Ellegaard, 2008). Risk management must take into account people's actions, and inadequate training can pose unnecessary risks to companies. Risk management should be implemented systematically, taking into account procedures for identifying risks, conducting risk analyses, planning measures, and implementing a risk strategy (Falkner and Hiebl, 2015). Risk management, which applies to the entire business, is also part of the ISO 9000 and EFQM requirements. Based on the above, we propose the following hypothesis:

H2. Risk management facilitates the relation between TQM dimensions and profitability.

There is some empirical evidence that digitalized companies outperform companies in terms of profitability compared to companies that are not digitalized (Abou-Foul et al., 2020). Martín-Peña et al. (2020) examined

the impact of servitization and digitalization on the performance of 828 Spanish industrial firms. Their research showed that servitization and digitalization are positively related to firm performance and that digitalization positively mediates the relationship between servitization and firm performance. With reference to previous studies (Martín-Peña et al., 2020; Davies, 2004; Parviainen et al., 2017; Kotarba, 2017), we propose the following hypothesis:

H3. Digitalization facilitates the relation between TQM dimensions and profitability.

Good leadership includes an understanding of stakeholder connections and behavior (Frooman, 1999). EFQM and ISO 9001 include the identification of stakeholders and their needs in their requirements. Thus, ISO 9001 certification cannot be obtained unless stakeholders and their requirements have been identified. This is also stated by Whysal (2000), who reports that companies should aim to meet stakeholder requirements. Poorly managed stakeholder relationships can lead to significant financial losses and thus negatively impact profitability (Preble, 2005). Based on the above, we propose the following hypothesis:

H4. Stakeholder management facilitates the relation between TQM dimensions and profitability.

Several studies have found that TQM has a positive impact on profitability issues related to the business environment. Such results have been reported, for example, by Abdullah et al. (2008), Kumar et al. (2009), Corredor and Goni (2010), and Valmohammadi (2011). Yusuf et al. (2007) note, however, that the achievement of results depends on the effectiveness of TQM deployment. Likewise, Oakland (2011) reports that improving profitability requires continuous process improvement and effective implementation of TQM. Based on the above, we propose the following hypothesis:

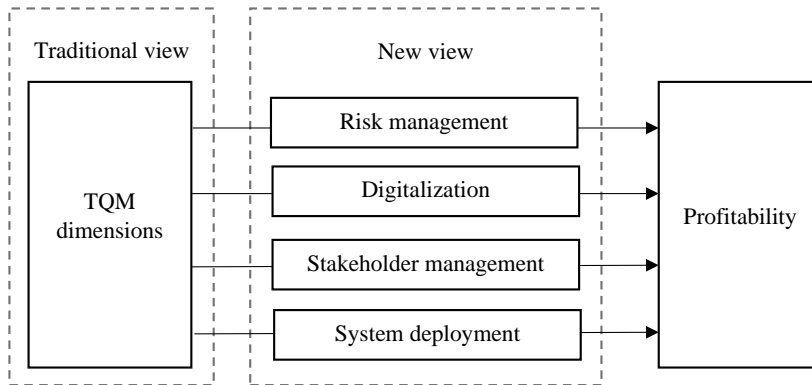
H5. System deployment facilitates the relation between TQM dimensions and profitability.

2.4 Research model

It is important for SMEs to ensure their profitability. As the resources of these companies are usually limited, it is essential to know to what they should pay special attention in order to improve their profitability and ensure their competitiveness. Sections 2.2 and 2.3 of the study, as well as Table 1, define and justify traditional TQM as well as views on extending the TQM idea. It is important for business leaders to know things that have a direct impact on profitability, but it is equally important to know things that can support and reinforce these factors.

This study is carried out according to Figure 1 and examines the impact of traditional TQM on profitability and whether the new TQM dimensions facilitate the impact of traditional TQM dimensions on profitability. Details of all dimensions are shown in Table 1, which also shows the rationale for why these issues are part of the study.

Figure 1. Research model



3 Methodology

3.1 Study planning

Based on data from previous studies, appropriate TQM dimensions and propositions mapping the practical functionality of the dimensions were developed for this study (Table 1). Researchers agree that TQM is divided into both hard and soft elements, and this study's propositions were classified accordingly. Table 1 includes a balanced selection of hard and soft TQM factors selected for this study.

The survey was designed using Table 1 as a guide. The order of the dimensions and the propositions related to the dimensions were designed so that it was easy for the respondents to understand the totality of TQM and the interconnection of the dimensions. The design also took into account unambiguity, which sought to ensure that the respondents answered just the right question and did not have to consider for themselves what the proposition means. Upon completion of the survey, several pilot surveys were conducted, based on the feedback of which the survey was developed. In the pilot survey, the response time varied between 10 and 15 minutes. The comprehensive design sought to ensure that common method bias would not distort the study's results.

The respondents ranked 61 items related to the traditional and new views of TQM. The responses used a Likert scale of 1 to 5, where 1 meant “strongly disagree”, 5 meant “strongly agree”, and 3 meant “neither disagree nor agree”. In addition, items describing the organization—such as the company’s size (measured by number of employees), whether the company has a certified quality system, and whether the company produces products or services—were added to the survey.

Profitability was included as a dependent variable and measured with a single item based on the subjective assessment of the responding CEO. Profitability refers to company-level profitability perceived by the CEO, and describes the extent to which the CEO assesses how the company performs. There is evidence of a significant correlation between subjective and objective items (e.g., Venkatraman and Ramanujan, 1987). Objective profitability items were not utilized for the following reasons: it is possible that timely accurate information does not exist, it requires additional work in order for the respondent to find the objective profitability information, and there may be reluctance to provide objective profitability information. These reasons all justify the use of subjective items. Subjective items also enhance the comparability between distinct types of companies, as they reduce the influence of contextual issues. In addition, single items increase the simplicity of the survey, which has the potential to increase the response rate and decrease costs (e.g., Sarstedt and Wilczynski, 2009).

The data was analyzed with multiple regression analyses. The mediating effects were tested by using Baron and Kenny’s (1986) procedure in line with Zhao et al. (2010) regarding the steps in establishing mediation.

3.2 Sample and data gathering

The survey was conducted among Finnish SMEs with a maximum of 250 employees and a turnover of less than EUR 50 million. Only companies with more than five employees were included to ensure that organizations genuinely reflect TQM procedures and their impact. A brief presentation of the study and its objectives was sent to the CEOs of 6,889 randomly selected SMEs. The initial number of responses was 274 of which 271 were kept in the analysis. A few responses were deleted because only option 5 was used in the responses and the response time was about 5 minutes, so the responses could not be considered reliable. Thus, there were three incomplete responses excluded from the analyses. These responses did not meet the sample criteria (SMEs) or answer all questions. The survey utilized two reminder messages and resulted in 271 usable responses, corresponding to 3.9% of the total mailing. All respondents were CEOs.

3.3 Non-response bias

Whitehead et al. (1993) state that the potential of non-response bias can be investigated by comparing the answers of groups of respondents. The first group consisted of CEOs who provided full answers, and the other group consisted of CEOs who did not fully answer the questions. The responses of the two groups were compared with the one-way ANOVA test. No statistical significance was observed between the two groups' responses. Thus, the lack of non-response bias increases the generalizability of the results.

Table 1. TQM dimensions selected for the study, literature related to dimensions selection, their identification and propositions used

TQM dimensions	Literature supporting selection	Identification used in this study	Argument for identification	Propositions	Soft (S)/ Hard(H)
Management / leadership	Saraph et al., 1989; Flynn et al., 1994; Badri et al., 1995; Powel, 1995; Black and Porter, 1995, 1996; Ahire et al, 1996; Grandzol and Gershon, 1998; Quazi et al., 1998; Rao et al., 1999; Wilson and Collier, 2000; Rahman, 2000; Yusof and Aspinval, 2000; Prajogo and Sohal, 2003; Parast et al., 2006.; Sila, 2007; Fotopoulos and Psomas, 2008; Sadikoglu and Olcay, 2014; EFQM, 2019	Organizational awareness of goals	EFQM:2019; [1] ISO 9001:2018; [6.2.1; 7.3; 8.5.1]	1 In our organization, we know the goals we strive for	S
		Monitoring the achievement of goals	EFQM: 2019; [6; 7] ISO 9001:2018; [6.2.1; 9.3.2]	2 In my opinion, the achievement of goals is monitored regularly in our organization	H
		Goal metrics and awareness of goals/goal metrics	EFQM: 2019; [1.4; 5.1; 6] ISO 9001:2018; [6.2.1; 7.1.6; 8.5.1]	3 The indicators for tracking goals are known to everyone	H
		Management feedback on success	EFQM: 2019; [2.1; 2.4] ISO 9001:2018; [5.1.1; 6.2]	4 Management gives feedback to staff on success	S
		Clarity of responsibilities and authority	EFQM: 2019; [2.1] ISO 9001:2018; [4.4; 5.3]	5 I think the responsibilities and powers are clearly defined	S
		Management support to achieve goals	EFQM: 2019; [2] ISO 9001:2018; [5.1.1]	6 Management supports the organization to achieve its goals	S
		Quality of internal cooperation	EFQM: 2019; [2.4] ISO 9001:2018; [4.4.1]	7 I think the collaboration in our organization is seamless	S
		Problem-solving	EFQM: 2019; [5.4] ISO 9001:2018; [10.2]	8 In our organization, problems are effectively solved cooperatively	S/H
		Equal partnership	EFQM: 2019; [3.2]	9 The members of our organization are equal partners	S
		Supporting initiatives	EFQM: 2019; [2.2; 2.3] ISO 9001:2018; [5.1.1]	10 I think that our approach supports initiative	S/H
		Clarity of strategy	EFQM: 2019; [1.4] ISO 9001:2018; [5.2.1] quality policy must support the strategy	11 I think our strategy is clear	S
Customer Focus	Flynn et al., 1994; Powel, 1995; Black and Porter, 1995,1996; Ahire et al., 1996; Grandzol and Gershon, 1998; Quazi et al., 1998; Rao et al., 1999; Wilson and Collier, 2000; Rahman, 2000; Prajogo and Sohal, 2003; Parast et al., 2006;	Customer satisfaction assessment procedures	EFQM: 2019; [3.1] ISO 9001:2018; [5.1.2]	12 I think we have excellent procedures for determining customer satisfaction	H
		Customer satisfaction	EFQM: 2019; [6] ISO 9001:2018; [9.1.2]	13 I think our customers are satisfied with our operations	S
		Customer satisfaction analysis	EFQM: 2019; [3] ISO 9001:2018; [9.1.2]	14 We regularly analyze our customers' satisfaction	H

	Sila, 2007; Fotopoulos and Psomas, 2008; Sadikoglu and Olcay, 2014; EFQM, 2019	Action plans to improve customer satisfaction	EFQM: 2019; [3] ISO 9001:2018; [10.1]	15 We develop improvement actions to improve customer satisfaction	S/H
Personnel	Saraph et al., 1989; Flynn et al., 1994; Badri et al., 1995; Powel, 1995; Black and Porter, 1995, 1996; Ahire et al., 1996; Grandzol and Gershon, 1998; Quazi et al., 1998; Rao et al., 1999; Wilson and Collier, 2000; Rahman, 2000; Yusof and Aspinval, 2000; Prajogo and Sohal, 2003; Parast et al., 2006; Sila, 2007; Fotopoulos and Psomas, 2008; Sadikoglu and Olcay, 2014; EFQM, 2019; Ahmed et al., 2020	Staff knowledge of opportunities to influence customer satisfaction	EFQM: 2019; [3.2] ISO 9001:2018; [7.1.6; 7.3]	16 Staff know how to affect customer satisfaction	S
		Mapping of training needs	EFQM: 2019; [3.2] ISO 9001:2018; [7.2]	17 Staff training needs are mapped regularly	H
		Training programs to achieve goals	EFQM: 2019; [3.2] ISO 9001:2018; [7.2]	18 Training programs are planned in our organization to achieve the goals	H
		Handling educational success	EFQM: 2019; [6] ISO 9001:2018; [7.2]	19 The success of the given training is discussed with the participants	H
		Level of staff competence	EFQM: 2019; [2.2; 3.2] ISO 9001:2018; [7.2]	20 I think our staff competence is at an excellent level	S
		Level of staff motivation	The details of the EQFM headings [3.2] and the results describing staff views [6] highlight the motivating factors.	21 Our staff is motivated	S
		Processes	Saraph et al., 1989; Flynn et al., 1994; Badri et al., 1995; Powel, 1995; Black and Porter, 1995, 1996; Ahire et al., 1996; Grandzol and Gershon, 1998; Quazi et al., 1998; Rao et al., 1999; Yusof and Aspinval, 2000; Wilson and Collier, 2000; Rahman, 2000; Prajogo and Sohal, 2003; Parast et al., 2006; Sila, 2007; Fotopoulos and Psomas, 2008; Sadikoglu and Olcay, 2014; EFQM, 2019	Process efficiency	EFQM: 2019; [7] ISO 9001:2018; [9.1.1; 9.3.2]
Measuring success and performance	EFQM: 2019; [7] ISO 9001:2018; [4.4.1; 9.3.2]			23 We regularly measure the success and performance of our processes	H
Process performance information	EFQM: 2019; [1.5; 2.4]			24 The results of process performance are communicated openly	S
Competitiveness of processes compared to competitors	EFQM: 2019; [7] table 3			25 Our processes are efficient compared to our competitors	S
Opportunities to improve processes	EFQM: 2019; [2.3; 4.1] ISO 9001:2018; [4.4; 10.1; 10.3]			26 We systematically look for opportunities to improve our processes	S
Self-assessment of process performance	EFQM: 2019; [1.5] ISO 9001:2018; [9.2; 9.3; 10.1]			27 We look for opportunities for improvement by evaluating the operation of our processes ourselves	H
Finding areas for improvement by comparing to competitors	EFQM: 2019; [7] table 1 and table 2			28 We are looking for opportunities to improve by comparing our own operations to competitors	H
Procurement and materials	Saraph et al., 1989; Flynn et al., 1994; Badri et al., 1995; Powel, 1995; Black and Porter., 1995, 1996; Ahire et al., 1996; Quazi et al., 1998; Rao et al., 1999; Rahman, 2000; Yusof and Aspinval, 2000; Parast et al., 2006; Sila, 2007; Fotopoulos and Psomas, 2008; Sadikoglu and Olcay, 2014; EFQM, 2019	Procurement efficiency	EFQM: 2019; [3.5]	29 I think the sourcing of materials is efficient	H
		Material deficiencies	ISO 9001:2018; [8.4.2]	30 Material deficiencies are very rare (do not interfere with operations)	S
		Value of inventories	EFQM: 2019; [5.5]	31 The material is not unreasonably in stock	S
		Quality of suppliers	EFQM: 2019; [3.5] ISO 9001:2018; [8.4]	32 I think the suppliers are reliable	S
		Identity of materials	ISO 9001:2018; [8.5.2]	33 The materials are easily identifiable	S
Products / Services	Saraph et al., 1989; Flynn et al., 1994; Badri et al., 1995; Ahire et al.,	Competitiveness of products/services	EFQM: 2019; [6] ISO 9001:2018; [8.2.2; 8.2.3]	34 I think our products/services are competitive	S

	1996; Grandzol and Gershon., 1998; Quazi et al., 1998; Rao et al., 1999; EFQM, 2019.	Product price/quality ratio	EFQM: 2019; [6] ISO 9001:2018; [8.2.2; 8.2.3]	35 I think the price/quality ratio of our products is good	S
		Customer complaints about products/services	ISO 9001:2018; [5.1.2; 8.2.2; 8.2.3]	36 We receive very few customer complaints about products/services	S
		Product/service development activity	ISO 9001:2018; [5.1.2; 8.2.2; 8.2.3]	37 We actively develop our products/services	H
		Progress of products/services compared to competitors	EFQM: 2019; [2.3; 6]	38 I think our products/services are advanced compared to our competitors	S
Risk management	Moore et al., 2000; Fatemi and Luft, 2002; Gilmore et al., 2004; Ellegaard, 2008; Altman et al., 2010; Sukumar et al., 2011; Thun et al., 2011; Wilson and Altanlar, 2013; EFQM, 2019.	Identification of risks to operations/products	EFQM: 2019; [5.1] ISO 9001:2018; [6.1]	39 We know the risks to our operations/products	S
		Maintenance of risk assessments	EFQM: 2019; [5.1] <i>Risk management should be implemented systematically, taking into account procedures for identifying risks and conducting risk analyzes.</i> (Falkner and Hiebl, 2015)	40 Risk mapping is maintained on a regular basis	H
		Monitoring of corrective actions related to the risks	ISO 9001:2018; [6.1.2]	41 Monitoring of risk-related corrective actions is systematic	H
		Reduction of risks to operations/products	ISO 9001:2018; [6.1]	42 We have reduced the risks to our operations/products	H
Continuous improvement	Black and Porter, 1995, 1996; Grandzol and Gershon, 1998; Yusuf and Aspinval, 2000; Sadikoglu and Olcay, 2014; EFQM, 2019	Overall level of continuous improvement in the system	ISO 9001:2018; [10.3]	43 I think we have an excellent system of continuous improvement	S/H
		Level of operational development	EFQM: 2019; [7 table 3] ISO 9001:2018; [9.3.2]	44 We have significantly developed our operations	S/H
		Control of corrective actions	ISO 9001:2018; [10.2]	45 We monitor the progress of corrective actions for deviations	S/H
		Informing staff of changes	ISO 9001:2018; [7.1.6]	46 Staff will be informed of future changes as a result of remedial/development measures	S/H
		Rewarding staff for successful projects	EFQM: 2019; [2.1; 3.2]	47 Staff are rewarded for success in continuous improvement projects	S/H
Stakeholder management	Frooman, 1999; Berman et al., 1999; Whysall, 2000; Preble, 2005; EFQM, 2019; Polese et al., 2019	Stakeholder identification	EFQM: 2019; [1.2] ISO 9001:2018; [4.2]	48 We have identified our key stakeholders	S
		Identification of stakeholder expectations and requirements	EFQM: 2019; [1.2] ISO 9001:2018; [4.2]	49 We know what our stakeholders expect of us	S
		Objectives to meet stakeholder requirements	EFQM: 2019; [2.4]	50 We have set targets to meet the expectations of our stakeholders	H
		Action plans to meet stakeholder requirements	ISO 9001:2018; [6.2]	51 We have defined action programs to better meet stakeholder expectations	H
		Monitoring the implementation of stakeholder requirements	EFQM: 2019; [7 table 2] ISO 9001:2018; [4.2]	52 We systematically monitor the fulfillment of our stakeholders' expectations	H
Digitalization	Davies, 2004; Kotarba, 2017; Muro et al., 2017; Parviainen et al., 2017; Joensuu-Salo et al., 2018; Isaksson et al., 2018; Martín-Peña et al., 2020	The importance of digitalization, the changes it brings, and harnessing the potential of digitalization to improve performance	<i>"Digitalization is transforming the locus of entrepreneurial opportunities and entrepreneurial practices."</i> (Joensuu-Salo et.al. 2018)	53 I think we are actively exploiting the opportunities offered by digitalization	H

		Digitalization and shop floor management (in operation and development of internal processes through digitalization)	<i>"In the future, control and all levels of operations and operational planning must co-exist in the same environment, supplementing each other without redundancies or competitive functions."</i> (Isaksson et.al 2018)	54 We have analyzed our own processes, considering their development through digitalization	S/H
		Digitalization utilization rate and metrics	<i>"Digitalization affects all businesses, and the impact will only increase in the future. Therefore, it is important that companies take a proactive approach, rather than waiting to see what will happen or thinking that their current position in the markets will remain the same if they do not do anything."</i> (Parviainen 2017)	55 I think we are pioneers in the field of digitalization in our industry	S
		Identification of stakeholder requirements in the field of digitalization	<i>It is important to develop digital performance metrics in parallel with the business case and to assure their on-going measurement to understand whether expected benefits are being delivered.</i> (Kotarba 2017)	56 We know what kind of development our stakeholders expect of us in the area of digitalization	S
System deployment	Bergquist and Ramsing, 1999; Gotzamani and Tsiotras, 2002; Chow-Chua et al., 2003; Terziovski and Power, 2007; Yusuf et al., 2007; Jeroen et al., 2001; Poksinska et al., 2006; Zeng et al., 2007; Abdullah et al., 2008; Kumar et al., 2009; Salaheldin, 2009; Corredor and Coni, 2010; Oakland, 2011; Valmohammadi, 2011; Prajogo and Sohal, 2003; Sciarelli et al., 2020	Adherence to ratified practices	EFQM: 2019; RADAR evaluation model, where D = use the developed models appropriately (Deployment) and [2.1]	57 Our organization follows agreed procedures	S/H
		Effectiveness of the implementation of agreed practices	EFQM: 2019; [7 table 1 and 2]	58 We have effectively implemented the agreed procedures	H
		Monitoring compliance with ratified practices	ISO 9001:2018; [9.2]	59 We actively monitor that we follow agreed policies	H
		Effectiveness of practices	EFQM: 2019; [7 table 1, 2 and 3] ISO 9001:2018; [9.2]	60 Our agreed practices are effective	S
		Staff awareness of the importance of adherence to practices	EFQM: 2019; [2.1] ISO 9001:2018; [7.3]	61 Employees have been informed of the importance of following the agreed procedures	S/H

4 Results

4.1 Assessment of the models

Table 2 shows the means, standard deviations, alpha values, and correlations of the study variables. The correlations show that all the variables have significant intercorrelation, which provides good prerequisites for hypotheses testing. Reliability was tested with Cronbach's alpha values, which exceeded the minimum acceptable value of 0.7, thus assuring the reliability of the constructs.

Construct validity is examined with criterion, content, and discriminant validity (Hair et al., 2010). Criterion validity is assessed with correlation analyses to ensure that the TQM constructs operate in a reasonable manner. Content validity is ensured by building items based on previous studies and by evaluating the survey items with a group of company practitioners and researchers. Discriminant validity is evaluated with internal consistency. There were no significant cross-loadings in the exploratory factor analyses, which supports the unidimensionality of the constructs. Generalizability was secured by the exact procedure of the sample selection and checking the potential of non-response bias.

Table 2. Means, standard deviations, alpha values, and correlations among variables

	Mean	St. dev.	1	2	3	4	5	6	7	8	9	10	11
1. Management/ leadership	3.88	.601	1.000										
2. Customer focus	3.56	.714	.563***	1.000									
3. Personnel	3.40	.711	.579***	.519***	1.000								
4. Processes	3.53	.705	.571***	.581***	.484***	1.000							
5. Procurement and materials	3.89	.638	.400***	.320***	.382***	.355***	1.000						
6. Products/services	4.03	.612	.608***	.492***	.479***	.546***	.511***	1.000					
7. Risk management	3.71	.759	.544***	.520***	.521***	.525***	.378***	.474***	1.000				
8. Continuous improvement	3.55	.766	.663***	.601***	.576***	.700***	.384***	.546***	.652***	1.000			
9. Digitalization	3.13	.958	.430***	.396***	.448***	.382***	.196***	.361***	.423***	.423***	1.000		
10. Stakeholder management	3.71	.788	.552***	.541***	.475***	.499***	.311***	.454***	.525***	.603***	.387***	1.000	
11. System deployment	3.83	.670	.649***	.497***	.523***	.623***	.465***	.643***	.580***	.694***	.453***	.548***	1.000
12. Profitability	2.80	.742	.272***	.208***	.167***	.249***	.254***	.334***	.059	.241***	.217***	.240***	.261***
Cronbach's alpha			0.895	0.799	0.792	0.848	0.765	0.797	0.840	0.841	0.886	0.878	0.877

*** p ≤ 0.001

The robustness of the models was tested with the Durbin–Watson value. All models had values close to 2, which are considered acceptable. The variance inflation factor values were also below the threshold, which indicates that multicollinearity is not a problem. Common method variance was tested following the method of Podsakoff et al. (2003). Unrotated factor solution resulted in 13 separate constructs accounting for 69.18% of the variance. The first factor accounts for 36.04% of the variance, which is below the 50% threshold. Thus, common method variance does not interfere with the regression analyses.

4.2 Hypothesis testing

Hypothesis 1 proposes a direct relation between the traditional dimensions of TQM and firm profitability. Hypotheses 2-5 are related to the mediation effect of the new TQM dimensions on the relation between traditional TQM dimensions and firm profitability. For the purpose of testing the mediation effects, the study utilized Baron and Kenny’s (1986) procedure. This procedure presents the following conditions that need to be fulfilled to establish a mediation effect. The independent variables (traditional TQM dimensions) should significantly relate to the mediator (new TQM dimension). When the dependent variable (firm profitability) is examined for both the independent variable (traditional TQM dimensions) and the mediator (new TQM dimension), the mediator should significantly relate to the dependent variable. Mediation is full if the independent variable does not significantly relate to the dependent variable, but the mediation is partial if the independent variable also relates to the dependent variable. Firm size, industry, and absence of certification are included as control variables in all the models.

Hypothesis 1 proposes a direct relation between TQM dimensions and profitability. As Table 3 shows, although the entire model is significant ($p \leq 0.001$), none of the traditional TQM dimensions were significant in the model. None of the traditional TQM dimensions—Management/leadership, Customer focus, Personnel, Processes, Procurement and materials, Products/services, and Continuous improvement—were significant in the model. Thus, there is not a direct relation between TQM dimensions and profitability, and the findings do not support hypothesis 1.

Table 3. Regression analyses for traditional TQM and firm profitability

	B	SE	Std. B	t	Sig.	R	R ²	Adj. R ²	SE	F
(Constant)	2.637	.188		14.019	.000	.076	.006	-.006	.729	.509
Number of employees	.000	.001	-.026	-.419	.675					
Industry	.029	.094	.020	.310	.756					
Certification	.087	.098	.058	.894	.372					
(Constant)	.535	.371		1.442	.150	.396	.157	.123	.677	4.733***
Number of employees	.000	.001	.017	.284	.776					
Industry	.041	.094	.027	.430	.667					
Certification	.100	.095	.067	1.053	.293					
Management/leadership	.162	.118	.134	1.370	.172					

Customer focus	.008	.082	.007	.092	.927
Personnel	-.086	.083	-.084	-1.046	.297
Processes	.101	.096	.098	1.049	.295
Procurement and materials	.107	.079	.094	1.359	.175
Products/services	.167	.101	.140	1.650	.100
Continuous improvement	.067	.094	.070	.705	.481

*** $p \leq 0.001$

As a prerequisite for hypotheses 2–5, the relations between the traditional dimensions of TQM and the dimensions representing the new view of TQM, namely risk management, digitalization, stakeholder management, and system deployment, were examined. First, it was examined whether there is a direct relation between TQM dimensions and risk management. This model is significant ($p \leq 0.001$), but a traditional TQM dimension, continuous improvement ($\beta = 0.347$, $p \leq 0.001$), was only significant in the model. There is a direct relation between continuous improvement and risk management. Second, it was examined whether there is a direct relation between TQM dimensions and digitalization. This model was significant ($p \leq 0.001$), but only the traditional TQM dimension, personnel ($\beta = 0.228$, $p \leq 0.05$), were significant in the model. Thus, there is a direct relation between personnel and digitalization. Third, it was examined whether there is a direct relation between TQM dimensions and stakeholder management. This model was significant ($p \leq 0.001$), and three traditional TQM dimensions, namely management ($\beta = 0.239$, $p \leq 0.05$), customers ($\beta = 0.232$, $p \leq 0.001$), and continuous improvement ($\beta = 0.295$, $p \leq 0.001$), were significant in the model. There is a direct relation between management and stakeholder management, customers and stakeholder management, and continuous improvement and stakeholder management. Fourth, it was examined whether there was a direct relation between TQM dimensions and system deployment. This model was significant ($p \leq 0.001$), and five traditional TQM dimensions, namely management ($\beta = 0.265$, $p \leq 0.05$), processes ($\beta = 0.175$, $p \leq 0.01$), procurement ($\beta = 0.142$, $p \leq 0.01$), products and services ($\beta = 0.208$, $p \leq 0.001$), and continuous improvement ($\beta = 0.192$, $p \leq 0.001$), were significant in the model. There is a direct relation between management and system deployment, processes and system deployment, procurement and system deployment, products and services and system deployment, and continuous improvement and system deployment.

Table 4. Regression analyses for traditional TQM and the dimensions of the new view of TQM

	B	SE	Std. B	t	Sig.	R	R ²	Adj. R ²	SE	F
Dependent: Risk management										
(Constant)	.143	.288		.495	.621	.726	.527	.508	.52646	28.416***
Number of employees	.000	.000	.044	.966	.335					
Industry	.123	.073	.080	1.677	.095					
Certification	-.064	.074	-.041	-.857	.392					
Management/leadership	.168	.092	.133	1.825	.069					
Customer focus	.113	.064	.106	1.777	.077					
Personnel	.111	.064	.104	1.731	.085					
Processes	.057	.075	.053	.758	.449					
Procurement and materials	.090	.062	.076	1.461	.145					

Products/services	.066	.079	.053	.841	.401					
Continuous improvement	.347	.074	.349	4.716	.000					
Dependent: Digitalization										
(Constant)	-.676	.438		-1.544	.124	.569	.324	.297	.79302	12.158***
Number of employees	.000	.001	-.022	-.411	.681					
Industry	.302	.111	.156	2.729	.007					
Certification	.293	.112	.150	2.616	.009					
Management/leadership	.181	.139	.114	1.305	.193					
Customer focus	.131	.096	.097	1.359	.175					
Personnel	.228	.097	.168	2.351	.020					
Processes	.193	.113	.143	1.706	.089					
Procurement and materials	-.152	.093	-.102	-1.642	.102					
Products/services	.083	.119	.053	.698	.486					
Continuous improvement	.156	.111	.124	1.405	.161					
Dependent: Stakeholder management										
(Constant)	.126	.322		.391	.696	.682	.465	.443	.58609	22.039***
Number of employees	9.129E-5	.000	.009	.188	.851					
Industry	.160	.082	.100	1.960	.051					
Certification	.011	.083	.007	.138	.890					
Management/leadership	.239	.103	.181	2.332	.021					
Customer focus	.232	.071	.208	3.273	.001					
Personnel	.045	.072	.040	.623	.534					
Processes	.043	.083	.038	.511	.610					
Procurement and materials	-.006	.069	-.005	-.090	.928					
Products/services	.063	.088	.049	.720	.472					
Continuous improvement	.295	.082	.285	3.602	.000					
Dependent: System deployment										
(Constant)	.037	.219		.170	.865	.809	.654	.640	.39965	48.137***
Number of employees	-.001	.000	-.070	-1.795	.074					
Industry	.087	.056	.064	1.563	.119					
Certification	-.045	.056	-.033	-.805	.422					
Management/ leadership	.265	.070	.236	3.781	.000					
Customer focus	-.017	.048	-.018	-.360	.719					
Personnel	.037	.049	.039	.763	.446					
Processes	.175	.057	.184	3.078	.002					
Procurement and materials	.142	.047	.135	3.029	.003					
Products/services	.208	.060	.188	3.470	.001					
Continuous improvement	.192	.056	.218	3.435	.001					

Hypothesis 2 proposes that risk management facilitates the relation between TQM dimensions and profitability. The results in Table 4 show that continuous improvement ($\beta = 0.347$, $p \leq 0.001$) has a significant relationship with risk management. In addition, Table 5 shows that risk management significantly relates to firm profitability ($\beta = -0.303$, $p \leq 0.001$) when entered with traditional TQM dimensions into the regression model predicting firm profitability, where traditional TQM dimensions have no significant effects. This suggests partial support for hypothesis 2. Risk management facilitates the relation between continuous improvement and firm profitability.

Hypothesis 3 proposes that digitalization facilitates the relation between TQM dimensions and profitability. The results in Table 4 show that personnel ($\beta = 0.228, p \leq 0.05$) has a significant relationship with digitalization. However, Table 5 shows that digitalization does not significantly relate to firm profitability ($\beta = 0.070$, not significant [ns]) when entered with traditional TQM dimensions into the regression model predicting firm profitability. This suggests no support for hypothesis 3. Digitalization does not facilitate the relation between TQM dimensions and firm profitability.

Hypothesis 4 proposes that stakeholder management facilitates the relation between TQM dimensions and profitability. The results in Table 4 show that management ($\beta = 0.239, p \leq 0.05$), customers ($\beta = 0.232, p \leq 0.001$), and continuous improvement ($\beta = 0.295, p \leq 0.001$) have a significant relationship with stakeholder management. In addition, Table 5 shows that stakeholder management significantly relates to firm profitability ($\beta = 0.144, p \leq 0.05$) when entered with traditional TQM dimensions into the regression model predicting firm profitability, where traditional TQM dimensions have no significant effects. These suggest partial support for hypothesis 4. Stakeholder management facilitates the relation between management and firm profitability, customers and firm profitability, and continuous improvement and firm profitability.

Hypothesis 5 proposes that system deployment facilitates the relation between TQM dimensions and profitability. The results in Table 4 show that management ($\beta = 0.265, p \leq 0.05$), processes ($\beta = 0.175, p \leq 0.01$), procurement ($\beta = 0.142, p \leq 0.01$), products and services ($\beta = 0.208, p \leq 0.001$), and continuous improvement ($\beta = 0.192, p \leq 0.001$) have a significant relationship with system deployment. However, Table 5 shows that system deployment does not significantly relate to firm profitability ($\beta = -0.059$, ns) when entered with traditional TQM dimensions into the regression model predicting firm profitability, suggesting no support for hypothesis 5. System deployment does not facilitate the relation between TQM dimensions and firm profitability.

Table 5. Regression analyses for mediation effects

	B	SE	Std. B	t	Sig.	R	R ²	Adj. R ²	SE	F
(Constant)	.578	.361		1.600	.111	.451 ^a	.203	.169	.659	5.892***
Number of employees	.000	.001	.031	.525	.600					
Industry	.078	.092	.053	.843	.400					
Certification	.081	.093	.054	.873	.384					
Management/leadership	.213	.116	.176	1.836	.068					
Customer focus	.042	.080	.041	.520	.603					
Personnel	-.053	.081	-.051	-.652	.515					
Processes	.118	.094	.114	1.259	.209					
Procurement and materials	.135	.077	.118	1.741	.083					
Products/services	.187	.099	.156	1.895	.059					
Continuous improvement	.172	.096	.180	1.788	.075					
<i>Risk management</i>	-.303	.078	-.314	-3.860	.000					
(Constant)	.563	.375		1.500	.135	.403	.162	.126	.677	4.462***
Number of employees	.000	.001	.023	.373	.710					
Industry	.021	.096	.014	.217	.828					

Certification	.083	.097	.055	.855	.393					
Management/leadership	.150	.119	.123	1.262	.208					
Customer focus	-.001	.082	-.001	-.006	.995					
Personnel	-.102	.084	-.098	-1.216	.225					
Processes	.085	.097	.082	.877	.381					
Procurement and materials	.117	.080	.103	1.469	.143					
Products/services	.163	.101	.135	1.603	.110					
Continuous improvement	.059	.095	.061	.620	.536					
<i>Digitalization</i>	.070	.054	.091	1.302	.194					
(Constant)	.502	.370		1.358	.176	.413	.170	.134	.674	4.722***
Number of employees	.000	.001	.017	.283	.778					
Industry	.018	.095	.012	.195	.845					
Certification	.103	.095	.069	1.079	.282					
Management/leadership	.129	.119	.106	1.085	.279					
Customer focus	-.025	.083	-.025	-.304	.761					
Personnel	-.092	.082	-.089	-1.116	.266					
Processes	.095	.096	.092	.985	.325					
Procurement and materials	.105	.079	.093	1.335	.183					
Products/services	.160	.101	.134	1.586	.114					
Continuous improvement	.024	.096	.025	.246	.806					
<i>Stakeholder management</i>	.144	.072	.156	1.991	.048					
(Constant)	.537	.371		1.446	.149	.397	.158	.121	.678	4.319***
Number of employees	.000	.001	.013	.220	.826					
Industry	.046	.095	.031	.482	.631					
Certification	.098	.096	.065	1.022	.308					
Management/leadership	.178	.122	.146	1.459	.146					
Customer focus	.006	.082	.006	.079	.937					
Personnel	-.084	.083	-.082	-1.017	.310					
Processes	.111	.098	.108	1.134	.258					
Procurement and materials	.116	.081	.102	1.436	.152					
Products/services	.179	.104	.150	1.728	.085					
Continuous improvement	.078	.097	.082	.805	.422					
<i>System deployment</i>	-.059	.106	-.054	-.554	.580					

5 Discussion

This study investigated the effect of TQM on SMEs' profitability. Specifically, the study examined whether the new TQM dimensions, namely risk management, digitalization, stakeholder management, and system deployment, facilitate the impact of traditional TQM dimensions on profitability. The results of this study somewhat support previous studies indicating that TQM and company profitability are connected (e.g., Kumar et al., 2009; Sadikoglu and Zehir, 2010; Valmohammadi, 2011; Barker and Cagvin, 2013 and Boulter et al., 2013). However, the results reveal that the connection is indirect through the new TQM dimensions. This study enhances understanding of the new dimensions, namely risk management, stakeholder management, digitalization and system deployment, through which TQM affects profitability.

There may be several reasons why the traditional TQM does not directly affect profitability in Finnish SMEs. One reason that the relationship between TQM and profitability is indirect may be that certified companies account for 39.3% of respondents. The certification of a company's system may lead to the misconception that its operating models are excellent, even if the auditor only verifies that the required procedures exist and provide evidence. This misconception can lead to a situation where management overestimates a company's practices, even if they do not improve profitability. In order to eliminate this uncertainty, a similar study should be carried out so that the first step is system evaluation; for example, by EFQM assessment.

When examining the impact of the new dimensions, it is shown that risk management facilitates the relationship between TQM and profitability. More specifically, risk management facilitates the relationship between continuous improvement and profitability. It is understandable that risk management facilitates the realization of profitability, as the principal purpose of risk management is to protect the company from financial losses (Moore et al., 2000). Also, continuous improvement methods may eliminate the realization of potential problems identified in risk assessments. Risk management should be implemented systematically, taking into account procedures for identifying risks, conducting risk analyses, planning measures, and implementing a risk strategy (Falkner and Hiebl, 2015). This may provide the necessary structure and push for continuous improvement, resulting in enhanced profitability.

Second, when examining the impact of the new dimensions, we show that stakeholder management facilitates the relationship between TQM and profitability. More specifically, stakeholder management facilitates the relationship between management/leadership and firm profitability, customer focus and firm profitability, and continuous improvement and firm profitability. This is in line with previous research, as poorly managed stakeholder relationships can lead to significant financial losses and thus negatively impact profitability (Preble, 2005). With well-implemented stakeholder management, companies can get the best out of management guidance (Mehmood et al., 2014), actions to satisfy customer needs (Sila, 2007), and development processes (Talib et al., 2013; Mehmood et al., 2014) to translate inputs into profitability.

Third, digitalization does not facilitate the relation between TQM dimensions and profitability. This result conflicts with the literature, which highlights the potential of digitalization for efficient data processing, streamlining processes and supply chains, implementation of individual customer solutions, and business development (Isaksson et al., 2018; Martín-Peña et al., 2020; Davies, 2004; Parviainen et al., 2017; Kotarba, 2017), which can be expected to improve a company's profitability. The reason why digitalization does not affect profitability, according to this study, may be that in SMEs the level of digitalization in TQM may be low or understanding of what digitalization offers may vary considerably. As a novel tool for SMEs, perceptions of their digitalization level may suffer from subjectivity, meaning that companies that are just

at the beginning of digitalization can imagine their level to be excellent, while companies that have been working on the issue for a long time see the potential of digitalization more broadly and feel that they are still in the early stages of development. Although there may be potential in digitalization, the benefits are not yet realized to benefit company profitability.

Fourth, system deployment does not facilitate the relation between TQM dimensions and profitability. This finding does not support previous studies that highlight the importance of system deployment for the effectiveness of TQM (Oakland, 2011; Kumar et al., 2009; Corredor and Coni, 2010; Valmohammadi, 2011). Reflecting on this finding, the level of implementation of operating systems in Finnish SMEs can be questioned, as system deployment does not support the TQM profitability link. There could be several reasons why system deployment does not facilitate the relation between TQM and profitability. First, poor effectiveness may be due to a lack of management commitment. Second, companies may undertake minimal work related to TQM and may not be interested in further developing processes. Third, this approach omits the importance of system implementation, when instructions are written into the system but their implementation is not monitored. The results of this study also revealed a direct relation between management and system deployment, processes and system deployment, procurement and system deployment, products and services and system deployment, and continuous improvement and system deployment. Developing these TQM dimensions could also boost system deployment and ultimately result in enhanced profitability. Hafeez et al. state (2006) that, because TQM has not been determined in detail, companies have difficulties in implementing TQM in practice, and only few companies have succeeded in doing so holistically. The results show clear inconsistencies between different studies, so company management must ensure that maximum benefits are achieved through investments in development. To avoid harm, decisions must be based on real information and not opinions.

6 Conclusions

This study shows the impact of TQM on improving Finnish SMEs' profitability. The traditional TQM dimensions were complemented by the new dimensions of risk management, stakeholder management, digitalization, and system deployment. We investigated if the new elements facilitate the relationship between traditional TQM and profitability. Thus, this study contributes to TQM research by showing the mechanisms through which TQM affects profitability. The results show that two of the new dimensions of TQM, namely risk management and stakeholder management, facilitate the relationship between traditional TQM and profitability. On the other hand, digitalization and system deployment do not facilitate the relationship between traditional TQM and profitability. Lastly, the study shows that certification, company size, and the company's industry do not have an impact on SMEs' profitability.

As a managerial implication, the study suggests that, to ensure maximum benefit from TQM procedures, management must pay attention to the new TQM dimensions of risk management and stakeholder management and implement them to ensure the influence of TQM practices on profitability. While the ISO 9001 Quality Standard includes most TQM procedures in companies, no one should imagine that their implementation will be effective enough if the company receives certification. For example, if a company has identified potential business risks but has not developed detailed action plans to minimize risks, it is likely that the level of risk management is inadequate. Corporate management must ensure that the implementation of operational programs is monitored, as this makes achievement of the objectives much more likely. Based on the evidence from this study, the mere identification of stakeholders will not improve performance unless it is accompanied by objectives, measures and monitoring, even if the ISO Quality Standard does not directly require them. It is also very likely that management can influence the effectiveness of the implementation of procedures if it requires documented programs of implementation.

The study's limitations, which offer possibilities for further research, are as follows. First, the research covers SMEs in one country, and the results should be tested in other regions. Second, the differences in managers' understanding about the quality of procedures and the effectiveness of implementation may affect the study's results. Variation in these views may also be brought about by the belief that in certified systems both the quality of the procedures and their implementation are excellent, although the certification process does not include an assessment of excellence at all. Potential limitations on research can be reduced by categorizing companies into different categories according to quality. This classification can be carried out either by researchers or by expert external organizations.

The study highlights new research directions. This is the first in-depth examination of the reasons why neither TQM nor certification directly affect SMEs' profitability. Case studies or qualitative approaches would be fruitful to study TQM implementation in distinct company settings. Another direction of further research could be the poor impact of system deployment on companies' profitability. Although the impact of digitalization for productivity and profitability has been highlighted, this study does not support this idea. Further research is needed to clarify the relations between TQM, digitalization, and company performance. When conducting these studies, it is necessary to ensure the actual level of the company's digitalization, so that ignorance of the company management about the possibilities of digitalization does not distort the studies' results.

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Publication IV

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The effects of soft total quality management on the sustainable development of SMEs

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The effects of soft total quality management on the sustainable development of SMEs

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Abstract

This study investigates the soft total quality management (soft TQM) dimensions that affect the environmental and social sustainability of Finnish small and medium-sized enterprises (SMEs), considering the company's business, size, and possible certificates as control variables. Sustainable business has been found to be key to the success of companies, so investing in it is essential for companies. With the help of extensive literature research, the TQM dimensions covering the entire business activity were determined, from which detailed issues were identified. To ascertain the level of implementation of detailed issues, the survey was constructed and sent to 6889 randomly selected CEOs in autumn 2020. A total of 271 responses were received. Based on prior literature and studies, 10 hypotheses were proposed. The collected data were analyzed using regression analysis. The results reveal that two practices—business management systems and human resources (HR) practices—were related to environmental sustainability, while only business management system was related to social sustainability. None of the control variables affected environmental sustainability; however, the industrial sector influenced social sustainability. The study presents recommendations for company managers and the government to support sustainable development, especially in Finnish SMEs. As a practical contribution, the study demonstrates the importance of designing and implementing business management systems for enhanced sustainability. Management should also appreciate that sustainability will not automatically be set at a high level upon certification; thus, the performance of operations and processes should be monitored.

KEYWORDS

environmental sustainability, SME, social sustainability, soft TQM, sustainable business, sustainable development, total quality management, TQM

1 | INTRODUCTION

One of the most difficult issues in business management is achieving sustainable competitiveness and long-term profitability (Corredor & Goñi, 2011; Nasiri et al., 2022). Stakeholders increasingly set demands on small and medium-sized enterprises (SMEs). Companies must

ensure the transparency and responsibility of their businesses. SMEs are also required to take measures to increase their environmental sustainability (Font et al., 2016). Despite cost pressures, it is important for companies to implement sustainable solutions in their operations (Bakos et al., 2020). Tasleem et al. (2017) state that total quality management (TQM) is the most common strategic operating model for

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companies seeking comprehensive development. Through TQM, all functions of the organization can be developed with continuous improvement, which takes into account the needs of customers and stakeholders (Mehralian et al., 2016). TQM is therefore presented as a significant determinant of sustainability. For example, Ooi (2014) and Abbas (2020) stated that TQM is an important procedure in the achievement of goals and sustainable development. Because TQM positively impacts firms' sustainable competitive advantage (Chen et al., 2020), it has proven to be a good strategy for pursuing excellence and strengthening sustainable development (Tasleem et al., 2017). However, in the past, companies focused more on economic sustainability, while broader sustainability goals are now being adopted (Bateh et al., 2013). Environmental and social sustainability issues are likely to be affected by the appropriate implementation of TQM practices (García-Alcaraz et al., 2019; Khalil & Muneenam, 2021; Nazar et al., 2019), but existing research has mainly focused on economic aspects, whereas environmental and social impacts have fallen into the background. To fill this research gap, this study focuses on the effects of soft TQM on the sustainability of SMEs, especially on environmental and social factors.

In the current business environment, sustainable development has become significant, and with effective sustainable development methods, companies can ensure future success and gain a competitive advantage (Magd & Karyamsetty, 2021). A well-recognized approach to sustainability is the triple bottom line, which considers the economic, social, and environmental components of sustainability (Elkington, 1998), all of which must be in place for economic success. Sustainable operations are thus built on the three principles: environmental integrity, economic prosperity, and social justice (Bansal, 2005). Environmental sustainability considers emissions, waste, and pollution prevention (Cancino et al., 2018; Gupta et al., 2013); social sustainability includes equality, diversity, livelihoods, cooperation, and health; and financial issues include profit, return on investment, and business viability, including long-term viability (Cancino et al., 2018). As described above, sustainable development is a complex system that includes different interpretations (Carew & Mitchell, 2008) and perspectives. Perspectives can include, for example, things that are considered important by different stakeholders (Petrini & Pozzebon, 2009), as well as perspectives related to environmental and social aspects. Stakeholders, in particular, are in a position where they can pressure companies to consider environment and social issues (Koç & Durmaz, 2015). Sustainable development includes the idea of progress toward a fair and prosperous world and the preservation of nature and culture for future generations. For this reason, long-term sustainability requires the management of natural resources and social capital (Dyllick & Hockerts, 2002; Hussain et al., 2018; Petrini & Pozzebon, 2009; Shahzad et al., 2020). On the other hand, to produce more goods with fewer inputs (Vieira & Amaral, 2016), informal pressure on companies is required (Ashton et al., 2017). The above notions show that performance is not only financial but also environmental and social (Zink, 2007). Although the concept of sustainable development has become more common, there remains no clear understanding of the procedures needed to achieve it (Alharbi et al., 2016).

Thinking about sustainable environmental activities globally, Sáez-Martínez et al. (2016) stated that work to improve the environmental sustainability of SMEs is important because they are significant consumers of material and energy and produce around 64% of Europe's pollution. According to their research, only about 20% of companies in Europe are able to fall below the required environmental standards and thus demonstrate excellent performance in environmental matters. Despite this, SMEs think that their impact on environmental issues is limited, but they do not think about the large number of companies that raise the environmental impact of SMEs (Cassells & Lewis, 2011). Also, Caldera et al. (2019) state that the share of SMEs in the pollution produced by the world's industry is formed in SMEs; thus, SMEs must also bear a significant responsibility in reducing pollution and organizing their businesses to a sustainable level. For this reason, it is essential to focus on supporting SMEs in achieving sustainable development because SMEs' resources for developing sustainable business are substantially less than those of large companies (Bakos et al., 2020; Ukko et al., 2022). Madsen and Ulhøi (2016) found that small companies are successful in implementing reductions in environmental emissions, but in the longer term, SMEs have difficulties seeing financial benefits after they have completed easily implemented measures. This lack of perspective makes it difficult to implement investments in environmental innovations because the payback period for these investments may be relatively long. This is one reason why Taiwo et al. (2022) recommended that governments design favorable financing forms for SMEs. Large polluters who can improve their processes through small investments receive the most significant benefits from environmental measures.

Previous studies have emphasized the need for all companies—especially manufacturers—to pay attention to economic issues and environmental and social sustainability needs (Zaid et al., 2018). Achieving a balance between these priorities is difficult and requires effective management systems that improve environmental, social, and economic performance. TQM can be a solution that strives for a balance between these priorities. Bansal (2002) argued that social sustainability requires the integration of sustainable development into management activities, and Elhuni and Ahmad (2014) claimed that organizations should invest in sustainable development as part of strategic quality development. Previous studies related to TQM, such as Sadikoglu and Zehir (2010) and Al-Dujaili (2013), have shown that TQM has a positive effect on company performance. Despite confidence in the effectiveness of TQM, its details have not been determined in detail; however, the quality award criteria have clarified the situation (Modgil & Sharma, 2017). A clear consensus on the structure of TQM focuses on the fact that TQM contains both soft and hard elements (Gadenne & Sharma, 2009). For this reason, this study was initiated with a broad mapping of previous studies to define issues related to TQM. The mapping also considered the priorities highlighted by the European Foundation of Quality Management (EFQM), which is a common reference framework in Europe when discussing issues related to TQM. EFQM provides companies ideas about factors that should be considered when striving toward excellence. The issues dealt with by EFQM are divided into procedures and results. The procedures are divided into: (1) defining the basic mission, vision, and

strategy; (2) organizational culture, pioneering, and leadership; (3) stakeholder engagement; (4) creating sustainable value; and (5) directing and renewing performance. The results are used to measure the organization's performance in matters relevant to the organization. Companies utilizing TQM can develop sustainability-supporting solutions, considering their own processes, for example, in the selection of used energy, the use of waste materials, the development of management processes and the implementation of personnel-related matters, if economic competitiveness allows it. Isensee et al. (2020) highlighted the following opportunities within companies to support the improvement of sustainability in companies: awareness of digitalization, leadership for sustainability, organizational culture and mental states, culture for sustainability, digitalization for sustainability, and digitalization integrated into culture. It is worth noting that many of the problems presented above do not require an unreasonable amount of investment.

By utilizing soft TQM elements, especially in SMEs, significant progress in environmental and social sustainability can be achieved. To explore this research gap, this study proposed ten hypotheses to investigate the soft TQM elements that significantly contribute to environmental and social sustainability. An extensive literature review around the soft TQM studies, EFQM criteria, and related sustainability studies was conducted in order to operationalize the items for studied variables. The information was collected through a survey of Finnish SMEs. This survey was sent to 6889 randomly selected CEOs in autumn 2020. A total of 271 responses were received. In this study, the term "SME" refers to an enterprise that employs fewer than 250 people and whose turnover does not exceed 50 million euros per year. The balance sheet total is no more than 40 million euros, and no more than 25 percent of their shares or voting rights are held by a large company (Statistics Finland, 2020). Regression analysis was used to analyze the collected data, and the reliability of the analysis was verified. The results showed that two practices—business management and human resources (HR) practices—were related to environmental sustainability, while only business management was related to social sustainability. None of the control variables affected environmental sustainability; however, industry/service influenced social sustainability. The structure of the rest of this paper is as follows. First, a theoretical framework is presented, including theoretical foundations, key concepts, and hypotheses. Then, the research methodology is described, followed by the results and discussion. Finally, the conclusions of the study are presented.

2 | THEORETICAL FRAMEWORK AND HYPOTHESES

2.1 | Key literature

2.1.1 | Sustainable business

In the current business environment, sustainable development has become significant, and with effective sustainability procedures, companies can ensure their future success and gain a competitive advantage (Magd & Karyamsetty, 2021). The consideration of sustainable

development in business operations has received increasing attention, and its weight has been recognized (Albloushi et al., 2023). A well-recognized approach to sustainability is the triple bottom line, which considers the economic, social, and environmental elements of sustainability (Elkington, 1998), all of which must be in place for economic success; sustainable activities are thus built on the three principles of environmental integrity, economic prosperity, and social equity (Bansal, 2005). The concept of sustainable development has become widespread, but there remains no clear understanding of the procedures needed to achieve it (Alharbi et al., 2016). Previous studies have, however, highlighted the need for all companies—especially manufacturers—to pay attention to economic, environmental, and social sustainability needs (Zaid et al., 2018). In addition, achieving a balance between priorities is difficult and requires effective management systems that improve environmental, social, and economic performance. Bansal (2002) argued that social sustainability requires the integration of sustainable development into management functions, and Elhuni and Ahmad (2014) stated that organizations must invest in sustainable development as part of strategic quality development.

Referring to environmental sustainability, Bozkaya et al. (2022) found that in this century, the importance of renewable and clean energy and environmentally friendly economies will be emphasized. Although the economy is constantly growing, it should be implemented to the highest extent of sustainability and environmental friendliness possible. For this reason, investments related to renewable energy should be a viable option everywhere, as in the exemplary case in Nordic countries are exemplary, which can serve as an example for the rest of the world. Nordic countries should invest more in R&D projects related to renewable energy; this would influence the use of foreign energy and the environmental friendliness of the overall energy use. Due to economic growth, attention must be paid to energy consumption, and efforts must be made to reduce the use of fossil energy. Almeida et al. (2015) highlighted a less often emphasized detail about the possibilities of clean production (CP), that is, the benefits it brings to people's health. The positive health-related effects grow larger as more and more widely generated pollution can be affected. In pursuit of financial benefits and sustainable environmental activities, many companies have evaluated the environmental effects of their own operations. Based on the evaluations, they succeeded in developing cleaner production methods for themselves. Due to the limited resources of SMEs, large companies are clearly ahead of SMEs in adopting clean production operating models. (Nunes et al., 2019) In Finland, the assessment and identification of the environmental impacts of business operations are regulated by law 2014/527. It is also worth noting that when companies apply for certification according to standard ISO 14001, they are required to identify their own environmental aspects and initiate measures to reduce the effects of the most significant aspects and risks. Thus, external guidance also aims to reduce the environmental impact of companies' operations and guides companies toward the introduction of cleaner production. Furthermore, Bakos et al. (2020) showed that pressure exerted by management and stakeholders is essential in improving the environmental sustainability of SMEs. The pursuit of a competitive advantage

is also essential. Competitive advantage is obtained by reducing consumption and waste accumulation and by and by adopting environmental policies that affect the company's image. It should also be noted that it is possible for companies that violate the requirements to receive fines for damages caused by their activities. In addition, knowledge and awareness of sustainable solutions are key to the sustainable operation of SMEs, as SMEs often have very few resources for providing training on these topics.

Additionally, to respond to the ever-increasing number of environmental issues, companies define appropriate strategies to develop their environmentally responsible operations (Xu et al., 2021). The level of this corporate environmental responsibility (CER) often exceeds the legal minimum. Indeed, CER has been recognized as one of the most significant producers of long-term value and sustainability in companies, and company managers have stated that it has a positive meaning for the company's long-term success and value development (Kim et al., 2017). Gyamfi et al. (2022) determined that achieving sustainable environmental activities requires investments by both governments and business stakeholders in, among other things, green information, communication infrastructure, and high-quality education. Furthermore, the need to achieve carbon neutrality is constantly growing. The Intergovernmental Panel on Climate Change (IPCC) has established that reaching global goals requires a reduction of gigatons in the use of coal (IPCC, 2022). Improving the environmental situation and achieving carbon neutrality requires changing the global energy policy, as fossil fuels such as oil, gas, and coal make up the largest part of the total global energy consumption. This problem has been publicly raised, and several countries have drawn up plans to adapt their energy policies toward carbon neutrality. Ambitious goals, however, require innovation in energy use and subsidies to implement environmental investments. (Alola & Onifade, 2022) Finland is among these countries and aims to achieve carbon neutrality by 2035 (Ministry of the Environment, n.d.). In addition, the United Nations (2021), in its medium-term strategy, highlights the three most significant risks for the planet, which are climate change, loss of biological diversity, and pollution. All these risks endanger our relationship with nature. Responding to these risks requires movement toward more sustainable and fairer operating models, reducing pollution and living in harmony with nature. The strategy maps the necessary measures to reorganize consumption and production models toward sustainable development and defines the role of the United Nations Environment Program in the Agenda for Sustainable Development 2030.

Regarding social sustainability, the concept of corporate social responsibility (CSR) has emerged (Kim et al., 2017) to supplement the concept of corporate environmental responsibility. In several studies, CSR has been found to have a positive effect on the company's performance and value (Deng et al., 2013), and it is said to reduce companies' risks; thus, it also influences the financing companies receive (Albuquerque et al., 2019). Lopez-Perez et al. (2017) studied SMEs and found that CSR affects a company's reputation, brand, and company value. Their research shows that as the size of the company increases, so does the relationship between CSR and business results. CSR should therefore be seen as an investment in the future that improves the

company's chances of surviving in the intensifying competition. In terms of resources, it can be imagined that larger companies can hire managers from smaller companies in a more targeted manner, which gives larger companies a certain advantage over smaller companies. The advantage in question can be seen in the organization's training and the quality of communication, which can support the progress of sustainable business. According to Zbucea and Pinzaru (2017), the involvement of top management and owners in the development of operations plays a central role in the realization of social responsibility in SMEs, and the strategic weight of CSR will further increase. Sarvaiya et al. (2018), in turn, reported that the involvement of human resources management (HRM) in the implementation of CSR is desirable because employees must be involved and involved in the change of organizational culture and new ways of working. Due to the significant role of HRM, its tasks should be defined when implementing CSR.

Despite the benefits of sustainable business, its implementation can involve many problems. Bakos et al. (2020) found that barriers to the implementation of sustainable development can be either external or internal. Internal barriers can be, for example, a lack of resources or management support, while external barriers can be weak government support or the fact that there is no consumer demand for sustainable products. It is clear that awareness of sustainable development and its training are at the center of the implementation of sustainable solutions. Often, SMEs do not have the time or resources to train their organizations in these matters. Altinay et al. (2016) emphasized that organizational learning capability is an important factor in the proactive entrepreneurship and sustainable growth of SMEs. Similarly, Álvarez Jaramillo et al. (2019) investigated the barriers faced by SMEs when developing their operations on an even more sustainable basis. They identified 175 barriers to the sustainable development of SMEs and showed that costs and the lack of resources and expertise are the most important barriers. Ghadge et al. (2017) highlight poor market structure, lack of appropriate logistics, and possible weaknesses in environmental legislation as barriers to the implementation of sustainable practices. Lopez-Perez et al. (2017) claimed that small companies face more problems than large companies in the availability of trained personnel and in training the organization; thus, there is a risk that the CSR effectiveness of small companies will not reach the level of large companies. According to Aboelmaged (2018), technology drivers, which in their study were, for example, information, communication, and networking technology; devices and appliances that can be used to save waste and energy; new manufacturing innovations; skills to manage new technology and smart devices; trained employees in using new technology and sustainable manufacturing, do not affect sustainable manufacturing practices. On the other hand, pressure from customers and competitors has a greater impact than, for example, legislation. The support of top management and the commitment of the staff to sustainable development are significant in his research. Aboelmaged (2018) stated that, especially in developed countries, these have a significant impact because management in those countries is based more on dialog than on control. According to Font et al. (2016), in SMEs, the owner-manager's personality often shapes the company's culture, and decision-making also includes elements other

than just the pursuit of profit. Their advantage is the ability to react quickly, but they are often limited by a lack of resources and knowledge. In addition to economic factors, SME owners' attitudes toward sustainable business are influenced by their values and lifestyles.

2.1.2 | Total quality management

TQM is a management philosophy that has helped companies succeed amid intensifying competition (Chen et al., 2020; Sureshchandar et al., 2001). The operational benefits of TQM are usually reflected in reduced failures and losses, which improve finances and increase the sustainability of operations (Iqbal & Asrar-ul-Haq, 2018; Klassen & Whybark, 1999). According to Iqbal and Asrar-ul-Haq (2018), TQM improves performance by enabling functional, economic, social, and sustainable benefits. Its goal is to empower employees, provide understanding of customer needs, measure core processes, and minimize business variability. It is used in the development of an organization's functions, with the aim of continuously meeting customer requirements and improving operating systems to increase profitability and productivity (Mehralian et al., 2016). Tasleem et al. (2017) suggested that TQM is the most common strategic operating model for companies to strive for excellence. Furthermore, successful TQM reduces repetition and waste, producing significant cost savings (Abu-Alain, 2018), and social sustainability reflects the functions of an organization that supports people's well-being (Ajmal et al., 2017). Activities should therefore be designed to maintain competitiveness, care for environmental issues, and observe principles of social responsibility (Koç & Durmaz, 2015). According to Isaksson (2005), economic success is a basic precondition of sustainability, and TQM enables the integration of management processes with environmental and social sustainability goals. TQM contains both hard and soft elements (Gadanne & Sharma, 2009)—various quality-related tools or techniques are usually associated with the hard elements, while the soft elements are related to operational management procedures. Both types of element play an important role in quality management systems, but soft TQM has been shown to have a greater impact on performance than hard TQM (Fotopoulos & Psomas, 2009). For this reason, this study focuses on soft elements.

2.1.3 | Justifications for selected TQM dimensions

The soft TQM dimensions used in seven previous studies are presented in Table 1. Table 1 shows that each researcher has a slightly different view of TQM, and no common content has been established. Focusing the research on the right dimensions and issues, the EFQM model and previous studies were used in the planning phase. The dimensions and issues used are categorized in Table 1. This ensured that the study was in line with the European view of TQM. In addition to the information presented above, statements on the structure of soft TQM can be found in the literature, showing that soft TQM relies on strategic planning, goals, feedback, management commitment, and

employee involvement in the development of TQM operations (Abu-Alain, 2018; Ali & Johl, 2021; Cancino et al., 2018; Elhuni & Ahmad, 2014; Khalil & Muneenam, 2021). Based on the above, the first TQM dimension of this study was identified as the business management system. In addition to the dimensions of previous studies presented in Table 1, the literature suggests that soft TQM includes empowerment, collaboration, organizational culture, motivation, commitment, and equality (Chams & García-Blandón, 2019; Lagrosen & Lagrosen, 2019; Vihari et al., 2021). Based on this, HR practices were chosen as the second TQM dimension in this study, and the detailed issues are shown in Table 1. Process management, which encompasses the continuous and systematic monitoring of process productivity and materials use, is also an essential aspect of soft TQM (Cetindere et al., 2015; Khalil & Muneenam, 2021; Nazar et al., 2019). This, combined with the data in Table 1, formed the dimension of the research aimed at the processes called constantly evolving processes, whose detailed information is documented in Table 1. Procurement management is an essential aspect of soft TQM, encompassing the management of raw materials, suppliers' processes, and supplier selection (Gonzalez-Benito & Gonzalez-Benito, 2005; Singh et al., 2018). For this reason, and referring to the data in Table 1, in this study, the fourth dimension of TQM was titled advanced procurement procedures. The last aspect of soft TQM examined in this study incorporates stakeholder identification, customer satisfaction, customer expectations, product characteristics, and product image (Álvarez-Santos et al., 2018; Vesal et al., 2020) and was named stakeholder identification and competitive products. EFQM also emphasizes the importance of stakeholders and their satisfaction in several of its titles in implementing effective TQM, so the choice of dimension is justified. In sum, this study aims to examine whether the different dimensions of soft TQM impact sustainability. These dimensions, their details, and their formulations in previous studies are presented above and in Table 1.

2.2 | Hypothesis development

All five dimensions of soft TQM in this study are connected to sustainability and sustainable development (Antolín-López et al., 2016; Khalil & Muneenam, 2021; Lagrosen & Lagrosen, 2019; Nazar et al., 2019; Singh et al., 2018), so it can be assumed that the selected dimensions describe the effectiveness of TQM in matters related to the sustainable business of companies. In this section, we examine the results reported in previous studies on the impact of the selected dimensions on the overall sustainability of operations and set up hypotheses related to the environmental sustainability and social sustainability of companies' operations. Successful operations require minimal bureaucracy, efficient resource planning, effective management systems, better products, better service, and effective responses to changing needs. Failure to develop such operations may be due to a lack of clear development models, which is why organizations invest in sustainable development that accounts for strategies to improve their operations. (Elhuni & Ahmad, 2014) TQM and sustainability

TABLE 1 Summary of soft TQM practices in the current study compared to previous studies.

Soft TQM dimensions	Including...	EFQM criteria	Fotopoulos and Psomas (2009)	Abdullah and Tari (2012)	Singh and Dubey (2013)	Mosaddeghrad (2014)	Arunachalam and Palanichamy (2017)	Ong and Tan (2018)	Vihari et al. (2021)	
Business management system	<ul style="list-style-type: none"> Goals Feedback Responsibilities Management support Strategy Risks Information Stakeholder expectations 	2.3; 1.4 2.1; 2.4; 4.4 1.5; 5.2 1.5 1.3; 1.4 5.1 5.4 1.2	Top management commitment Strategic quality planning Facts-based decision making	Management commitment	Leadership management People results Communication	Top management support Organizational support	Top management commitment Appraisal system	Strategic quality planning	Top management commitment	
HR practices	<ul style="list-style-type: none"> collaboration Equality Initiative Staff competence 	2.3 2.1 2.2; 2.3; 3.2 1.3; 1.4; 2.2; 2.3; 3.2	Human resource development Employee involvement	Training and education Employee involvement	Empowerment Training HR focus	Training Employee participation	Training Teamwork Organizational trust	Employee empowerment	Employee empowerment	Empowerment Training Involvement Teamwork
Constantly evolving processes	<ul style="list-style-type: none"> process efficiency Efficiency of operations Continuous improvement 	5.1; 5.2; 5.3 5.2; 5.3 5.2; 5.3	Process orientation Continuous improvement		Quality culture	Managed processes Continuous process improvement	Continuous improvement			
Advanced procurement procedures	<ul style="list-style-type: none"> Materials and inventory management Reliability of suppliers 	3.5 3.5	Supplier management	Supplier relationship	Partnership and resources		Supplier quality management			
Stakeholder identification and competitive products	<ul style="list-style-type: none"> Competitive products Price-quality ratio = products as expected Stakeholder identification 	4.1 4.4 3.1; 3.3	Customer focus	Customer focus	Customer needs	Customer orientation	Customer focus	Customer focus	Customer focus	

are therefore connected (García-Alcaraz et al., 2019; Khalil & Muneenam, 2021; Nazar et al., 2019).

Management is an important means of achieving sustainability (Cancino et al., 2018; Elhuni & Ahmad, 2014; Khalil & Muneenam, 2021; Khizar et al., 2021). Khalil and Muneenam (2021) found that TQM practices, specifically strategic planning and human resource management, positively affect green performance in health care settings. Using a similar classification of TQM, Nazar et al. (2019) found that strategic planning and human resource management also positively contribute to corporate social responsibility in hotels. Elhuni and Ahmad (2014) recommended paying attention to management engagement and employee involvement when implementing TQM, as these are important factors that companies must adopt when seeking both environmental and social sustainability (see also Ali & Johl, 2021); therefore, they emphasize employees' involvement in the development of TQM operations. Organizational management is crucial to sustainable operations, and comprehensive training and proper supervision help increase the responsibility of personnel (Abu-Alain, 2018). One of the guiding principles of TQM is employee involvement, and it is essential that the staff be empowered, provided with good working conditions, and have common goals to act upon. A business management system would therefore seem essential for achieving environmental and social sustainability. Thus, we hypothesize the following:

H1. Business management systems positively affect environmental sustainability.

H2. Business management systems positively affect social sustainability.

Organizational factors also appear to contribute to sustainability (Ozaki, 2011), and their role in the implementation of TQM was emphasized by Chams and García-Blandón (2019), who claimed that, at the firm level, sustainability can be supported by integrating environmental issues into human resource management functions, supporting a holistic organizational identity and striving to create a transparent organizational culture. To maximize results, employees must be committed to the company's quality programs, as this provides the necessary feedback on process problems (García-Alcaraz et al., 2019). Similarly, Lagrosen and Lagrosen (2019) reported that, with the help of TQM, companies can continuously improve their processes and the quality of their operations, suggesting that commitment, equality, innovative dynamics, sustainable thinking, and openness to learning are crucial mechanisms of sustainable quality management. Ozaki (2011) also found that raising awareness of sustainable development is the best way to promote the adoption of procedures that lead to it and that, without awareness, it is unnecessary to wait for results. Therefore, we argue that making the organization of a company as seamless as possible will motivate the organization's actors to further sustainability initiatives. Therefore, we hypothesize the following:

H3. HR practices positively affect environmental sustainability.

H4. HR practices positively affect social sustainability.

Process management is also an important determinant of sustainability (Khalil & Muneenam, 2021; Nazar et al., 2019) and exerts positive and significant effects on green performance (Khalil & Muneenam, 2021) and corporate social responsibility (Nazar et al., 2019). Klassen and Whybark (1999) determined that preventive process improvement measures can reduce both pollution and losses and that such activity is directly linked to TQM and positively impacts both production and environmental issues; therefore, it is important for management to monitor productivity and material use to ensure the success of TQM (Cetindere et al., 2015). The results of such monitoring can provide management with insights into TQM implementation and the ability of staff to act in accordance with its principles; the sustainable competitiveness of products is also increasingly important, and maintaining such competitiveness can contribute to social and environmental sustainability (Rajesh, 2019). Thus, we believe that process facilitation has an important effect on environmental and social sustainability, and we hypothesize the following:

H5. Constantly evolving processes positively affect environmental sustainability.

H6. Constantly evolving processes positively affect social sustainability.

Procurement is essential for any company's operations, as the timely availability of goods and materials must be ensured and must account for the efficiency of the company and the purchasing process. Sustainability in procurement includes issues related to strategy, the environment, and social issues, so procurement should be understood as part of a company's sustainable operations (Gonzalez-Benito & Gonzalez-Benito, 2005; Singh et al., 2018; Vörösmarty et al., 2011). In addition to efficiency and performance, companies' procurement processes increasingly consider environmental and social responsibility issues (Vörösmarty et al., 2011). When developing sustainable procurement and selecting suppliers, special attention should be paid to waste, production chain losses, and suppliers' operating processes (Gonzalez-Benito & Gonzalez-Benito, 2005), and the management of raw materials is one of the most important criteria for TQM success (Singh et al., 2018). We therefore propose that advanced procurement, as a dimension of TQM, contributes to environmental and social sustainability and hypothesize the following:

H7. Advanced procurement procedures positively affect environmental sustainability.

H8. Advanced procurement procedures positively affect social sustainability.

Satisfied stakeholders play a key role in business performance reviews (Dyllick & Hockerts, 2002; Jorge et al., 2015), including sustainability. Greater stakeholder requirements have increasingly forced

companies to consider the social dimension in sustainable operations (Antolín-López et al., 2016), and the growing interest of stakeholders and customers in corporate social issues means that companies cannot ignore their social responsibilities if they wish to remain competitive (Herremans et al., 2016). Stakeholders also significantly impact social sustainability in supply chains (Mani & Gunasekaran, 2018), and TQM can provide a company with social benefits in the form of better customer satisfaction, broad social acceptance, and motivated employees who are well integrated into the company's operations (Álvarez-Santos et al., 2018). Vesal et al. (2020) also found that a product's characteristics, image, and ability to meet customer expectations significantly impact the market; thus, a company's products impact its sustainability. We therefore suggest that stakeholder identification and competitive products contribute to both environmental and social sustainability, and we hypothesize the following:

H9. Stakeholder identification and competitive products positively affect environmental sustainability.

H10. Stakeholder identification and competitive products positively affect social sustainability.

2.3 | Research framework

A framework was designed (Figure 1) based on the above outline and considering the view of Fotopoulos and Psomas (2009) that the focus

of soft TQM is on operational management procedures. As described in detail above, TQM is expected to affect environmental and social sustainability (Abu-Alain, 2018; Elhuni & Ahmad, 2014; Iqbal & Asrarul-Haq, 2018; Khalil & Muneenam, 2021; Nazar et al., 2019), and the research model therefore proposes that the five dimensions of soft TQM— business management systems, HR practices, constantly evolving processes, advanced procurement procedures, and stakeholder identification and competitive products—contribute to firms' environmental and social sustainability. The framework also incorporates a company's industry, size, and system certification as control variables. The Methodology section justifies why these control variables have been chosen for this study.

3 | METHODOLOGY

3.1 | Sample and data collection

This study focused on Finnish SMEs, with the criteria for inclusion being a turnover below EUR 50 million and having fewer than 250 employees. The respondents were managing directors of the participating companies, although companies with five or fewer employees were excluded to ensure that the participating companies had genuine TQM practices. The survey was conducted through Webropol. A brief introduction to the study, its focus, and its objectives was sent to 6889 randomly selected CEOs representing both industrial and service businesses, together with the survey, followed by

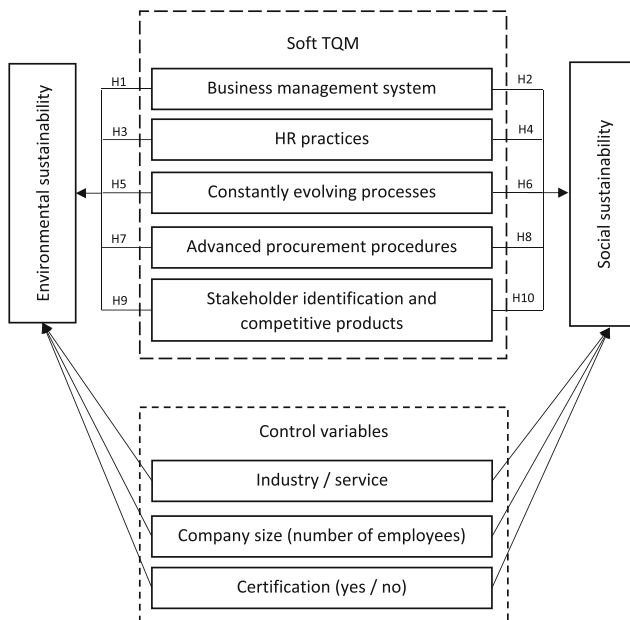


FIGURE 1 Research model and hypotheses.



two reminder messages, which resulted in 271 companies participating (a 3.9% response rate). The survey was carried out during autumn 2020.

3.2 | Measures

The survey assessed the views of the individual respondents on the functioning of soft TQM in their organizations and on the success of the organization in implementing environmental and social sustainability. The design of the detailed questionnaire was based on EFQM requirements, which were taken from EFQM sections mentioned in Table 1. Soft TQM was evaluated according to the five dimensions stated above using 28 statements to which the participants were asked to respond—on a Likert scale from 1 to 5, where 1 = “strongly disagree” and 5 = “strongly agree”—at the company level to ensure that they evaluated the operations of the entire company. The reliabilities of the TQM variables were assessed using Cronbach's α ; all values

exceeded 0.7, and the constructs were therefore considered reliable (Table 2).

The respondents were then asked to rate their organization's environmental and social sustainability. As Venkatraman and Ramanujan (1987) found both a high correlation and concurrent validity between objective and subjective measures, the use of subjective measures was considered appropriate. Because it was assumed that the terms environmental and social sustainability do not necessarily have an unequivocal interpretation among Finnish business managers, to harmonize the answers, both terms were briefly explained in connection with the question. In the evaluation of social sustainability, the respondent was asked to consider, among other things, equality, treatment of personnel, and compliance with labor legislation. In the evaluation of environmental sustainability, the respondent was asked to consider, among other things, limiting emissions, complying with environmental legislation, and minimizing waste. The evaluation of the level of the company's operations in terms of social sustainability and environmental sustainability was determined on the above-

TABLE 2 Survey items and reliability.

TQM practices	Items	Loadings	α
Business management system	In our organization, we know the goals we strive for	0.570	0.892
	Management provides feedback to staff upon their success	0.527	
	I think responsibilities and powers are clearly defined	0.499	
	Management supports the organization in achieving its goals	0.568	
	I think our strategy is clear	0.476	
	We know the risks of our operations/products	0.476	
	We have significantly developed our operations	0.458	
	Staff are informed of future changes due to remedial/developmental measures	0.603	
	Staff are rewarded for success in continuous improvement projects	0.538	
	We know what our stakeholders expect of us	0.561	
Employees have been informed of the importance of following agreed-upon procedures	0.622		
HR practices	I think the collaboration within our organization is seamless	0.664	0.859
	In our organization, problems are effectively solved through cooperation	0.743	
	The members of our organization are equal partners	0.559	
	I think that our approach supports initiative	0.599	
	Our staff is motivated	0.583	
Constantly evolving processes	I think our staff competence is excellent	0.416	0.807
	I think our operational processes are effective	0.645	
	Our processes are efficient compared to our competitors	0.700	
	We systematically look for opportunities to improve our processes	0.466	
Advanced procurement procedures	Our agreed-upon practices are effective	0.508	0.733
	Material deficiencies are very rare (and do not interfere with operations)	0.504	
	Materials are not unreasonably in stock	0.519	
	I think our suppliers are reliable	0.743	
Stakeholder identification and competitive products	Materials are easily identifiable	0.613	0.789
	I think our products/services are competitive	0.609	
	I think the price/quality ratio of our products is good	0.559	
	We have identified our key stakeholders	0.544	

mentioned Likert scale, where 1 = "bad", 3 = "neither good nor bad" and 5 = "good".

Finally, the respondents were asked about the organizations they represented, including certification, the number of employees, and whether the company was industrial or a service provider (industry/service) (Table 3). According to Statistics Finland (2021), there are 379,653 companies in Finland, of which there are 343,590 companies with less than five employees; thus, there are 36,063 companies composed of 5–249 people. Taking into account the aforementioned distribution of Finnish companies, it is clear that only a few SMEs have the resources to develop their own products, and these companies mostly act as an additional resource for large companies. According to the International Organization for Standardization (2021), 1,077,884 quality management systems have been certified according to ISO 9001 worldwide. In Finland, 2916 companies have certified their quality systems. For this reason, it is important to study the impact of certification on business sustainability. It has also been assumed that industry and service businesses are different from each other. In addition, it is assumed that large companies have more resources to invest in sustainable business (Lopez-Perez et al., 2017; Nunes et al., 2019); thus, company size is important in the realization of sustainable business. For these reasons, certification, nature of business (industry/service) and company size were selected as control variables for the study.

3.3 | Common method bias and non-response bias

Podsakoff et al. (2003) claimed that common method bias, which could distort the results of the current study, may be a problem in studies with only one informant per company; however, the anonymity of the answers and the logical order of the questions helped to

reduce the likelihood of this occurring. An attempt was made to minimize the problem by examining the literature at the design stage and ensuring that the hypotheses were properly focused on the topic under study. The responses were anonymous, although the respondents were limited to CEOs, and the timing of the responses and the time spent on the prompts were not controlled. The statements were designed individually so that, for example, strategy, risks, and staff communication were related to management, whereas continuous improvement was linked to processes. The order of the statements created a logical progression. It can therefore be assumed that common method bias did not affect this study.

Whitehead et al. (1993) found that non-response bias can be determined by comparing the responses of groups of respondents. The first group was comprised of CEOs who responded to all the prompts, while the second group was made up of respondents who failed to respond to some of the prompts. The responses of the groups were compared using one-way ANOVA; no significant difference was found; therefore, non-response bias was not considered an issue in this study.

4 | RESULTS

The study examined the relationships between soft TQM and SME environmental and social sustainability. Table 4 presents a correlation matrix with the means and standard deviations of the variables. The linear regression method was used to test the hypotheses. Prior to hypothesis testing, the pre-assumptions of linear regression were checked as follows. Normality and heteroscedasticity were investigated with a normal P–P plot and a scatterplot of the residuals. Multicollinearity was checked by analyzing the correlation coefficients and variance inflation factor values. As presented in Table 4, all

TABLE 3 Description of the respondent companies.

	Industrial	%	Service	%	Total	%
Type of company	163	60.1	108	39.9	271	100
Certified	83	50.9	23	21.2	106	39.1
Uncertified	80	49.1	85	78.8	165	60.9

TABLE 4 Correlation matrix with means and standard deviations.

	Mean	SD	1	2	3	4	5	6	7
1 Business management system	3.90	0.585	1.000						
2 HR practices	3.88	0.630	0.627***	1.000					
3 Constantly evolving processes	3.66	0.695	0.636***	0.565***	1.000				
4 Advanced procurement procedures	3.92	0.681	0.415***	0.391***	0.376***	1.000			
5 Stakeholder identification and competitive products	4.21	0.583	0.576***	0.486***	0.534***	0.481***	1.000		
6 Environmental sustainability	3.16	0.553	0.269***	0.241***	0.115	0.164**	0.134*	1.000	
7 Social sustainability	3.45	0.547	0.271***	0.222***	0.222***	0.145*	0.238***	0.463***	1.000

Note: *** $p \leq 0.001$, ** $0.001 < p \leq 0.01$, * $0.01 < p \leq 0.05$.

5.1 | The role of TQM in sustainable business

First, regarding the positive implications of business management systems, this study supports previous research, which identified business management system as an important means for achieving sustainability (Cancino et al., 2018; Elhuni & Ahmad, 2014; Khalil & Muneenam, 2021; Khizar et al., 2021). More specifically, Aboelmegeed (2018) and Bakos et al. (2020) found that business management has a significant impact on both environmental and social sustainability. In the field of business management, achieving sustainable long-term competitiveness has been a longstanding problem (Corredor & Goñi, 2011). Tasleem et al. (2017) addressed this by stating that TQM is the most common operating model when aiming for comprehensive development. With the help of TQM, it is possible for companies to develop their operations through continuous improvement, considering the requirements of customers and other stakeholders (Mehralian et al., 2016). Ooi (2014) and Chen et al. (2020) also reported on the effectiveness of TQM in achieving goals and developing sustainable business. The results of this study are in line with previous works.

Second, regarding the role of HR practices in sustainable business, the results of the study support the notion of their positive influence on environmental sustainability. The results are in line with Chams and García-Blandón (2019), who found that at the firm level, sustainability can be supported by integrating environmental issues into human resource management functions, supporting a holistic organizational identity, and striving to create a transparent organizational culture. Contrary to this study's initial expectations, HR practices did not have a statistically significant effect on social sustainability, even though the issues to be considered related to that dimension were collaboration, equality, initiative, and staff competence. The reasons for this result may include the fact that Finnish SMEs have not yet understood the comprehensive nature of TQM and the observation that companies should invest in developing sustainability as part of strategic operational development, as stated by Elhuni and Ahmad (2014).

Third, constantly evolving processes did not have an effect on either environmental or social sustainability. This result conflicts with prior research on the management of processes (Khalil & Muneenam, 2021; Nazar et al., 2019). Mehralian et al. (2016) stated that through continuous improvement, operations can be developed considering the requirements of customers and other stakeholders. In this study, which examined how continuous improvement, especially the efficiency of processes and operations, affects the environmental sustainability and social sustainability of business, such an implication was not found. The reason for this may be the possible lack of pressure from large customer companies described above, especially if they were not ready to participate in the sustainability-improving investments made by manufacturing companies in the form of increased prices, for example. Companies are driven by financial drivers and, according to Madsen and Ulhøi (2016), it can be difficult for SMEs to see financial benefits in improving sustainable business, after they have undertaken the so-called easy solutions and the development of TQM or sustainability is no longer a focus.

Fourth, advanced procurement procedures did not directly contribute to the sustainability of business. Previous research has highlighted sustainability in procurement that includes issues related to strategy, the environment, and social issues (Gonzalez-Benito & Gonzalez-Benito, 2005; Singh et al., 2018; Vörösmarty et al., 2011). However, this study shows that advanced procurement procedures do not directly contribute to a company's sustainable operations. The things to aim for are undeniably excellent in companies that manufacture their own products, but in a situation where the vast majority of Finnish SMEs operate (i.e., produce products and services according to the specifications given by customer companies), advanced procurement procedures are not a statistically significant criterion in terms of sustainability. This can be due to the fact that, in some cases, SMEs buy raw materials specified by the customer company with contracts negotiated by the customer company. This leads to a situation in which the manufacturing company has no decision-making power at all in the selection of suppliers and raw materials. In these scenarios, the manufacturing company must settle for the customer company's decisions, even if the company sees that the decisions are not reasonable in terms of sustainability. This is something that large companies should take into account, for example, so that they utilize the experiences of manufacturing companies with material suppliers when performing, for example, supplier evaluations required by their quality system.

Fifth, regarding the dimension stakeholder identification and competitive products, no direct effect on sustainability was found. In previous studies, such as a paper by Koç and Durmaz (2015), it has been reported that stakeholders have the opportunity to pressure companies into more sustainable operating models. As previously stated in this study, the vast majority of Finnish SMEs act as additional productive resources for larger companies. The extent to which large companies require their suppliers to continuously improve their environmental sustainability and social sustainability is an interesting question—are they only interested in product quality and product price? One could imagine that the increasing interest of large companies in environmental and social sustainability would be reflected in the entire field of Finnish SMEs. If such pressure does not come from large companies, the situation results in smaller companies having to justify ignorance of these issues by claiming that their influence in improving the sustainability of the entire industry is negligible, as Casells and Lewis (2011) found. Another explanation of the nonexistence of the direct relationship is that the manufacturers do not have the opportunity to influence the final product because they deliver products specified by the customer companies. In this case, the only competitive factor remains reliable deliveries and a competitive process. This study raises the issue but does not allow for more detailed analyses of the results, but more precise results require carefully targeted and planned additional research.

Although Ooi (2014) and Chen et al. (2020) reported that TQM is an effective operating method in the development of sustainable business, Magd and Karyamsetty (2021) found that sustainable development has emerged as a significant opportunity to ensure future success and competitive advantage, based on the results of this study,

TQM does not have a wider impact than described above in improving business sustainability. This study did not focus on determining the barriers to sustainability; however, previous studies have shown that achieving positive effects from TQM requires proper implementation of TQM (García-Alcaraz et al., 2019; Khalil & Muneenam, 2021; Nazar et al., 2019). As has already been stated, certified systems are quite common in Finnish companies. Certification may lead to the illusion that the company's system is good and that its procedures are excellently implemented simply because an external certifier has granted the system a certificate. This conclusion is also supported by Kiefer et al.'s (2018) observation that the certification of systems has a very small effect on business sustainability.

5.2 | The role of contextual factors

When looking at the effects of contextual factors on SMEs' environmental sustainability and social sustainability, it can be stated that certification has no effect on them. As stated above, Kiefer et al. (2018) also reached the same conclusion. This is unfortunate because current standards require companies to identify the internal and external requirements affecting their operations, stakeholders, business risks, the level of training required for the operations, and business goals. If implemented correctly, the issues in question should also affect the sustainability of the business; thus, the questions of whether the procedures of SMEs are too superficial and therefore have weaknesses and whether certifiers have the skills to demand sustainability-related procedures must be addressed. Whatever the reason, SME managers must understand that a certified system does not automatically mean sustainable business; as Elhuni and Ahmad (2014) stated, sustainability must be included in strategic planning.

The results of the study also showed that company size has no effect on SMEs' environmental and social sustainability. The result was surprising because several previous studies, such as work by Bakos et al. (2020), Nunes et al. (2019), and Lopez-Perez et al. (2017), found that the larger the company, the more resources it has for development work. This would suggest that larger companies are also ahead of small companies in sustainability matters. It should be noted that this research is aimed at SMEs whose number of employees varied between 10–250 people. In this size distribution, the study did not show that the size of the company has any significance in matters related to sustainability. This study does not take a position on whether the situation would have changed if large companies, which often act as customers of SMEs, had participated in the study.

The last contextual factor examined the impact of the company's industry on sustainability. The companies were divided into industrial companies and service companies. The results showed that when looking at social sustainability, service companies were statistically significantly ahead of industrial companies. In terms of environmental sustainability, the study did not show any differences between industrial companies and service companies. This result is surprising in the sense that industrial companies could have possibilities to influence environmental matters than service companies. However, this finding

is in line with the previously mentioned findings of Cassells and Lewis (2011) in that small companies perceive their influence opportunities to be limited due to their size. The reason that service companies are ahead of industrial companies in terms of social sustainability may be due to the fact that industrial companies are often additional resources for the production of large companies, while service producers can supply different services to the processes of larger companies. Such projects are usually managed in close cooperation with the client as different teams; therefore, social sustainability models are automatically included in working in service companies.

6 | CONCLUSIONS

6.1 | Theoretical implications

The research promotes TQM research by demonstrating the effectiveness of TQM practices for the sustainability of the operating conditions of Finnish SMEs. First, the results show that a business management system has a statistically significant impact on both environmental and social sustainability, which is consistent with previous studies, as shown earlier. Business management system appears particularly critical for achieving sustainability as it was the only TQM practice found to be significant for both environmental and social sustainability.

Second, HR practices have a positive impact on environmental sustainability, but not social sustainability, which is consistent with previous research suggesting that organizational factors are key to achieving environmental sustainability (Chams & García-Blandón, 2019; García-Alcaraz et al., 2019). Ozaki (2011) stated that raising awareness of sustainable development is the best way to promote the adoption of procedures that lead to it, and this also seems to be true for SMEs. However, HR practices had no statistical effect on social sustainability, which differs from previous studies, such as that of Nazar et al. (2019) and Ali and Juhl (2021). This result is unexpected, especially as the issues under consideration include organizational equality, cooperation, initiative, and motivation.

Third, the remaining TQM practices—constantly evolving processes, advanced procurement procedures, and stakeholder identification and competitive products—had no impact on the environmental or social sustainability of companies. These results are also inconsistent with previous research that examined TQM practices such as process improvement (Khalil & Muneenam, 2021; Nazar et al., 2019), procurement (Singh et al., 2018; Vörösmarty et al., 2011), and stakeholder acknowledgment (Mani & Gunasekaran, 2018); for example, Vesal et al. (2020) and Álvarez-Santos et al. (2018) highlight the importance of product quality for customer satisfaction and thus sustainable business. However, based on the current study, these factors may not be significant for Finnish SMEs, as companies in Finland are different and operate with varying criteria regarding their customers, as described earlier. The issues related to the sustainable business of a company that manufactures its own products differ significantly from a company that manufactures to its customers' specifications.

Finally, the study shows that neither certification nor company size directly contributes to a company's sustainability, even though certifications have the potential to enhance management performance, process performance, continuous improvement, staff competencies and training, and sourcing and supplier evaluations. Nevertheless, the results show that service companies are likelier to be socially sustainable than manufacturing companies.

6.2 | Managerial implications

The study clearly demonstrates the importance of designing and implementing business management system practices, which is underlined by the fact that there is no single way to implement TQM or sustainable business models, as each company must design its own systems. Management should also consider the fact that TQM functionality and sustainability are not automatically placed a high level upon certification; therefore, the performance of operations and processes should be monitored (including the process of management) to ensure continuous improvement of operations.

The study also makes a recommendation to the government to ensure the willingness of companies (especially SMEs) to make environmental investments because it is difficult for SMEs to determine the benefits of the necessary investments. As has already been stated before, the majority of Finnish companies are SMEs; therefore, as a whole, these companies have a significant responsibility for sustainable business operations. The Finnish government has set an ambitious goal of achieving carbon neutrality in 2035. Recent studies have shown that Finland's carbon sink has collapsed due to large-scale deforestation. Replacing felled forests is not simple, so Finland must strive to reduce the generation of emissions in industrial processes in which SMEs play a significant role. The government must support SMEs and think of ways to get companies to invest in better technology and support companies in developing their internal processes, as Alola and Onifade (2022) and Taiwo et al. (2022) state.

6.3 | Limitations and further research directions

This study examined only Finnish SMEs; therefore, it may not be generalizable to companies operating in different geographical areas. The study also used cross-sectional data; a longitudinal analysis would provide additional insights into the interplay between TQM and sustainability. For example, management views on sustainability may vary depending on how long a company has been considering its own sustainability, and longer investigation periods would assist in investigating the actions through which SME sustainability is built.

The study also raised other possible research topics, including why HR practices and constantly evolving processes do not affect sustainability. In-depth case studies are also needed to determine the mechanisms through which TQM practices contribute to both environmental and social sustainability. Furthermore, practical procedures for SMEs to identify stakeholders, their requirements, and the actions needed to

meet their needs should be developed—there remains the danger that stakeholders will be discussed by senior management only for this not to be followed with the implementation of operational programs.

The industry would also do well to determine the elements that are essential for companies that have their own products and for those that operate according to customer specifications. In this way, companies can obtain targeted tools for developing their sustainability.

In order to ensure that the real effects of TQM emerge, companies should be grouped into different categories according to how comprehensively TQM is being used in the company at the time of the investigation. Future researchers should conduct this initial study. The situation may be such that companies at the beginning of development imagine that they have already come a long way, while those who have been working with TQM for a longer time find that the work is just beginning and that there is still much to do with both TQM and sustainability.

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