Impacts of quality management relations on sustainability performance

A thesis submitted by

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Abstract

This study utilises the business relations theory as the theoretical lens to illustrate the links between quality management relations and the three dimensions of sustainability. The goal is to investigate the influences of the internal and external dimensional views of quality management (QM) relations in enhancing sustainability performance empirically. The internal quality management relations are associated with management and employees' factors, while the external quality management relations are connected with customers' and suppliers' factors. Sustainability performance is measured through the social, environmental, and economic sustainability performance dimensions, which represent the triple bottom line (TBL).

Additionally, this study examines the moderating impact of stakeholder pressure on the relationships between quality factors and sustainability dimensions. Also, the mediating effects of quality training, employee relations, supplier relations and customer relations were tested. Finally, this study examines group differences between the service and manufacturing sectors to enhance the generalisation of the survey findings. From this, a model is established to examine 24 hypothesised relationships.

Questionnaires were used to collect data from top managers of 467 UK service and manufacturing firms. Statistical analysis and structural equation modelling (SEM) techniques were applied to test and analyse the data.

The findings show that internal and external quality relations contribute to sustainability performance directly and indirectly, from management relations (MR) through employee relations (ER), customer relations (CR) and supplier relations (SR). Also, the results show that management relations (MR) supports other QM relations and is indirectly related to sustainability performance. The main effects were spread across the service and manufacturing sectors, and the results helped to identify the impact of different QM relations across different sustainability performance dimensions. The moderation results show mixed outcomes for QM relations and sustainability performance.

This study is relevant for academics and practitioners as it focuses on significant QM management relations that are beneficial for the triple bottom line (TBL) of firms. This research contributes to the streams of business relations research by examining the internal and external quality aspects related to management, employees, customers, and suppliers to explain the mechanisms through which those internal and external aspects could contribute to the firms' sustainability performance. As firms adopt internal and external QM relations to sustain their competitive advantage and achieve operational performance, their social, environmental, and economic sustainability performance dimensions improve. The importance of this research is that it investigates the influence of specific QM relations on the three dimensions of sustainability by providing robust and generalisable simultaneous examinations of these sustainability dimensions, primarily the social one. The social dimension has been paid less attention than the other sustainability dimensions and examining this aspect will provide further knowledge that has thus far been neglected in sustainability studies.

Dedication

This thesis is dedicated to the soul of my father, my beloved mother, brother, sisters, relatives and friends for their endless motivation, encouragement, and inspiration.

Thank you all!

Acknowledgements

Abbreviations, Acronyms and Units

AGFI	Adjusted goodness of fit index
AMOS	Analysis of Moment Structures
AVE	Average variance extracted
CFA	Confirmatory factor analysis
CFI	Comparative fir measure
CMV	Common method variance
CR	Composite reliability
DF	Degree of freedom
E	Error
E-mail	Electronic mail
EFA	Exploratory factor analysis
EN	Environmental substantiality
ES	Economic sustainability
GFI	Goodness of fit
H	Hypothesis
MCAR	Missing completely at random
MI	Modification indices
ML	Maximum likelihood
MSV	Maximum shared variance
N	Sample size
QM	Quality management
CR	Customer relation
ER	Employee relation
MR	Management relation
SR	Supplier relation
RMSEA	Root mean square error of approximation
SD	Standard deviation
SE	Standard error
SEM	Structural Equation Modelling
SS	social sustainability
SMC	Squared multiple correlations
SP	Stakeholder pressure
SPSS	Statistical Package for Social Sciences
SRMR	Standardised root mean square residual
URL	Uniform Resource Locator
VIF	Variance inflation factor
α	Cronbach's Alpha
β	Standardized coefficient
X^2	Chi-square

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Chapter 1. Introduction

1.1 Background

Technological advancement, globalisation, sustainability and business growth have created a complex and changing business environment that requires firms to advance their operations, resources and strategies to maintain higher performance and competitiveness. Along with profitability, firms are also required to react to the requirements and worries of various stakeholders, such as community and social responsibility requirements. Furthermore, firms need to consider their internal operations, including management and employee issues. However, regardless of all the efforts, concerns related to sustainable development (e.g., balance the economic, environmental and social needs) still represent a challenge for businesses to become successful. Literature has shown that the quality management (QM) approach, and its related practices, has improved processes, operational efficiency, customer satisfaction and quality performance, as well as provided a competitive advantage. Firms must consider internal and external quality resources to respond to sustainability concerns. Thus, this study aims to shed more light on quality relations by categorising quality practices in terms of internal and external effects. Previous research aimed at identifying the elements of the relationship between QM practices and sustainability performance has not been entirely conclusive. By contrast, this study is holistic as it investigates two categories of TQM practices: internal and external quality relations. The following sections provide a concise description of the thesis, include the research background of the main key concepts, the research objectives, the main findings, scope, significance and contribution of the study, and a brief description of the research chapters.

1.2 Main research characteristics

Quality management

QM and TQM have become universally accepted business methods, and academics and practitioners apply these extensively. They are integrated, with a set of practices that emphasise continuous improvement and the meeting of customer requirements,

as well as the management of quality (Powell, 1995) and the maintenance of competitive advantage (Brah *et al.*, 2000). There is a contradiction in the literature of what constitutes TQM practices owing to various reasons, such as the approach used by firms and their focus, or by the use of different concepts based on quality management systems such as Six Sigma, Lean, ISO standards or quality awards. However, the majority of research mostly agrees with the basic principles and practices of TQM. Scholars argue that TQM is underpinned by eight fundamental principles, including leadership, the workforce, the customer, quality information, supplier relations, service and product design and the process of continuous improvement (Herzallah *et al.*, 2014).

CSR and sustainability performance

Despite the lack of quantitative research on measuring sustainability performance, especially the social domain, scholars have tried to operationalise sustainability performance based on previous debates and theoretical backgrounds related to corporate social responsibility. The measurement of sustainability performance typically relates to TBL, which is based on the environmental, social, and economic performance (Elkington, 1994). The corporate social performance focuses more on social issues, while the TBL focuses on three dimensions of sustainability. The TBL is a tool that allows an assessment of an organisation' progress of being sustainable (Pagell and Gobeli, 2009). However, managing 'social, environmental and economic' performance simultaneously is a significantly challenging process (Epstein *et al.*, 2015).

Research motive

The quality management approach offers a basis and structure for carrying out sustainability (Frolova and Lapina, 2014). TQM enhances the development of corporate social responsibility (Benavides-Velasco *et al.*, 2014). For example, quality management and training as parts of TQM practices are the main factors that enhance social and environmental issues (Parast and Adams, 2012). However, previous empirical research has suggested that QM deals more with environmental and social issues. In this context, King and Lenox (2001) found that implementing ISO 9000 corresponds to initiatives related to waste and pollution management. They stated that CSR and QM systems aim at achieving a higher level of customer satisfaction to enhance organisational performance. However, research that has investigated the

relationships between quality practices and CSR simultaneously is insufficient (Tarí, 2011).

Tarí (2011) argued that quality and ethical issues are both a philosophy and a process that aim to improve the purpose and nature of work. Tarí (2011) suggested that QM practices could assist the development of social responsibility by taking into consideration all the different levels of the organisation, such as leadership. In this context, Frolova and Lapina (2014) found that implementing CSR activities in the QMS of organisations improves the quality of the process and overall performance. According to Garegnani *et al.* (2015), quality standards are at above-average in larger organisations in which there are strong relationships with critical stakeholders. They stated that quality management and its relationship with other important factors should be investigated and analysed more in order to assess the quality management scope.

1.3 Research philosophy

This study has followed the positivist approach. This philosophy is based on the idea that causes determine outcomes. Also, it is reductionist in that it seeks to reduce ideas to smaller parts or discrete variables that include hypotheses. For a positivist, the reality is more objective, and it exists 'out there' in the real world. This study believes that knowledge is objective and it is detached from the researcher. As a consequence, the relationships and hypotheses in this research have been identified through the hypothetic-deductive approach. The objective view of reality, which this research has adopted, depends on the existence of valid theories, which help to establish hypotheses (Sale *et al.*, 2002). For this research, quality management practices implementation is viewed as an external reality that exists independently and which can be measured. In addition, this study aims to use and integrate well-established theories to justify the results. Thus, this research argues that using the objectivist view is appropriate. Flynn *et al.* (1990) pointed out that operations management researchers should be aware of the theory which underlies their work. Regarding the axiological approach, the researcher took a value-free position as using a questionnaire involves very limited interaction with respondents.

As the research questions should steer the study in the appropriate direction (Maxwell and Loomis, 2003), the quantitative paradigm is suitable for answering the research objectives and questions. Moreover, this research has adopted a

confirmatory approach, which means it looks to confirm or disconfirm the hypothesised relationships of the quality management relations and sustainability dimensions (Hair Jr *et al.*, 2019).

1.4 Research objectives

The key aim of this study is to examine what the impacts of internal and external quality relations are on sustainability dimensions. The internal quality factors relate to management and employee aspects, and the external quality factors are associated with suppliers and customer aspects. Concerning sustainability performance (SP), it is defined according to established guidelines (Elkington, 1994; Elkington, 1998; Elkington, 2002). It is comprised of the TBL concept that includes social, environmental and economic sustainability performance. The TBL concept also reflects the sustainability dimensions, including "people, planet and profit" (Kleindorfer *et al.*, 2005, p. 482). Also, this study aims to respond to some limitations of previous research by providing a more robust analysis of and insights into the type of relationships that exist between internal and external quality management relations and sustainability performance. Predominantly, this study seeks to respond to the main objective, which is, what are the impacts of quality management relations on the social, environmental and economic sustainability performance.

Given the scope of QM relations and sustainability dimensions, this research aimed to examine the associations among different QM relations and investigate which relate to social, environmental and economic outcomes. Also, it aimed to examine the moderating effects of stakeholder pressure. This study proposes a framework, develops hypotheses based on the literature, and delivers empirical evidence from manufacturing and service firms in the UK. The study confirms that sustainability performance can be achieved by focusing on various quality practices. Chapter three, which is about the hypotheses and conceptual framework, covers the hypotheses used in this research.

1.5 Main findings

The results of the influences of management relations (MR) on other quality relations (employees, training, suppliers, and customer) strongly support H1a, H1b, H1c, and H1d. The effect of MR on ER, QT, SR and CR were significant (β = 0.426, p <0.001; β = 0.615, p <0.001; β = 0.600, p <0.001; β = 0.531, p <0.001, respectively). The relationship between MR and ER was also enriched by the role of quality training as a mediator, which was explained by the management relations supporting H2. The mediating role of training was partially supported as all the paths between MR and QT, and between QT and ER, showed significant relationships. The findings related to the impacts of QM relations on sustainability dimensions were mixed. The standardised estimated path coefficient of the relationships between MR and social sustainability performance showed insignificant results (β = 0.125; p >0.05), while there were significant positive relationships between MR and environmental sustainability outcomes (β = 0.203; p <0.05), and between MR and economic sustainability performance (β = 0.218; p <0.05). These findings support H3a and H3c, while they do not support H3b. The results related to the impact of ER on social and environmental sustainability outcomes were positively supported (β = 0.266; p <0.05; β = 0.245; p <0.05, respectively) (H4a, b), while the ER did not show significant results regarding economic sustainability performance (H4c). The study's findings indicate that the relational paths between supplier relations and the three dimensions of sustainability performance (H5 a, b, c) were significant (β=.225, p< .05) for economic sustainability performance; (β=.187, p< .001) for environmental sustainability performance; and (β=.193, p< .05) for social sustainability performance. The results of the relationships between CR and three sustainability performance dimensions (H6 a, b, c) were positively supported (β=.190, p< .05) for economic sustainability performance; (β=.116, p< .001) for environmental sustainability performance; and (β=.122, p< .05) for social sustainability performance. In addition, the relationships between internal and external quality management relations and the three dimensions of sustainability performance were tested across sector type: service and manufacturing.

The study also reported the moderating effects of stakeholder pressure (H7, H8, H9, and H10), as from NGOs, the media and government. These effects were reported for separate models of MR, ER, SR, and CR on SS, ENS and ES using a hierarchal regression technique.

1.6 Research significance

By utilising the business relations theory, this study created a theoretical lens to illustrate the links between quality management relations and the three dimensions of sustainability performance.

This research is novel in examining the link between the internal and external aspects of TQM practices with the three dimensions of sustainability performance. QM practices are more likely to occur as a part of the quality management system and create a more focused system. The nature of these quality practices is dynamic, and they are combined with operations management. Nevertheless, investing more in those practices represents an opportunity that enhances business relations and affects sustainability performance. As the nature of the internal and external quality management practices represent a relationship, quality management practices are conceptualised as quality management relations. Quality management relations, especially in the operations management domain, focus on creating consistency everywhere in the organisation: internally, by dealing with production systems or people inside the organisation; and externally, by broadening the scope to consider relations with suppliers and customers (Boje and Winsor, 1993; Kaynak and Hartley, 2008).

It should also be noted that the association between QM relations and the three dimensions of sustainability have not been investigated simultaneously. Moreover, some research has shown contradictory results concerning some of the relationships. Nevertheless, the importance of this research is that it tests the impact of specific QM relations on three dimensions of sustainability empirically. It is also the case that quality relations research has been investigated in isolation and has focused mostly on economic outcomes, especially with contradictory results in reporting financial outcomes.

Previous research has almost ignored the social dimension and solely focused on environmental or economic dimensions. This study argues that the three sustainability dimensions are all critical for organisations, as well as for the environment and society.

This study extends the findings of the primary relationships and hypotheses to include two different industries: UK service and manufacturing firms. The role of three ISO standards in driving sustainability performance dimensions is also examined. ISO 9001, ISO 45001 and ISO 26000 are the certificates that organisations are mainly

looking to attain as these three ISO standards deal with quality management issues, occupational health and safety, and environmental sustainability. The moderating effects of stakeholder pressure on primary relationships are also analysed.

1.7 Flow of chapters

The Introduction offers a brief overview of the main research questions and the chapters of this research, which are summarised in the following sections.

Chapter 2: Literature review

The literature review includes the theoretical background related to the key concepts of this research, including quality management, corporate social responsibility, and sustainability. This chapter presents an in-depth discussion of quality management and sustainability performance. It can be summarised as follows:

a. *Quality management*

This section presents the theories, concepts and definitions related to quality management (QM), (TQM), (QMS), quality awards, quality practices, and service and manufacturing organisations.

b. *Sustainability*

This part extensively discusses various theories and concepts of CSR and sustainability. It started with the CSR theoretical background and related theories, CSR evolution, CSP models and CSR dimensions. Then, the evolution of sustainable development theory and the triple bottom line are discussed. Also, it focuses on the social responsibility dimension and its practical aspects. Then, it sheds some light on social sustainability and its measurement initiatives.

c. *Quality management and sustainability*

This section discusses the similarities, frameworks, processes, perspectives and motives of two philosophies: quality management and sustainability. This part sheds lights on these two approaches by discussing how they consider social and environmental issues and how this leads to business performance. Also, to what extent they are similar and how they have common philosophical focuses is examined. Also, this section discusses the operational view of how organisations manage their interests and community concerns to reach sustainability spots that make a balance between 'doing good' and 'doing well'.

Chapter 3: Conceptual framework and hypotheses development

This chapter is concerned with establishing the conceptual framework and developing the hypotheses of the study. It considers all the relationships involved, including management relations, employee relations, customer relations, supplier relations and the three dimensions of sustainability performance.

Chapter 4: Research methodology

The methodology chapter discusses the research procedures used to generate the knowledge which will help to answer the research questions. It starts by discussing the adopted research paradigm and adopted approach. Then, it discusses the methods that were implemented to carry out the empirical stages, data collection and analysis procedures. Also, this chapter discusses the steps employed for survey development and the rationale for using the appropriate methods.

Chapter 5: The analysis

The analysis chapter deliberates on the findings of this research. It starts with data screening assessments that include outliers, missing data and normality tests. Then, it runs homoscedasticity, multicollinearity and response rate bias tests. Next, it reports on the results based on an exploratory factor analysis (EFA), confirmatory factor analysis (CFA), hierarchical linear regression, and the SEM assessments. Also, it presents the hypotheses testing results, multigroup analysis findings and moderation results. The analysis was done using SPSS 25 and AMOS 25 software.

Chapter 6: Discussion

The discussion chapter brings the critical aspects of the research findings and literature together by showing the importance of the study findings. It debates the findings according to the main research questions that include examining the associations between internal and external quality relations and sustainability performance. Then, it discusses other sub-questions regarding the roles of stakeholder pressure on the three dimensions of sustainability performance, and the roles of quality certifications on sustainability performance aspects. Also, it discusses the findings related to quality training as a mediator between QM relations and quality employee relations, as well as the mediating effect of quality employee relations in the relationship between management relations and sustainability outcomes. Furthermore, it discusses the results related to the service and manufacturing sectors.

Chapter 7: Implications, conclusion, research limitations and future studies

This chapter presents the implications of the research results. The implications are categorised into theoretical and managerial by focusing on the significant QM relations that are useful for the TBL of firms. It presents the importance of identifying which internal quality relations related to social, environmental and economic sustainability performance dimensions. Also, it presents implications as regards to the supply chain management. Also, this chapter presents the study's contributions, its conclusion, research limitations and future research opportunities.

Chapter 2. Literature review

The following sections focus on reviewing the literature concerning the primary concepts of interest in this study, including quality management (QM) and sustainability performance. The scope of this research is centred around the key research question which is to investigate the impacts of internal and external quality relations on sustainability dimensions. Therefore, by discussing QM relations and sustainability performance dimensions and their theoretical underpinning in-depth and critically, this chapter seeks to determine the contextual background and framework of the study. Also, this literature review discusses relevant topics of QM and sustainability that help in framing the conceptual model and hypotheses development of this study. The first part discusses quality management and TQM practices and their related models, concepts, and frameworks. Then, the following sections deal with sustainability performance and social responsibility. Next, the theoretical lens related to quality management and sustainability are examined. Finally, it concludes and identifies the gaps in the existing literature and discusses the research focus.

2.1 Quality Management (QM)

QM has become a universally applied philosophy for most organisations around the world. It can be confusing identifying a quality concept due to different individual perspectives within the business environment. Scholars and practitioners have used many different definitions of quality; however, there has been inconsistency in these definitions (Reeves and Bednar, 1994), and different ones have been utilised according to different situations. The table below summaries the different definitions of quality used in the literature.

The definition has developed over time, from being related to conformance (the early 1970s) to specifications and achieving customer expectations (1979) to focusing on customer satisfaction and processes such as service delivery (1980s). Currently, it has evolved into a TQM approach that involves the entire organisation (Wynen *et al.*, 2016). The increasing acknowledgement of quality management and its methods in the last decades is due to the increasing concerns about the quality of products and services. TQM philosophy is one of the accepted methods, one which allows for the development of other methods, awards and management systems, such as the

Malcolm Bridge and European Awards (EFQM). QM is a system that is used by organisations to comply with their customer requirements (Eriksson *et al.*, 2016).

Table 2-1 Quality definitions

Definitions	Sources
Quality is excellence	Greek philosophers (e.g., Plato and Aristotle); Tuchman (1980)
Quality is a value or price (product quality is part of the product cost); Quality is best for certain customers' conditions (end-use and price). Meeting customers expectations of product and services	Feigenbaum (1951); Feigenbaum (1983)
Conformance to specifications	Levitt (1972); Gilmore and HL (1974)
Quality means conformance to requirements; zero defects	Crosby (1979)
Quality is 'fitness for use'; it comprises two parts: design and conformance.	Juran and Godfrey (1999)
Meeting customer expectations (products or services)	Gronroos (1982); Parasuraman *et al.* (1985)

Source: Adapted from Reeves and Bednar (1994)

Zhang and Xia (2013) inquired whether quality had lost its importance and competitiveness, and found that organisations with improved quality systems were financially performing better than their competitors. Indeed, recent research has found that quality management is still significant. For instance, according to Zeng *et al.* (2017), quality management has been increasingly deployed and has increased in recent decades.

QM is defined as "an approach to achieving and sustaining high-quality output" (Flynn *et al.*, 1994, p. 339). The definition is used throughout the academic literature. Some essential principles and related practices characterise it: e.g., customer focus, teamwork and leadership (Zhang *et al.*, 2012). It also refers to the firm's attempts to achieve better quality products and services (Kaynak, 2003).

QM has been determined by the recognised contributors to the discipline, including W. Edwards Deming, Joseph Juran, Philip Crosby, Feigenbaum and Kaoru Ishikawa (Valmohammadi and Roshanzamir, 2015). It has obtained a current status, having become popular during the 1980s to the early 1990s, supported by the growing

acknowledgement of quality awards: e.g., the MBNQA and EQA (Sousa, 2003), Total Quality Management (TQM), and other systems, such as ISO 9000 quality standards. QM is considered as an approach to improve performance (Zhang *et al.*, 2012). However, it is claimed that understanding how to implement QM is essential in achieving maximum performance (Zhang *et al.*, 2012).

2.1.1 *Total Quality Management (TQM)*

TQM is a philosophy that is combined with a group of practices that emphasise continuous improvement and achieving customer requirements and quality management (Powell, 1995). It is also a tool for sustaining a business' competitive power globally (Brah *et al.*, 2000). TQM is a philosophy that pursuits constant improvement throughout the whole organisation by utilizing TQM concepts, from resources acquisition to customer services (Kaynak, 2003; Valmohammadi and Roshanzamir, 2015). TQM is a management approach that is expected to boost efficiency and competitiveness through management commitment, strategic planning, process enhancement and employee involvement (Oakland, 2003).

The influence of TQM as a critical competitive tool has been consistently on the increase. Earlier studies gave indications of the roles of TQM implementation in product quality in manufacturing firms. For example, it was found that leadership commitment positively influences TQM outcomes related to product quality (Ahire and O'Shaughnessy, 1998) Similarly, TQM can be adopted successfully by manufacturing and service firms to improve their organisational performance (Valmohammadi and Roshanzamir, 2015).

Many other quality systems and tools have been established, such as Six Sigma and Lean. Also, other models and awards related to excellence have evolved from QM: e.g., the MBNGA, EFQM, Malcolm Baldrige and ISO standards (Eriksson *et al.*, 2016). The increases and changes in customer demands and the rapid growth in competitiveness between organisations have resulted in more quality awareness (Chatzoglou *et al.*, 2015). Consequently, the evolution of quality models and standards have driven organisations to employ QM methods.

Therefore, the quality management approach is perceived from various points of view, and there is no unique definition that can be appropriately applied to a specific organisation. However, the majority of scholars and quality experts agree that QM

depends on the role of management support for quality implementation. Generally, TQM is related to eight fundamental principles, including management support, customer focus, employee involvement, training, quality information, supplier relations, services and product design and the continuous improvement of the process (Herzallah *et al.*, 2014).

2.1.2 *Quality management systems (QMS) and ISO certification*

ISO 9000 standard

The most applied standard of QMS is ISO 9000. It is a QM standard that is seen as being synonymous with QM (Eriksson *et al.*, 2016). This is because it is a successful method in supporting the quality system employed within a firm (Salgado *et al.*, 2016). It is popular as more than one million organizations in 187 countries are certified (Manders *et al.*, 2016; Salgado *et al.*, 2016). The increased number of ISO certificates indicates the economic development of countries (Salgado *et al.*, 2016). It also confirms the greater interest of companies in this standard. This standard is comprised of eight elements, including leadership, the customer, the employee and supplier aspects, and technical factors, such as process and continuous improvement (ISO, 2015). These QMSs and standards are regularly revised and updated. The updated version of ISO 9001-20015 has seven principles in comparison to the previous version, ISO 9001-2008. These principles are also found in other different QMSs, such as the EFQM.

ISO 14001

ISO 14001 refers to the international standard for an environmental management system (ISO14001, 2015), and it was published in 1996. The latest version was updated in 2015. It has been adopted by many organisations in the world as motivation to develop their operations and performance (Jiang and Bansal, 2003). To adopt this standard, organisations are required to identify their environmental goals, policies and relevant local regulations and governments policies. Also, organisations should establish operational procedures and establish training programmes for their employees.

Furthermore, like other quality systems, organisations have to establish structured documents to facilitate the management review process and auditing procedures (Jiang and Bansal, 2003). Bansal and Hunter (2003) found that ISO14001

certified US firms had substantial environmental legitimacy and a strong international presence. (Boiral *et al.*, 2018) analysed ISO 14001 implementation through a systematic review and found that the standard had improved results related to pollution, waste management, and energy management and consumption, while they found mixed results in terms of environmental performance and water pollution. Also, they found that ISO 14001 has improved employee awareness and commitment to training.

Nevertheless, they argued that the role of managers and support is a success factor of ISO 14001 implementation. Another important standard that is related to social sustainability and which is concerned with the employee is ISO 45001. ISO 45001 is a standard that provides organisations with requirements and guidance on how to improve occupational health for the employees and to maintain safety management systems (ISO45001, 2018).

Quality models (awards)

The Deming Prize was founded in 1951, in Japan, as the earliest prize related to quality management. This prize was awarded by the Japanese Union of Scientists and Engineers to Japanese companies which showed improvements in quality control (Cauchick Miguel, 2001). The companies are evaluated based on their quality control achievements and assessed through two examinations: documents and on-site (Bohoris, 1995). An equivalent award to the Deming Prize is the Malcolm Baldrige (MBNQA). It was created in 1987, in the USA, by Congress and circulated to businesses worldwide (Wilson and Collier, 2000). The measures derived from this award capture the main dimensions of TQM (Curkovic *et al.*, 2000). Based on this, (Lee *et al.*, 2003) found that the MBNQA positively influenced organisational quality performance among manufacturing firms in Korea.

Another award is the EQA, or what is now referred to as the EFQM model. It was established in Europe, and firms have implemented it since the 1990s as a tool to shape organisational policy and to discover areas for improvement (Van Schoten *et al.*, 2016). It can be applied to any type or size of an organisation (EFQM, 2017). This model consists of two parts: enablers (criteria) and results. The criteria include aspects related to the way organisations do things and how they do them (Suarez *et al.*, 2016). These aspects relate to the management, employees, strategy, partnerships, resources, processes, and products and services. The results involve outcomes related to two levels. The first level considers people, customers, and social outcomes,

while the second level is related to business results (EFQM, 2017). The implementation of this model is related to better performance. It is accepted and used in empirical research. The figure below presents the model and the nine criteria associated with it. The criteria in this model share the principles of TQM practices and QMSs, such as ISO 9000.
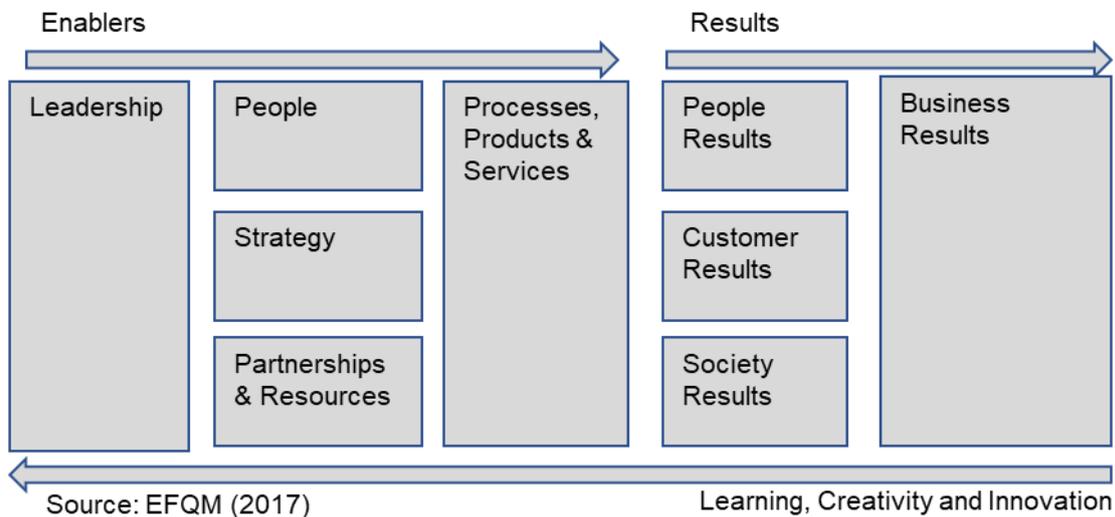
Figure 2-1 EFQM model

2.2 Internal and external QM relations

Quality management is a management approach that has a set of practices (Sousa and Voss, 2002). Total quality management (TQM) practices are part of QM improvement (Chaudhuri and Jayaram, 2018), which explains why the claims and arguments related to QM and TQM studies are particularly relevant for the purposes of this research. By capturing the internal (management and employees) and external (customers and suppliers) dimensional views of QM, this study develops a research framework that investigates the relationships between internal quality relations and sustainability performance. Human factors, such as management relations, employee relations, customer relations, and supplier relations, positively relate to improved quality performance (Dow et al., 1999).

The term 'quality management practices' has been used in the research in different forms: for example, these practices have been conceptualised as 'critical factors' (Saraph *et al.*, 1989). Other studies have conceptualised them as

'improvement activities' (Ahire and Golhar, 1996), while they have been conceptualised as 'techniques' by Adam *et al.* (1997), or 'items', as in the study by (Powell, 1995). Also, different QM frameworks have used different terms: for example, the EFQM uses the term 'enablers'. As for the number of QM practices used in different models and frameworks, there is inconsistency. However, the efforts to develop QM factors, or multi constructs and quality dimensions, have established the basis to theoretically link traditional quality management studies and philosophies to functional activities (Kim *et al.*, 2012). In this context, the literature has recently moved toward developing and examining certain groups of QM practices. The term 'quality management relations' will be used in this research to maintain consistency.

By looking at different quantitative studies that have tested the relationships between QM factors and different business outcomes, like organisational, business or financial performance, or innovation, it can be seen that these studies have revealed mixed results, according to the types of QM practices, performance measures, contexts, and sector type: e.g., Kim *et al.* (2012) and Manders *et al.* (2016). Also, other studies may have come up with different results in different settings, such as manufacturing or service organisations, or applied in different countries with different national or organisational cultures.

After reviewing the literature, most research on QM practices were built on Saraph *et al.* (1989) study. It is one of the first studies that examined QM practises and has triggered several studies in this field to look at the same: e.g., (Flynn *et al.*, 1994; Kaynak, 2003). They conceptualised eight quality factors. These factors represent the operational measures which were used to understand QM practices. The instrument used by Saraph *et al.* (1989) was the first reliable and valid model of QM practices (Flynn *et al.*, 1994). Their instrument consisted of different factors related to management, the quality department, employee relations, training, quality information, supplier relations, design, and process management. However, some of these practices were ignored as they were not suitable for all contexts. For example, the role of quality departments was not measured in later studies. This was due to some organisations not having quality departments.

Nevertheless, later studies have proposed other models that are related to these factors or QM practices. One of the studies is the study by Flynn *et al.* (1994). They came up with a set of 14 scales that are based on seven QM practices, such as leadership, customer and supplier involvement, and supplier and employee management. These scales were tested for reliability and validity in the United States

in various industries, such as electronics, transportation and machinery. Also, Kaynak (2003) constructed a refined version of Saraph *Saraph et al. (1989)* and investigated direct and indirect relationships among QM relations and business outcomes. Despite the attempts to categorise QM relations and practices, the most researched aspects are related to management, strategy, customer and supplier aspects, workforce aspects, and design and process aspects (Calvo-Mora *et al.*, 2014). However, some quality practices could be related to each other and represent a similar quality practice, such as aspects of management or leadership or strategy and planning. Brah *et al.* (2000) argued that having a successful quality system could be determined more by intangible practices, such as management commitment, an open organisation or employee empowerment, rather than the practices that deal with technical aspects, such as process management.

In general, QM practices, as a set of various practices, are connected to different TQM approaches and quality systems. The QMS is sometimes used as a 'critical success factor of TQM' (Basu and Bhola, 2016). Calvo-Mora *et al.* (2014) argue that QM practices are designated as critical factors as they are critical to an organisation's performance. Some studies have categorised TQM practices as either social or hard dimensions. The soft dimension refers to human resources aspects and social and behavioural factors, while the hard dimension refers to the QMS design aspects that have more technical features, such as product design (Van Schoten *et al.*, 2016). Other studies, such as Herzallah *Herzallah et al. (2014),* have conceptualised TQM as soft and hard practice.

Other research, e.g., Zhang *et al.* (2012), has divided QM practices into two groups or types. The first one is quality exploitation, which is related to a range of aspects, such as improvement and optimization. The second one concerns quality exploration, which refers to identifying the unknown and finding novel solutions. Zhang *et al.* (2012) stated that an organisation has to choose a suitable group or type as each orientation competes for scarce resources.

To discriminate between each group of practices is problematic. The difficulty of determining the differences of each group of practices and the disagreement of their contents have resulted in contradictory research conclusions. Also, these inconsistent findings could be because of different research methods and forms of analysis used. For example, some studies measure quality practices through the mediating effect of other factors; at other times, QM practices are the mediating factor (Mehralian *et al.*, 2016). Table 2-2 shows most of the critical QM factors and their relevant effects. Also,

the table shows that those QM practices have positive results in different firms' performance. This implies that it is important to consider different QM practices to improve performance rather than focusing on specific aspects.

Moreover, QM practices were categorised as hard and soft practices. The hard QM elements include design and process aspects, while the soft QM practices are related to those practices which involve management and employee commitment, as well as all human resource aspects, such as training. *Jayaram et al. (2010)* argued that QM factors include the social and technical aspects that combined both practices, such as design and supplier management. As argued by Zeng *et al.* (2017), the integration of both aspects is preferable and beneficial for reinforcing product innovation. They stated that hard QM practices are related to those practices which concentrate on process controlling and the monitoring of the manufacturing process, while the soft QM practices are related to those practices which involve management and employee commitment, and all human resource aspects, such as training. Despite this, there has been inconsistency with the empirical results that have investigated hard and soft quality relations with business performance. For example, Rahman and Bullock (2005) found positive relationships in three out of seven operation performance measures related to quality management. They argued that 'supplier relations' is more relevant to the manufacturing than the service sector. According to Powell (1995), 'supplier relations' are negatively associated with operational performance.

Table 2-2 Importance of different quality management practices

QM practices	Importance/ effects	References
Customer focus	It refers to fulfilling customers' current and future requirements and needs. It should exceed the requirements of their potential to maintain and sustain positive business outcomes. It leads to an improvement of the current quality of a firm's services and products.	*Sadikoglu and Zehir (2010); Manders et al. (2016)*
	It enhances performance for both suppliers and buyers.	*Basu and Bhola (2016)*
Employees relations	It refers to the process of enabling the workforce to think, behave, act and control their work. It helps organisations to improve and increase product quality.	*Chatzoglou et al. (2015)*
	It encourages employees to participate actively and to identify quality issues and errors. It has a link to firm performance.	*Hietschold et al. (2014)*
	It positively influences operational and strategic outcomes	*Lee et al. (2003)*

QM practices	Importance/ effects	References
Quality data and information	Also, social quality aspects, e.g., HRM has improved process management.	
	Availability of information helps firms to evaluate other quality practices, such as supplier management, and process and service design. Quality information is considered a technical practice that shows defect rates, compliance and breakdowns.	*Flynn (1994); Zeng et al. (2017)*
Service/ product design	It is related to new product quality and inter-functional design processes. It refers to involving different departments in design reviews, development and improvement. Also, to identify and resolve quality and environmental issues.	*Molina‑Azorín et al. (2009)*
Supplier relations	It is related to developing close partnerships and trust with a few suppliers to maintain long-term relations and ensure the quality of their product and services.	*Baird et al. (2011)*
	Effective supplier relationships improve process and conformance quality performance.	*Sadikoglu and Zehir (2010)*
Top management commitment	It is essential in a quality management system. It positively affects QMS implementation and overall performance.	*Kaynak (2003); (Sharma and Gadenne, 2008)*
	It is the most significant factor that influences other practices, e.g., it results in higher quality products.	*Ahire and O'Shaughnessy (1998)*
	It positively influences financial outcomes	*Adam et al. (1997)*
Training	Training improves employees' interactive and problem-solving skill and other technical skills.	*Herzallah et al. (2014)*
	It is crucial for manufacturing and services firms.	*Bon and Mustafa (2013)*
	It refers to the extent to which a firm provides its employees with job-related skills and quality techniques that enhance their knowledge and skills. It is a critical factor to set up a quality system and improves employee-related aspects, such as problem-solving and teamwork.	*Saraph et al. (1989); Kim et al. (2012)*

With regard to different methods used to investigate QM relations, most studies consider soft practices as the antecedent and hard practices as the mediator. Ho *et al.* (2001) found that successful implementation of core practices can be achieved by considering supportive practices, such as employee relations and training. For example, a study by Rahman and Bullock (2005) analysed 261 Australian firms and found that there were positive results between the direct effect of soft practices on performance and indirect effect of soft practices through the mediating effect of hard practices. This suggests the importance of soft practices in the firms' performance, directly and indirectly. In this regard, Jayaram *et al.* (2010) stated that organisations exhibiting flexible process practices through management commitment to quality and customer relations are better positioned to implement TQM.

Although the excellence models, such as the EFQM model, have no categorisations between soft and hard QM practices, previous studies have suggested that practices such as management commitment represent social factors, whereas

practices such as process management represent technical factors (Bou-Llusar *et al.*, 2009). Similarly, Suarez *et al.* (2016) studied 225 Spanish firms and found that the social factors (soft) of the EFQM model, such as management commitment, are essential to improving the organisational performance (Suarez *et al.*, 2016). Also, a study by Zeng *et al.* (2017) has suggested that, according to the empirical findings, it is better to focus on soft QM practices when aiming at product innovation.

Hard practices emphasise the speed of the workflow and reduce work and control activities, while the soft QM practices strive to reflect employee commitment, and the empowerment required to solve problems and improve quality. As for the technical side (hard), including practices such as process control and quality information, Zeng *et al.* (2017) have stated that upgrading and updating technologies may not increase the competitive advantage and that it is necessary to utilise resources related to human aspects, such as problem-solving (soft), which can identify quality problems and facilitate continuous improvement.

To some extent, most studies agree on the categorisation of what should be considered hard and soft practices (see Table 2-3). The table shows most resources that characterised soft and hard quality practices in different time scale agree on a certain categorisation. Most of these studies agree that soft quality practices promote the human aspects of the quality system, such as employees, customers, and management. Similarly, those studies considered technical aspects such as design, process management and data management as hard quality practices. However, some categories vary. Prajogo and Sohal (2004) have categorised quality practices into two different classifications: organic and mechanistic. Organic practices include practices that are related to aspects of management and the employee. By considering that previous research have not considered the internal and external aspects of the QM, this study is different as it investigates the internal and external aspects of the QM system, and it will clarify the unappropriated categorisation of the QM system.

Table 2-3 How quality management practices are classified into hard and soft in previous research

Author/Year	Wilkinson (1992)	Ho *et al.* (2001)	Prajogo and Sohal (2004)	Fotopoulos and Psomas (2009)	Jayaram *et al.* (2010)	Zeng *et al.* (2015) & Zeng *et al.* (2017)	Suarez *et al.* (2016)
Soft quality practices *(Promoting the human aspects of the system).*	Social system: - Customer awareness - Human resources management	Functional Roles: Management; quality department Human Aspects: workforce relations; quality training	Organic: leadership, people management	Soft aspects: related to management and strategy, employee management, supplier management, customer focus, process and design management.	- Empowerment - Training	Employee aspects such as: training, problem-solving and involvement in suggestions.	- Management commitment - Focus on stakeholder - Human resource management
Hard quality practices *(Emphasising process control and techniques to conform to satisfy and establish requirements).*	Production techniques: - Statistical process control - Quality function deployment	- Product design - Process management - Quality data/reporting - Supplier quality management	Mechanistic: customer focus and process management	Hard: - quality tools and techniques	- Design - Supplier management	- Process management (planning and monitoring of the manufacturing process) - Quality information	- Control and management process - Analysis, measurement, and problem-solving tools - Resources management - Supplier management
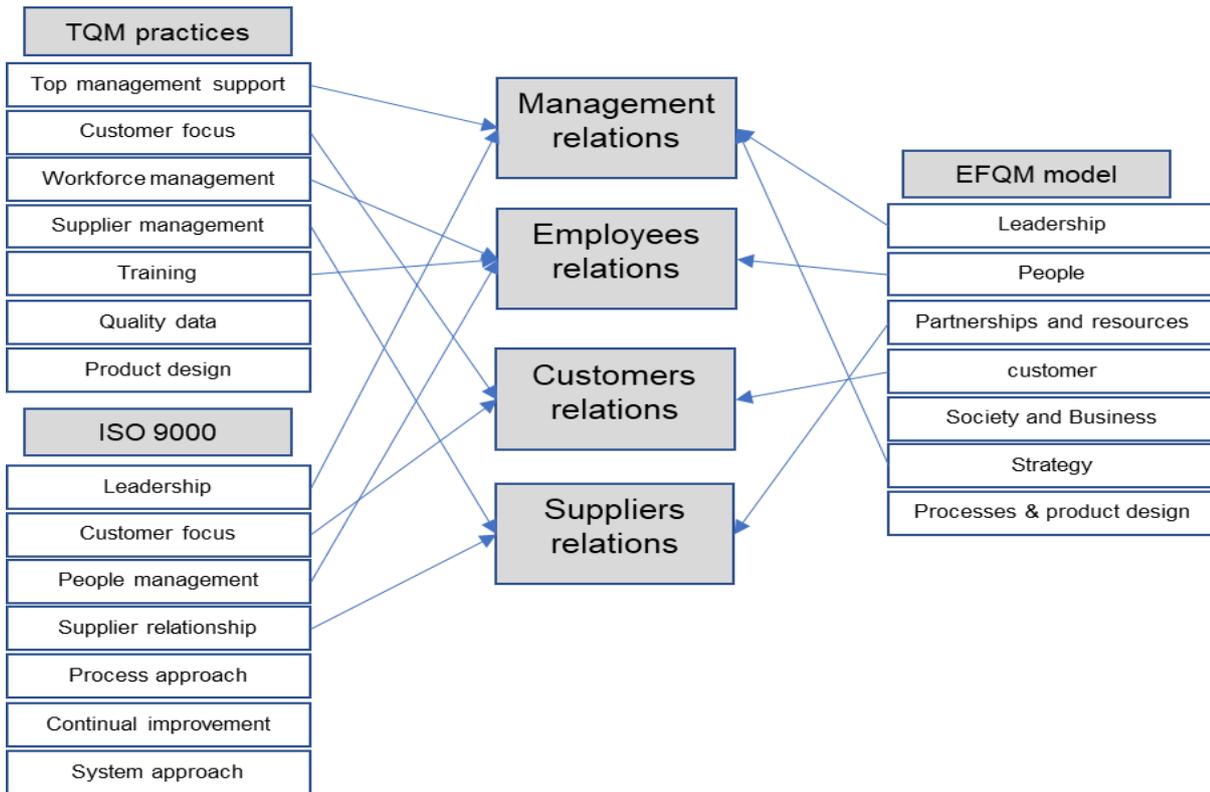
Figure 2-2 Relations between different QM systems and the focus of the research

Based on the above discussion about different classifications of QM practices, this study focuses on how quality practices are related in terms of internal and external quality relations. Figure 2-2 shows the linkages of how this research has derived internal and external quality relations from different quality approaches, such as TQM, QMS and EFQM.

These practices are conceptualised as internal quality relations that include top management relations and workforce relations; and external quality relations that include supplier relations and customer relations. These practices are mostly concerned with the human factors and are more appropriate for the services and manufacturing sectors. This study will provide a more in-depth academic understanding by extending the knowledge of both quality management relations and sustainability dimensions. The proposed quality relations model contributes to the existing research by focusing on the associations between its derived constructs in service and manufacturing firms. The four quality relations constructs are derived and developed by using scales adapted from previous studies.

Therefore, this study fills a gap regarding the dimensionality of the QM practices by adopting a multi-dimensional view through distinguishing internal and external quality relations (Figure 2-3). Then, this study examines the multi-dimensional view of QM with sustainability performance. Section (2.5) reports a rigorous comparison of the conflict results between the relationships of QM practices and performance. One of the reasons for having conflicting results is related to the disregard of some of the QM practices in QM models such as EFQM (Zeng *et al.*, 2017) and ISO 9001 (El Manzani *et al.*, 2019). This implies that the proper distinguishing of multidimensionality of QM is to promote the human aspects of TQM and QM systems (Prajogo and Sohal, 2004).
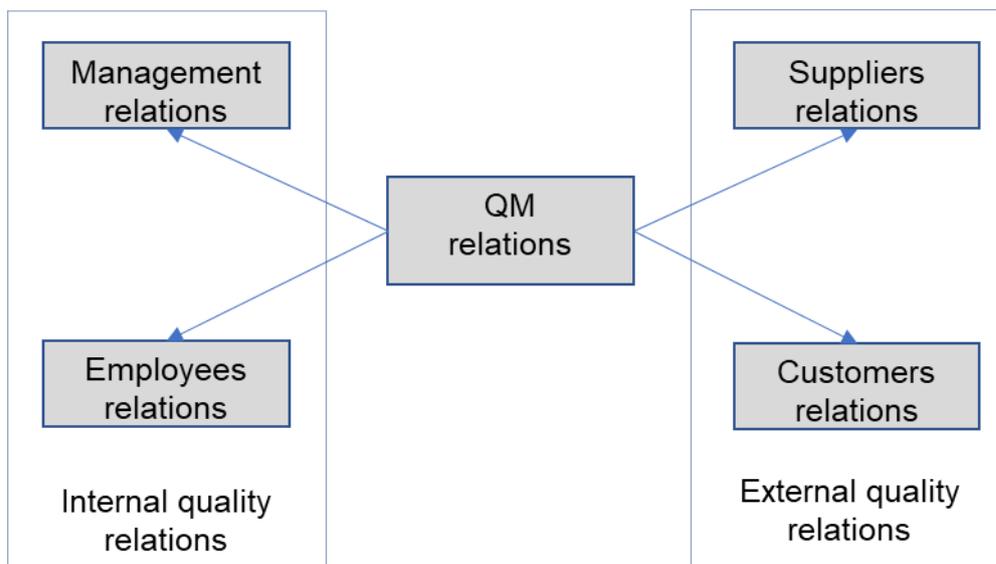
Figure 2-3 QM relations

2.2.1 *Management relations (MR)*

The concept of MR, in this research, is generally defined as management commitment towards quality practices, in which it produces positive performance results (Tarí et al., 2017). Indeed, without management relation, it is challenging to attain payback from other QM practices such as employee relations (Kim et al., 2012). MR is generally portrayed as the firm's managerial role in supporting quality improvement processes, including taking responsibility for relevant quality initiatives, such as evaluating the quality system and performance and considering QM in top management meetings (Kaynak and Hartley, 2008). Examining MR and other quality relations is important in

two respects: First, management relation is essential in obtaining greater firm performance (Rahman and Bullock, 2005). Second, managers are responsible for developing and reconfiguring the firm's resources that drive performance (Adner and Helfat, 2003; Ambrosini and Altintas, 2019). Latest research has acknowledged the role of management in organisational development and creating dynamic capabilities (e.g., Ambrosini and Altintas, 2019; Glaister et al., 2018). According to Ambrosini and Altintas (2019), dynamic capabilities developed by managers are key to achieving performance. The role of talented managers works as a transmission mechanism in a changing environment (Glaister et al., 2018). MR also focuses on core value as well as principle which are necessary to communicate with its employee in an appropriate manner. Thus, management relations is helpful in increasing motivation or satisfaction level of employees within business organisation. MR emphasises on motivating employees to perform their work in an appropriate manner. It is the responsibility of higher authority to manage the quality for achieving goals. Therefore, QM is helpful in achieving differentiation that helps in achieving competitive advantage over rivalries at Marketplace. MR focuses on assessing that element that helps in successfully maintaining quality. Hence, it is the responsibility of higher authority to maintain quality for success as well as the growth of a business organisation.

2.2.2 *Employees relations (ER)*

Management relations facilitate the creation of a quality environment that affects quality performance and drive other internal quality relations, e.g., employee relation (Kaynak and Hartley, 2008; Kim et al., 2012). Management is responsible for influencing employee relations and ensuring effective communications between the employees (Daily and Huang, 2001). Management relations also focuses on taking involvement of employees in order to make decisions which will be beneficial for a business organisation. The main purpose is to maintain appropriate relations with the employees that helps in bringing positive ambience at workplace. ER in the QM literature is related to employee involvement, employee empowerment and teamwork. It refers to the employees' continuous development and growth and is a practice that encourages team problem-solving. It also refers to how supervisors take the role of coaches rather than giving orders to enhance the employees' ability to solve problems (Flynn et al., 1995). Also, ER is related to providing training to the employees in order

to increase their knowledge in relation to quality that help in satisfying the customer and improving firm performance. ER also focus on optimum utilisation of resources in order to improve quality and reducing costs. It assists in maintaining quality and encouraging workforce as well as help in maintaining appropriate communication or cooperation among them. It also increases morale as well as the motivation level of employees that help in increasing the productivity of the business organisation. It focuses on bringing changes which are necessary for success as well as the growth of the business organisation.

2.2.3 *Customers relations (CR) and Suppliers relations (SR)*

Customer relations and suppliers relations, in this research, represent the external factors of QM relations. Customer relations is one of the quality practices that leads to higher levels of operational performance (Phan *et al.*, 2019). Firms are required to be focused on their customers (Zeng *et al.*, 2017). This is because implementing quality customer relations would provide better quality performance (Kaynak and Hartley, 2008). According to Wilson and Campbell (2016), the main purpose of QM is meeting customers' requirements. This also explains the increasing attention given by scholars since 2000s to empirically investigating quality management relations, including customer relations, and operational performance (Phan *et al.*, 2019). Customer relations is an essential part of the quality management system and standards such as 9001, 26000 and 18001 (Chiarini *et al.*, 2017; Lafuente and Abad, 2018; and Lo and Yeung, 2018). It is a key factor of QM as the quality of the products and services are based on customers' requirements (Chaudhuri and Jayaram, 2018). According to Wu *et al.* (2017), customer relations begins by understanding customers' needs. QM that ensures meeting customer requirements leads to effectiveness and efficiency (Zeng *et al.*, 2017).

Customer relation is one of the most logistics capabilities that has been frequently discussed in the literature (Liu *et al.*, 2017). According to Ambrosini and Altintas (2019), sensing opportunities is a capacity of dynamic capabilities that refers to identifying opportunities through identifying customers' needs and business relations. Managers are responsible for sensing those opportunities as they are close to customers (Ambrosini and Altintas, 2019). Customer relations promotes dynamic capability and firm performance (Hong *et al.*, 2018). Although previous scholars on QM

have found that customer relations improve firms' performance, this relationship is still an important enquiry. The reason for that is because customers' behaviour has changed rapidly as a movement towards globalisation and reducing the environmental effects (Pipatprapa *et al.*, 2017). Thus, firms are required to meet their customer requirements through quality customers relations, and by collecting and assessing data on customers' current and future requirements (Pipatprapa *et al.*, 2017).

2.3 Sustainability

According to Epstein (2018), sustainability is important for businesses because of four reasons. First, governments regulations require organisations to address sustainability requirements. Failure to respond to those requirements can be costly and results in penalties such as closure and fines. Second, addressing sustainability by identifying social and environmental issues improve community and stakeholders' relations and improve business performance. Third, sustainability increases sales and financial incomes due to an improved reputation. Fourth, it is an obligation to achieve sustainability due to its impact on environmental and social performance.

The following review will help to drive the relevant information for this research by highlighting some of the key terms that are widely used in sustainability literature. A debate between organisations, societies, and governments, which started in the 1990s, has become increasingly vocal and critical. This debate revolves around the sustainability, social responsibility, stakeholders and public policies (Gonzalez-Rodriguez *et al.*, 2015). The discussion is related to the ethical commitment of working in an economically and environmentally sustainable way. Also, it is about recognising stakeholder interests and considering other issues, such as linking strategies with ethical values, community and the environment (Mijatovic and Stokic, 2010). The recent and fundamental value of the importance and attention given to CSR by organisations in the business world reflects the importance of those organisations' success. The significant benefits of CSR motivate organisations to become engaged with CSR initiatives (Paek *et al.*, 2013).

The definitions of CSR vary from one country to another, from one culture to another and from one region to another, not just from one sector to another (Crane *et al.*, 2019). Most definitions of CSR are not only concerned with the interests of organisations but also include an element of society (Schreck, 2009). If an organisation

only complies with basic legal requirements, it cannot be considered to be socially responsible. Organisations are expected to reach beyond the societal values that are defined by law: for example, to be part of the local community in charity sponsorship or educational investment. By these practices, firms can avoid 'unethical business practices such as bribing' (Schreck, 2009, p. 10).

CSR theoretical background

The earliest academic writings on CSR, such as Stocking *et al.* (1933), focused on the leaders' responsibility rather than discussing and understanding how firms achieve corporate responsibility (CR). Later, Davis (1973) was one of the corporate responsibility theorists who shifted the focus from the individual to the company, as an institution. In the 1980s, the stakeholder theory was introduced. Then, during the 1990s, a growing debate on the theory and practice of CR evolved, particularly by raising questions about how business can be responsible, what it is responsible for, and to whom it is responsible. These questions led to the development of CR theory (Blowfield and Murray, 2014). CSR theories can be categorised in four ways: instrumental, political, integrative and value-orientated. These four theories mainly focus on four CR characteristics: achieving long-term economic objectives, exercising responsible business power, incorporating social requirements and being moral and ethical toward society (Garriga and Melé, 2004). Figure 2-4 presents the CSR theories as they are classified in the literature.
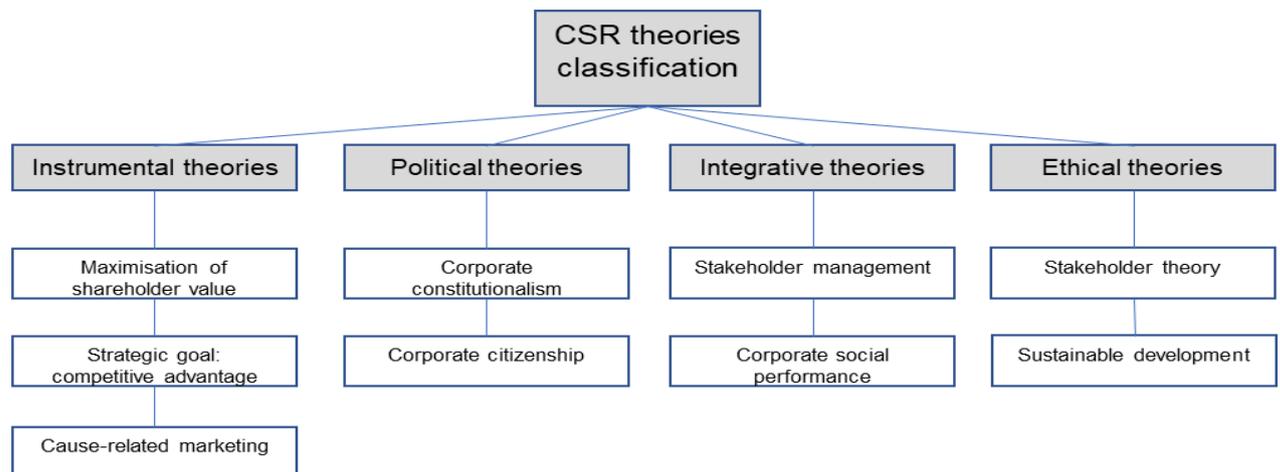
Source: Adapted from Crane et al. (2014)

Figure 2-4 CSR theories classification

Instrumental theories are related to understanding CSR as a source of revenues and achieving economic objectives. This understanding has led scholars to study the relationships between CSR and economic outcomes. In this theory, three main categories are identified. First, increasing shareholder value by rejecting social activities that impose costs. The second category focuses on allocating resources that are essential to achieving a competitive advantage and objectives. The third category is related to cause-related marketing that deals with companies' attempts to reinforce revenues and sales, which is also related to brand acquisitions and being compatible with CSR activities (Crane *et al.*, 2019).

Regarding political theories, social power is related to society but has responsibility related to the political domain as well. Corporate constitutionalism is related to the role of power as it is explored by Davis (1960). If the firms do not use social power, they will lose it and be occupied by other groups. This can be done by defining conditions for its responsible use. As for corporate citizenship, its purpose arises from the idea that some corporations are replacing powerful institutions, such as the government (Crane *et al.*, 2019).

Concerning the integrative theories, they describe how business is contingent on the social community to develop and be sustainable, and they are related to the existence of the business itself. They highlight the role of managers and their taking into account social values while operating business and functions. For example, the stakeholder management approach focuses on all the stakes who involve or are involved with firms' behaviours. The basic principle of this approach is to have more collaboration between firms and stakeholder groups. This requires efforts to manage stakeholder relations, which then requires the firms to deal with other issues affecting different stakeholders. As for corporate social performance, it is based on Carroll (1979) model. This model has three parts related to SR: a definition, a list of social issues, and a response to the social issues. This model has been modified to include economic, legal and ethical aspects (Crane *et al.*, 2019).

As for the ethical theories, they are based on the principles that are necessary to achieve in a good society. Stakeholder theory, proposed by Freeman (1984), is an ethical theory dealing with stakeholder groups, such as shareholders and customers, who have a stake in a firm. Stakeholder theory requires firms to pay attention to the

stakeholders by identifying their interests. Another theory is related to sustainable development; it was basically developed at a macro level but it spread beyond this in 1987 through the World Commission, which published a report about it (Crane *et al.*, 2019).

The development of CSR

The CSR concept is based on organisational behaviour and institutional development. Although CSR as a concept has been studied academically in recent decades, evidence of CSR can be found in the early 1920s. This section traces the origins of the theory of CSR and considers the concepts, such as 'public service', trusteeship', 'business social responsibility' introduced by Bowen and Johnson (1953), and 'stewardship' by Friedman (1970), which have led to the development of the current definitions. Firms need to consider the necessary shareholders' perspective, as well as consider the broader perspective of the stakeholders (Bhaduri and Selarka, 2016). Table 2-4 summarises the development of concepts of CSR.

Table 2-4 the evolution of CSR concept

Period	Year	Name/ theorist	Key concepts	References
Early Theoretical views 1910 – 1940s	1916	J.M. Clark	Transparency in business	(Clark, 1916, p. 223)
	The 1930s	Professor Theodore Kreps	Social audit/social welfare	Carroll and Beiler (1975)
	1942	Peter Drucker	Social dimension	Drucker (1995)
Introductory stages of CSR (corporate philanthropy) 1950 – 1960s	1950	Frederick	Trusteeship; corporate philanthropy	Bhaduri and Selarka (2016)
	1953	Bowen	Businessmen's obligations, Corporate social obligations	Bowen *et al.* (2013, p. 6); Carroll (2006)
	1960	K Davis	Social power	Davis (1960)
	1961	Goyder	Social auditing	Pearce (2002)
	1962	Milton Friedman	CSR for increasing profits	Friedman (1962)
	1967	Walton, Clarence Cyril	Degree of voluntarism	Walton (1967); Carroll (1999)
Growth of CSR concepts (Stakeholder Theory and Business Ethics) and CSR models	1970	Friedman	Capitalist approach; profits; soulless corporations	Friedman (2007, p. 178)
	1975	Sethi	Corporate Social Performance (CSP); social obligation; social responsiveness	Sethi (1975)
	1977	Ansoff	Societal dimension; enterprise strategy	Ansoff (1977)

Period	Year	Name/ theorist	Key concepts	References
The 1970s-1980s	1979	Carroll	CSP model	Carroll (1979)
	1984	Freeman	Stakeholder approach	Freeman (1984)
Debates of corporate social practices 1990- 2000	1991	Carroll	CSP pyramid model; Corporate citizenship	Carroll (1991)
	1997	Davis	The stewardship theory	Davis *et al.* (1997)
	1998	Elkington	Triple bottom line (TBL)	Elkington (1998)
2000- Present empirical focus on CSR and sustainability	2000	Husted	CSP, contingency theory	Husted (2000)
	2003	Schwartz and Carroll	Three domain approach	Schwartz and Carroll (2003)
	2005	David Vogel	Corporate strategy	(Vogel, 2005)
	2010	Pedersen	TBL, practitioner-based model, social responsibility	Pedersen (2010)
	2011	Gholami	value creation internally (firm) and externally (society) managers	(Gholami, 2011)
	2015	Low	CSR expansion to stakeholder, e.g., employees (safety, health, training)	Low (2016)
	2018	El Akremi	TBL, employee focus	El Akremi *et al.* (2018)

1950s – 1960s: introductory stages of CSR (corporate philanthropy)

This stage is concerned with the introduction of CSR. Frederick (1950) suggested different substantial views. One of these views was of the managers, whereby they are concerned with balancing the competing claims to the business resources and with accepting philanthropy as an aspect of business support (Bhaduri and Selarka, 2016). Related to this, Bowen (1953) has asserted the obligations of businessmen as they are responsible for following the rules and making the decisions that society requires (Carroll, 2006; Bowen *et al.*, 2013). Similarly, in 1960, Davis viewed CSR in terms of managers' roles in making decisions and taking action which went beyond the company's economic status, which were required to correspond to the social power of their organisation (Davis, 1960).

The 1970s-1980s: first stages of CSR concepts

Friedman (1970) argued that increasing shareholders' wealth and meeting their interests are the primary purposes of business. The view of social responsibly was that resources in activities that could increase profit should be used or involved, which is viewed as the capitalist approach. This view of social responsibly was one way for organisations to produce goodwill (Friedman, 2007). In 1975, Sethi (1975) developed a three-layer model of corporate social performance. It involved: first, social obligation, which meant that the company responded to all legal requirements; second, social responsibility, which meant the company had to address societal expectations; and

third, social responsiveness, which meant taking proactive responses to address social needs (Bhaduri and Selarka, 2016). In 1977, Ansoff explored the societal dimension of strategic management by proposing that interaction between firms and their environment should be part of their strategy (Ansoff, 1977). In 1979, Carroll developed a CSR model (CSP model) of four levels. First, the economic level focused on profit and on producing services and products that society required. The second level was legal, which meant that society expected firms to follow the law and fulfil their legal responsibilities. The third, ethical responsibility, implied firms had to be fair and avoid harm. The fourth, the philanthropic (discretionary) level, was related to involvement in social activities for the community and to being a good corporate citizen. These roles were complicated because they were carried out based on individual judgment (Carroll, 1979).

The 1990s- 2000: debates on corporate social practices

Carroll (1991) revisited his previous CSP model (1979) by suggesting that the discretionary level include 'corporate citizenship'. Then, Davis *et al.* (1997) integrated the agency theory and arrived at the stewardship concept. This theory views managers as 'stewards', whose aim was to satisfy the shareholders and the stakeholders; this led to newer models of CSR, such as the sustainable development model. By using stakeholder theory, Elkington (1998) came up with the TBL (Triple Bottom Line), which defined CSR as a central definition among many definitions of sustainability because it combined environmental, social and economic performance (Anisul Huq *et al.*, 2014).

Philanthropic Responsibility
Be a good corporate citizen by engaging in social activities

Ethical Responsibilities
Be ethical to do the right and fair, and avert harm

Legal Responsibilities
Obey the law and fulfil the legal responsibility

Economic Responsibilities
To focus on profit by providing products and services for the society

Source: Carroll (1991)

Figure 2-5 CSR pyramid model

The 2000s- present: empirical focus on CSR

In this period, more empirical research on CSR was conducted (Bhaduri and Selarka, 2016). For example, Husted (2000) discussed CSP about contingency theory and claimed that it was part of the social domain. Also, Carroll's model (1979) was refined by Schwartz and Carroll (2003) from four levels to three: economic, legal, and ethical. Moreover, in 2005, (Vogel) suggested in his book 'The Market for Virtue' that CSR was not a precondition of business success, despite it being part of the corporate strategy.

This period has focused more on the three-domain approach, TBL, practitioner-based model, and social responsibility. In addition to considering TBL, this period witnessed an expansion of CSR stakeholders by giving more attention to internal and external stakeholders. For example, for the internal aspects, firms consider employees' aspects such as safety, health, wellbeing, and training. The external aspects related to firms' managers initiatives in considering society by focusing on local communities that their firms work with.

Twenty-first-century stage

This stage witnessed the development of various CSR models and theories, such as sustainable development and TBL. The following section discusses the sustainable model and TBL.

Sustainable Development Model

This model is related to the stewardship concept, which essentially is based on that managers should have the moral and ethical attitude to do the right thing without considering the consequences to economic outcomes (McWilliams *et al.*, 2006). Donaldson and Davis (1991) found empirical evidence that combining the roles of board directors and CEOs (stewardship theory) maximised shareholder interest. When managers acted, according to this theory, by fostering social and moral actions, they were likely to integrate CSR into their corporate strategies (Aguilera *et al.*, 2007). In this regard, a study by Godos-Díez *et al.* (2011) found that those managers who were more likely to apply the stewardship model were mostly engaging with social and ethical issues. They were more likely to implement CSR practices in their companies. Francoeur *et al.* (2017) found that some managers preferred to act as stewards and accepted lower and less incentive-based compensation from environmental-friendly firms. Based on sustainable development theory, other existing concepts of CSR were enhanced and integrated: for example, TBL with CSR concepts, sustainable development with the stakeholder theory, and the stewardship theory with TBL.

Stakeholder theory

CSR is multidimensional as it includes different social and environmental dimensions, as well as voluntary and stakeholder aspects (Pedersen, 2015). The stakeholder framework is the leading theoretical model of CSR (Carroll, 1991). According to Freeman (1984), stakeholder theory is generally related to the groups who affect and are affected by firms. This designation implies that analysing the role of stakeholder theory is not the firm itself, but also the other groups and individuals who have relationships with the firm (Freeman, 2010). Stakeholder theory is used in sustainability research to describe the external motives of firms' sustainable goals. It considers satisfying various groups and individuals such as suppliers, customers, governments, and competitors. As those stakeholders have different interests, it is the firms' role to make the proper decisions to respond to the stakeholders' expectations (Wu *et al.*, 2017).

Although the stakeholder theory and sustainability use different terminologies, they share similar terms such as morality and sustainable development. Also, both have a similar goal that aims for and increasing profits. The stakeholder theory extends its scope to include a broader societal environment that includes the firm and its connections. They have long-term perspectives. Also, sustainability focuses on societal and environmental of the firm and its interrelationships. Besides, sustainability and stakeholder theory do not separate business and ethics issues and consider these issues as essentially interrelated (Hörisch *et al.*, 2014). The stakeholders' concepts include social and economic dimensions and engage with employees, suppliers and society (Wichaisri and Sopadang, 2018).

According to Wiengarten *et al.* (2017b), firms' success nowadays is not only evaluated by financial outcomes, but it is also attributed to environmental and social performance. Stakeholders such as employees, customers and governments are increasingly interested in firms' environmental and social outcomes (Wiengarten *et al.*, 2017b). Also, stakeholders have valuable knowledge that can improve firms' decisions making (Wilson and Campbell, 2016). According to Hörisch *et al.* (2014), managing the relationships between the stakeholders (i.e., groups and individuals) equally, managers of the firms will be able to emphasise on the best decisions. However, manging stakeholders equally was criticised. It is the role of top management to recognise which stakeholders are useful to the firm (Hörisch *et al.*, 2014).

Stakeholder theory is usually used in sustainability and quality management research. According to Wilson and Campbell (2016), it is necessary to involve

stakeholders in quality practices. The importance of the stakeholder theory is because it plays an important role in addressing sustainability challenges (Hörisch *et al.*, 2014). Also, the stakeholder theory is linked to the quality management system. In this regards, Quality standards such ISO 9001 and ISO 14001 have been adopted by many firms as a response to stakeholders' requirements and in order to increase stakeholders satisfaction (Nunhes and Oliveira, 2018).

The debate on stakeholder theory and sustainability was linked to stakeholder pressures as a consequence of environmental issues and unsustainable practices (Taylor and Vachon, 2018). Stakeholder pressure was commonly seen as the main motive of corporate sustainability (Wu *et al.*, 2017). Stakeholder pressure has increased significantly in recent years (Wiengarten *et al.*, 2017b).

Stakeholder theory is also associated with concerns that are related to image, reputation, brand and values. The growing societal pressures, as is shown in the literature, are related to claims that stakeholder pressure inspires firms to respond to social and environmental demands; otherwise, their image will be harmed. One of the sources of societal pressures is business partners: e.g., IBM was required by their business partners to adopt waste management standards. Another source of pressure is consumers, especially people who are more aware of ethical and green products and services. Non-governmental organisations (NGOs) and governments are other sources forcing firms to change their CSR agendas (Pedersen, 2015, pp. 9-11). In light of this, firms need to consider all of their stakeholders by adding value and creating a good deal for them. This includes responding to their demands regarding economic, social and environmental aspects (Pedersen, 2015, p. 13). Stakeholder theory helps to identify and interpret independent variables of CSR dimensions. Organisations feel obliged to fulfil stakeholders' demands (Block and Wagner, 2014).

Sustainable development (SD) and Social sustainability (SS)

Organisations need to address all the social issues to avoid any failures that affect relations or breach the trust and interest of stakeholders, or communities in general. For example, it is crucial firms follow sustainability principles, including human rights and equality, and are aware of the social issues that may very well result in negative consequences for related stakeholder groups. In such circumstances, business performance would be negatively impacted.

The Brundtland Report defined sustainable development (Brundtland, 1987). It is related to meeting today's' needs while still being in a position to serve the needs of

future generations. Business has responded to sustainability issues (Burritt and Schaltegger, 2014), and practice leads the way, including in the social dimension through the concept of sustainable development. The concept now includes social, environmental and economic aspects (Elkington, 1998, Elkington, 2002). Due to the business focus on creating wealth, the ecological and economic dimensions are more popular than the social side of the equation (Brandenburg *et al.*, 2014). This was particularly the case from 1995 to 2015 (Wichaisri and Sopadang, 2018). This partially explains why social sustainability research is still lacking in offering clear answers concerning the value of this dimension in social development, resulting in speculative conclusions for businesses. For example, air pollution was perceived as an environmental issue, but its effect on the community is critical, especially with regard to health and safety concerns. Concerning this, Morioka and de Carvalho (2016) found, in their systematic review, that most cited papers focused on environmental performance compared to social performance. They suggested that future research should investigate more investigations on the social dimension.

Social sustainability dimension

Carroll (1979) argued that social issues were changing, and they were different across industries. This means that what is essential to the firm today may change over time. Also, as companies were focusing more on their core competencies, this allowed them to outsource their activities and depend on more suppliers. This led companies to focus more on the buyer-supplier relationship by increasing collaboration and developing specific skills and business relations (Sarkis and Talluri, 2002): for example, to be able to select and identify a suitable supplier that did not have limitations in capacity or constraints that may have caused negative consequences (Kannan *et al.*, 2013). Identifying and evaluating suitable suppliers was critical for companies in the supply chain. This is because companies are accountable for their suppliers' environmental and social issues. The media has revealed several cases arising from this: for example, Nike's supplier was caught using child labour. Suppliers must consider social and environmental concerns which, in turn, may reduce disruptors and increase efficiency and improve the image of the buying companies (Krause *et al.*, 2009)

In recent years, social sustainability has joined the mainstream literature concerned with business management and supply chains. This can be explained by ethical and sensitive issues that we see on a global scale (Sarkis *et al.*, 2010b). Supply chains cut across both territories, and, thus, both literature and practice have devoted

attention to sustainable supply chain management (SSCM). When reviewing their processes for creating environmental-friendly products, organisations now consider more social aspects, including health and (Huq *et al.*, 2016). Clearly, the literature has emphasized the importance of social issues (Yawar and Seuring, 2017), which, naturally, begins with capturing the views of customers and producers (Brandenburg *et al.*, 2014). Some studies are limited to this narrow relationship, but social aspects can go beyond this, reaching wider stakeholder groups. This explains the lack of research that captures wider social aspects. According to Brandenburg *et al.* (2014), only four papers have elaborated on social issues (see Figure 2-6). The figure shows a Venn-Diagram listing the number of papers falling into the environmental, social and economic spheres, as well as presenting their interfaces. In this regards, recent literature reviews argued that social sustainability factor is still omitted in comparing to the environmental factor (Brandenburg *et al.*, 2019; Martins and Pato, 2019). Figure 2-7 shows that there is a little increase in the focus of the social diemsions between the year 2014 to the year 2018. Also, a recent study by Martins and Pato (2019) show that the focus of the social dimension is still low in comparing to other dimensions, see Figure 2-7.
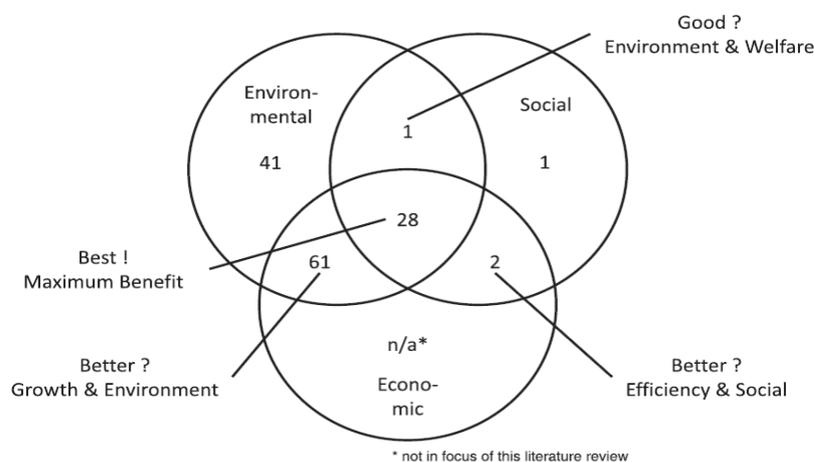
Source: Brandenburg et al. (2014).

Figure 2-6 Number of papers focusing on three factors sustainability dimensions.

Despite this split of attention, researchers have studied the internal and external drivers and the perceptions of managers who engage in sustainable social activities.

For example, environmental certifications, such as ISO 14001, and social initiatives are the minimum requirement to meet the international sustainability standard. While adhering to the standards, it remains unclear how firms actually perceive the importance of these issues. Put another way, it is speculative as to whether companies would engage in these activities without having the obligation to do so. Related to this, Johanne *et al.* (2014) argued that there are other supply chain sustainability practices that are important: for example, codes of conduct and the use of rewards of sustainable contributions and initiatives.

Klassen and Vereecke (2012) stated that many firms are still struggling to define, understand and plan action targeted at social issues. According to Yawar and Seuring (2017), the most debated social issues in the literature concern labour conditions, raised in 82% of articles reviewed. Previous literature has looked at organisations and their employees. These are issues that fall on the internal level. Overall, it seems that communities and societies are not given much attention in the literature. Understanding the social dimension is difficult due to the different concepts that relate to it.
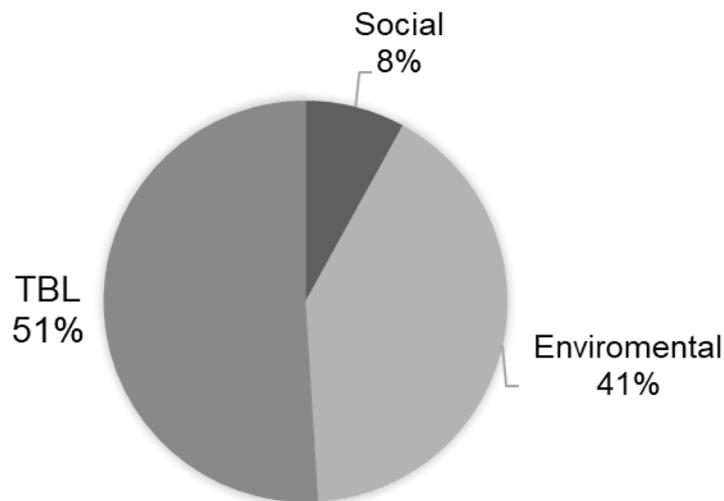
Figure 2-7 Sustainability focus (1995-2018)

Yawar and Seuring (2017) proposed a framework of CSP and identified a group of social aspects that firms are facing with their supply chains, such as human aspects and health and safety. The framework also highlighted the actions that firms used to deal with social issues, including communication strategies, compliance strategies, and supplier strategies. Another important social issue is health and safety, an

example of which is how the effect of unhealthy and unsafe conditions of the workplace could make it difficult to retain employees. Human rights is another aspect of social issues, including racial, regional and religious discrimination (Yawar and Seuring, 2017). Table 2-5 summarises the aspects of social issue most discussed in the literature. These social issues are mostly related to employee's' aspects such as health, safety and working conditions.

Table 2-5 Most discussed aspects of social issues covered in the literature

Social issues aspects	References
Human rights and working conditions, based on Social Accountability systems standard (SA8000)	Awaysheh and Klassen (2010)
Social issues (safety, wellbeing, etc.)	Klassen and Vereecke (2012)
Fairtrade	Moxham and Kauppi (2014)
Employee health and safety	Anisul Huq *et al.* (2014)
Social aspects, work conditions aspects, community and customer aspects.	Chardine-Baumann and Botta-Genoulaz (2014)
Philanthropy (donations), safety and security aspects, human right aspects, health aspects	Mani *et al.* (2016a)

Social Responsibility (a practical view)

Social issues and ethics debates have received enormous attention recently. These social issues and ethics are essential for the success of sustainability performance (Gunasekaran and Spalanzani, 2012). The European Commission issued a framework for CSR in 2001. The framework introduced some guidelines for sustainable development. They were related to corporate social issues, reporting standards, working conditions, human rights issues, environmental performance and the application of the regulations throughout a corporation's supply chain. These guidelines, with their pressures for corporate social responsibility, were the bases for adopting multinational standards, such as ISO and SA8000 (social accountability certification) (Miles and Munilla, 2004), and other ISO standards, such as ISO 26000. The following sections discuss these standards in detail.

SA8000

Social Accountability (SA) 8000 is considered to be the most crucial certification that considers social responsibility (Sartor *et al.*, 2016). This standard is acknowledged as certification for any organisation in any country. It was established in 1997 by Social

Accountability International (SAI) (Sa-intl.org., 2017). It addresses many of the emerging global social aspects, such as workers' rights, child labour and discrimination. This standard was designed to extend other standards, including ISO9000 and ISO14000 (Miles and Munilla, 2004).

This standard is auditable. This means that firms that are interested in becoming certified have to consider all the requirements of the standard, mainly the employee-related issues, such as improving working conditions. In addition to this, based on its requirement, the standard establishes better management systems, it lowers the risk of liabilities and it increases product quality (Gilbert and Rasche, 2007).

Implementing SA8000 and its ethical obligations extend pressure to include suppliers and the downstream supply chain and results in greater collaboration between the certified firms and their suppliers (Sartor *et al.*, 2016). That is because firms must protect their reputation by making sure that their suppliers and partners act in a socially responsible manner. Having an SA8000 is considered proof for consumers that a firm's products are not manufactured through the exploitation of child labour, for example (Miles and Munilla, 2004).

However, certified companies have faced some difficulties. Sartor *et al.* (2016) have classified these difficulties into three groups. First, there can be difficulties in getting the certification due to a firm's lack of internal expertise and difficulty in communicating the standard to its employees. Secondly, difficulties may arise in managing the implementation process, such as managing a large number of documents and affording the costs required to manage electronic data software. This can be particularly challenging for firms. Third, there can be difficulties associated to the cost of obtaining the certification, and other costs. These latter costs may be related to the consequences of implementing a system that sometimes requires changing business processes, or paying more for overtime compensation, or covering other labour costs.

To present to what extent this standard considers social sustainability and social responsibility, the following below table summarises the social aspects that are included in the SA8000 standard.

Table 2-6 A summary of the social issues of SA8000:2014

Requirements/ social performance indicators	Description
Child labour	The standard ensures the protection of children by making sure that no children are near the production zones, making sure there are no fake documents during recruitment procedures, and making sure that the company maintains records of proof of age.
Disciplinary practices	Workers are informed of any disciplinary procedure against them and they have the right to be heard.
Discrimination	All personnel are treated fairly and experience no discrimination in job postings, advertisements, training materials, handbooks, etc. Remediation plan of any incidents should be taken as part of the management review.
Forced or compulsory labour	Overtime hours regulations: overtime is voluntary, and no pressure on personnel is used, nor restraints on movement during breaks.
Freedom of association	Independent worker elections allow access for the trade union representative to workers. Organisations are open to dialogue and demonstrate good faith with trade unions.
Health and safety	The availability of documents, for example, fire safety, elevators, fuel, and building, is guaranteed. Availability of health and safety committee with safety risk assessments, training, and involvement in all incident investigations. Training is provided for personnel on emergency evacuation, fire, etc. Organisations should be prepared with alarm systems, personal protective equipment, and a clean working environment, with adequate water, air and with no high level of noise.
Management system	Policies and procedures are demonstrated to all personnel with instructions on how to comply with policies.
Remuneration	To estimate the living wage quantitatively and qualitatively and identify the requirements and provide discretionary income. To pay the wages by considering the legal minimum wage.
Working hours	Notify employees about expected circumstances that require extending working hours. Maintain time accurately, and workers keep their own records.

ISO 26000

The ISO 26000 is a universal standard (ISO, 2010) that assesses social performance using the latest directions document. It is has been developed to address all the problems that are related to social responsibility (SR) in any organisation (Moratis and Cochius, 2017). It aims to help organisations implement a social responsibility system. Being responsible means doing business while taking into account the responsibilities demanded by society. This standard provides firms with guidance in spotting and connecting with stakeholders (Castka and Balzarova, 2008). It also proposes principles, e.g., social activities (Moratis, 2017). Table 2-7 summarises the key components of ISO 26000 that are related to social responsibility.

Concerning ISO 26000 and performance, organisations seeking to get ISO 26000 certification usually consider aspects of social responsibility as a method of balancing the profitability of their business (Castka and Balzarova, 2008). To achieve this, organisations may consider some internal aspects, such as working conditions,

communication and transparency, to be important, as they do external issues, such as community and supplier relations (Castka and Balzarova, 2008).

Table 2-7 Social responsibility aspects according to ISO 26000

ISO 26000 key aspects of Social responsibility	Details
Community, stakeholder's involvement	To make sure of engaging the firm's stakeholders.
Customer issues	To make sure of increased customer satisfaction and confidence
Employees and the working environment	To make the working environment safe and healthy for the workforce
Environmental aspects	-
Human rights relations	Provides evidence of considering human rights based on a universal standard
Organisational governance	-
Social development	To enhance the social reputation
Un-proper practices	To make sure that the business does not have unfair practices such as bribery.

adapted from Hahn (2013)

ISO 26000 is useful as it helps organisations to build awareness of stakeholders' expectations by conducting a comprehensive analysis of the sustainable issues related to society (Hahn, 2013). Its seven social aspects can be the starting drivers of sustainability and social issues. However, ISO 26000 does not provide practical guidance on how to achieve sustainable objectives (Hahn, 2013).

Rating agencies of CSR/CSP

KLD and GRI are rating agencies of social responsibility (Girerd-Potin *et al.*, 2014). For KLD, there are seven themes related to social responsibility, including workforce aspects, product aspects and social aspects (Gonzalez-Rodriguez *et al.*, 2015). GRI refers to the Global Reporting Initiative. It is related to sustainability and corporate responsibility reporting guidelines. The GRI is divided under the triple bottom line (TBL). As for the social dimensions within the GRI, they are divided into four sub-dimensions: workforce, product, society issues and human rights issues (Bouten *et al.*, 2011). The table below summarises the social aspects of both the KLD and GRI rating agencies.

Table 2-8 Corporate social responsibility/performance dimensions of rating agencies

KLD- social responsibility dimensions	Details	GRI- Social dimension	Details
Community relations	Charitable contribution; enhancing the regions' quality of life; local schools and universities collaborations, NGOs collaborations.	Labour aspects	Management and employees' aspects, Working environment, training, health and safety, diversity
Diversity	Concerns of women, minorities, working agreements, proper work environments (e.g., childcare, mothers' room, employee assistance).	Human right aspects	Discrimination, safety, forced labour, collective bargaining, etc.
Employee relations	Workforce concerns; health violation; safety standard; underfunded pensions. Labour relations (health and safety of employees). Employees' training	Society	It is concerned with citizens and local communities' aspects and compliance with the regulations.
Environment	Invest in a clean energy market. No violations with any environmental regulations	Product aspects	Customers satisfaction in terms of healthy products and privacy; products cataloguing; following laws and regulations
Product safety/ quality issues	Concern about any incidents caused by the product, safety infractions. Strength caused by the high ranking of the product quality (Harrison and Berman, 2016) Being concerned about the improvement of the quality (Gonzalez-Rodriguez et al., 2015)		
Human rights	Respecting and defending human rights		

Adapted from (Harrison and Coombs, 2012); Gonzalez-Rodriguez et al. (2015); (Looser and Wehrmeyer, 2015)

The below table summaries social responsibility aspects according to the literature view and practical views (ISO 26000, SA8000, and rating agencies)

Table 2-9 Social responsibility as seen regarding the literature and practical views (ISO 26000, SA8000, and ranking agencies)

Social issues (literature)	Details	SA8000	ISO 26000	KLD+GRI
Human (employee) relations	Health & Safety	✓	✓	✓
	Child labour	✓	✓	-
	Forced labour	✓	✓	-
	Training	✓	✓	✓
	Freedom of association	✓	-	✓
	Discrimination, diversity	✓	✓	✓

Social issues (literature)	Details	SA8000	ISO 26000	KLD+GRI
Business practices & regulations	Bribery corruption, anti-competitive practices, compliance with the law and regulations	✓	✓	✓
Community relation	The increasing number of engaged stakeholders, charitable contributions, social development	-	✓	✓
Consumer issues	Customer satisfaction, customer health & safety	-	✓	✓
Product relations	Product quality and safety, marketing communication, compliance with the law and regulations	-	-	✓

To conclude on how social aspects are understood based on the practical perspective (i.e., ISO 26000, SA8000, and rating agencies), and on the related literature, five themes concerning social issues can be identified. These are employee relations, business practices and regulations, community relations, consumer issues, and product relations. As is shown in the table above, it seems that employees' issues, business practices and regulations are the issues most dealt with concerning social issues. Community relations and consumer issues are also connected to practice and to the literature. As for product relations, it seems that more attention is paid to this dimension by rating agencies. To further investigate issues of social sustainability, the next section summarises how it has been measured in empirical research.

Social sustainability measurements

By looking at empirical research into how sustainability performance is measured, few studies have used measurement scales. Generally, the literature is lacking in quantitive research, specifically in the domain of social studies and sustainability (Hong *et al.*, 2018). However, some scholars have tried to build on sustainability research to come up with sustainability performance measures. The operational performance measurement is adopted by a broad consideration of the TBL (Elkington, 1994). The TBL measurement is based on the three dimensions of environmental, social, and financial performance.

The challenge is measuring the TBL simultaneously, specifically in the area of sustainability (Epstein *et al.*, 2015). Pagell and Gobeli (2009) argued that the constructs of CSP, TBL, and sustainability seem to be similar, but they have unique elements. For example, CSP concentrates on common aspects of corporate responsibility, although some operationalisations have included environmental responsibility. He stated that definitions of sustainability include environmental and social concerns as part of sustainable organisations. Therefore, CSP focuses more on

social issues, while TBL focuses on the three dimensions of sustainability. TBL is a tool that allows the assessment of an organisation's progress in being sustainable.

One of the earliest pieces of sustainability research was by Pagell and Gobeli (2009). Their work was one of the early studies in operationalisation of the social and environmental elements of sustainability. Pullman *et al.* (2009) examined the social impacts on a firm's performance. Their results showed that cost improvements from sustainability practices must be derived indirectly through environmental and quality performance. Their results suggested that quality and sustainability programs should be integrated to get the maximum performance results.

Jakhar (2015) surveyed data from 278 Indian organisations to develop sustainable supply chain performance measures. In his literature review, he focused on sustainable supply chain literature since 2000 and classified it according to a case study, empirical modelling, analytical modelling (purchasing/supplier selection, manufacturing/production, transportation and logistics), and supply chain design. McKenzie (2004) discussed social sustainability issues and attempted to provide a framework for future agendas.

All in all, this research provides a robust and generalizable simultaneous examination of all the three elements of sustainability. This is because the previous literature, specifically in operation management, did not pay enough attention to the social dimension. For example, it was found that operational performance is improved by simultaneously focusing on social and environmental outcomes (Pagell and Gobeli, 2009). Table 2-10 summaries the types of studies used in sustainability performance measurements.

Table 2-10 Studies used sustainability performance measurements

Reference	Type	Purpose	Sustainability performance dimensions/ results		
			Economic aspects	Environmental aspects	Social aspects
Chardine-Baumann and Botta-Genoulaz (2014)	Proposed framework (modelling)	Proposed a model that examined supply chain aspects with the (social, environmental and economic) sustainability dimension	- Reliability - Responsiveness - Financial indicators - Quality	- Environmental aspects such as pollution, managing resources, hazards	Work environment and conditions, human right aspects, customer aspects, business aspects, community aspects

Reference	Type	Purpose	Sustainability performance dimensions/ results		
			Economic aspects	Environmental aspects	Social aspects
McKenzie (2004)	Working paper	Discussed social sustainability as distinct from environmental or economic sustainability	No measurement was provided	No measurement was provided	Internal: workforce aspects and satisfaction. External: firm's social reputation
Pagell and Gobeli (2009)	Exploratory (qualitative approach)	Examined operational managers' experiences, employee well-being and environmental performance, and how they interact	No measurement was provided	Environmental performance (pollution/emissions based on companies' reports) Interacts significantly with operational performance	Employee well-being' records (employee health and safety) interact significantly with operational performance.

The following section summarises the quantitative studies that operationalized the sustainability construct. More details of these articles and the items used in them are explained in Table 2-11. Gimenez *et al.* (2012) analysed environmental and social practices and the programmes on each dimension of the TBL. They used one item for each dimension. Longoni *et al.* (2014) in their framework, examined the extent companies consider sustainability to be a competitive priority; and what efforts have been made in the last three years towards the implementation of environmental and social programs. For the social sustainability performance, they addressed two dimensions: the employee dimension, which is measured by employees' satisfaction; and the community dimension, which is measured by social reputation. Wiengarten *et al.* (2017a) argued that measuring all three dimensions of sustainability simultaneously is essential in addressing stakeholder requirements, and in advancing a theory of operations management performance. They used four items for the social and environmental dimensions, and three items for the economic dimension.

2.4 Quality management relations and sustainability

The following discussion summarises the complementarity aspects of both philosophies: sustainability and quality management relations. Generally, both approaches provide a framework and create a basis for sustainability implementation (Frolova and Lapina, 2014). This claim is supported by previous research in both areas.

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For example, the study by Benavides-Velasco *et al.* (2014) found that TQM enhances the development of corporate social responsibility through management support and quality training. Similarly, Parast and Adams (2012) found that management commitment is the primary factor that enhances social and environmental issues.

Previous empirical research has suggested a link between the two approaches. Some studies found that the implementation of QM practices by firms allows them to deal more with environmental and social issues. For example, King and Lenox (2001) found the implementing ISO 9000 is complementary to issues of waste and pollution reduction. They stated that CSR and QM systems aim at achieving a higher level of customer satisfaction to enhance organisation performance. They argue that firms include community and society from a broader scope than just their own customers.

Tarí (2011) stated that quality management concepts are jointly related to management concepts and values. Successfully managing quality in a business environment requires a focus on moral values, as well as ethical and social issues. They stated that quality and ethical issues are both a philosophy as well as a process that aim to improve the purpose and nature of work. Both quality management and social responsibility management use general frameworks to manage responsibility and quality. Furthermore, quality practices overlap with social responsibility. Tarí (2011) has explained how QM practices could assist the development of social responsibility following a systematic review of the literature. He argued that it is important to take into consideration all the different aspects of the organisation, such as teamwork and employee management. These practices increase the value of employees for the organisation, themselves and society (Tarí, 2011). Employees are the prominent primary stakeholders who have influence and power in a firm (Kaler, 2002). Therefore, TQM practices can help in creating the environment for sustainability and social responsibility performance. In this regard, Frolova and Lapina (2014) found that implementing social and responsibility activities in QMS of organisations helped to enhance their processes and performance. QMS allows organisations to maintain, monitor and evaluate the continuous effect of CSR principles. Both QM and CSR improve sustainability and business excellence and are considered to be potential sources in obtaining a competitive advantage (Benavides-Velasco *et al.*, 2014).

Table 2-11 Measurements used for sustainability performance

Author	Rank	TBL	No. items	Items details	Methodology	Business level/ industry
Gimenez *et al.* (2012)	3	Eco.	1	- Unit manufacturing cost	Hierarchical regression	Manufacturing assembly industry
		Env.	1	- Environmental performance (single item) used in the literature		
		Soc.	1	- Social reputation (firms engage in CSR activities to enhance reputation)		
Longoni *et al.* (2014)	3	Eco.	0	- Not measured	Hierarchical regression models	Operational in Manufacturing companies
		Env.	1	- Pollution and consumption performance (assessment based on 3 years improvement)		
		Soc.	2	- Social reputation (external community dimension) - Employee satisfaction (internal workforce) (assessment based on 3 years improvement)		
Wiengarten *et al.* (2017a)	4	Eco.	3	- Sales increase - Profitability - Market share	SEM & latent moderated structural equations approach	Manufacturing plants
		Env.	4	- Energy consumption - Water consumption - Waste reduction - Emissions reduction		

Garegnani *et al.* (2015) found that quality standards are at a higher level than usual in larger organisations in which there are strong relationships with critical stakeholders. They stated that quality management should be investigated and analysed more concerning its relationship with other important areas in order to assess its scope.

CSR initiatives can generate 'moral capital' and can lead to improving employee morale, productivity and efficiency (Godfrey, 2005; Parast and Adams, 2012). In relation to this, quality contributors (such as Deming and Juran) have pointed to some of the quality practices that are related to CSR, such as ethical behaviour, customer satisfaction, and values (Barrett, 2009).

The similarities of the two approaches, as shown in excellence models and quality standards such as EFQM and ISO 26000, show the importance of both approaches (Tarí, 2011). Talwar has included social responsibility issues as one of the quality models (Tarí, 2011). The table below shows how both approaches have common philosophical focuses.

Table 2-12 Common interests of QM system and social responsibility

Common interests	References
The two are philosophies and processes that are seeking to enhance behaviour. They illustrate the aims and characteristics of the work.	Bowman and Wittmer (2000)
Both have primary ethical values of improving the integrity of products and services.	(Knouse *et al.*, 2009)
Similar values in both approaches: 'doing good'; 'continuous improvement'; 'doing the right thing'.	Gentili *et al.* (2003); Looser and Wehrmeyer (2015)
Both focus on the responsibilities toward different stakeholders. For example, QM requires achieving customer satisfaction, which is an ethical issue,	Hazlett *et al.* (2007a)
Managing employee involvement and employee responsibility for maintaining quality aspects and activities reflect the ethical values of both approaches.	Freiesleben and Pohl (2004); Knouse *et al.* (2009)
Elements in both approaches overlap: for example, 'management commitment' facilitates 'equity'; 'employee empowerment' facilitates fulfilling stakeholders' requirements.	Hazlett *et al.* (2007b)

By considering the quality management practices found in the literature, it is apparent that they share some sustainability notions. To shed some light on how

quality management practices are related to social and ethical issues, Table 2-13 presents some of these relationships.

Table 2-13 QM practices and sustainability relationships

Quality Management Practices	Sustainability relationships	References
Customer focus	Internal customers' (employees) and external customers' satisfaction is a prerequisite for the QM system. Similarly, social responsibility and the sustainability approach consider employees and customers (stakeholders) by creating trusted relationships.	*Peters (1997); Waddock and Bodwell (2004)*
Data and information analysis	Both approaches rely on information and analysing data. It is the basis for measuring and assessing the system in order to provide information for stakeholders.	*Waddock and Bodwell (2004)*
Employees empowerment/ involvement	Giving employees the responsibility for firms' processes and taking action on ethical dilemmas, e.g., product safety, encourages them to participate in improvement activities and implies trust between management and employees. Also, employee involvement increases the value for them and the community.	*Chen et al. (1997); Russo (2009)*
Employees teamwork	Employees become more satisfied and conscious about their actions when they participate in firms' activities such as suggestions schemes and small group problem-solving. This type of work environment promotes ethical behaviour.	*Roth (1993); Chen et al. (1997)*
Management commitment	Management commitment to quality is essential in quality and sustainability schemes.	*Kaynak (2003); Waddock and Bodwell (2004)*
Planning	Planning and developing a formal planning process are prerequisites in implementing QMS and sustainability initiatives. For example, considering and satisfying the stakeholders is part of planning both QM and sustainability, e.g., employee relations is to take responsibility for incorporating ethical practices for social sustainability.	*Rahbek Pedersen and Neergaard (2008); Galbreath (2010)*
Process management	Process management in QM systems is essential to improve efficiency and reduce errors in service or production processes. From the sustainability perspective, improving the quality and operational processes facilitates work activities according to an ethical and social manner.	*Vinten (1998)*
Supplier management	Suppliers are part of the external stakeholders. They are important for QM systems in all manufacturing processes. From a social responsibility perspective, it is essential to maintain good relationships with them. This will enhance performance and improve quality.	*Waddock and Bodwell (2004)*
Training	Training is a fundamental practice for quality systems. It increases employee's knowledge and improves their job quality. Firms usually include training on social responsibility aspects and safety issues in sustainability initiatives.	*Raiborn and Payne (1996); Galbreath (2010)*

Sustainability performance

Research on achieving sustainability performance, social goals and profitability has attracted a vast amount of research investigating their relationships (Sabadoz, 2011). Profitability and social goals can be achieved through the benefits generated in those firms which consider sustainability and social responsibility (Du *et al.*, 2011). Surroca *et al.* (2010) found that profitability influences more social performance. Also, Harrison and Coombs (2012) found that higher resources, such as liquidity, influence social responsibility activities. However, Harrison and Berman (2016) argued that one of the reasons that firms may have fewer financial benefits is when they are spent on social activities.

Nevertheless, as stated by Paek *et al.* (2013), the most significant advantage of being socially responsible is achieving a strong financial performance. They stated that although some studies found contradictory results, there are other benefits, which are related to human resource aspects such as job satisfaction, improved teamwork, and employee attraction. The complicated nature of the area of social responsibility is one of the reasons for the contradictory results (Girerd-Potin *et al.*, 2014). Kang *et al.* (2016) suggested that future research is encouraged to investigate social responsibility and financial performance.

Quality management systems and sustainability

Van Marrewijk (2003) argued that firms that continue to improve their quality systems are ultimately moving towards adopting corporate sustainability. This explains the increase of research into the connection between QM systems and sustainability performance (Siva *et al.*, 2016b). Although these attempts have not considered all the dimensions of sustainability simultaneously, they have triggered motives to study QM and sustainability. For example, Molina‐Azorín *et al.* (2009) have investigated how quality management and environmental management systems could be integrated to improve business performance. Therefore, the previous initiatives in the literature tried to link the two systems with a focus on environmental sustainability. This research, however, seeks to go beyond previous literature and examine quality management relations and the three dimensions of sustainability performance.

CSR, Corporate sustainability and TBL

Savitz (2014) argued that inconsistency and ambiguity of CSR is due to the understanding and interpretation of the term 'social' from a social welfare perspective only. This term comprises all dimensions, relationships and responsibilities related to

society as a whole. This explains the use of the term 'societal' instead of 'social'. The ultimate goal of CR and CSR is to consider sustainability. Sustainability as a term arose in the 1980s from a growing awareness of the importance of finding ways to increase economic profit without ruining the environment or the wellbeing of future generations. It became a fashionable dominant term for corporations. Corporations are considered sustainable if they generate financial outcomes for their stakeholders while considering environmental concerns and the welfare of the community they interact with.

Generally, sustainability concerns have become a critical issue for today's business success. Thus, to achieve long-term business success, organisations must address all the issues to avoid any failures that affect relations or breach the trust and interest of stakeholders and the community in general. Let us consider the example of the situation with the employees of Cadbury Schweppes (Epstein, 2018). The company closed a plant factory in Brazil in 2003 and 300 employees lost their jobs. The company was transparent with these issues and worked with its employees to resolve this issue by informing them and by hiring a specialist company to support them. The specialist company designed a program to support the employees in searching for job vacancies in local companies. It was able to match the employees' interests and business relations with the business environment (Epstein, 2018). This example illustrates that it is central to consider sustainability values, e.g., human rights and discrimination, and to address all the issues which could jeopardize business success (Savitz, 2014).

In order to enhance business success, firms should consider sustainability issues from its triple bottom line. Considering the triple bottom line perspectives, including environmental, economic and social, will result in a successful sustainable business. Savitz (2014) argued that sustainability enhances business by considering three matters. First, sustainability protects businesses by reducing risk to customers, employees, and communities. It is required to identify what are emerging risks earlier, to limit regulatory interventions, and to retain the authorised permission to operate by the government or the community. Failing to consider sustainability and its demands will result in a risk to business success.

Second, running the business requires attention is paid to certain operational issues that could affect the business, employees, or the community, such as waste management. The essential idea is to pursue eco-efficiency by reducing the number of resources used in the production process and services. That, in turn, will improve profitability and eliminate the negative environmental effects. For example, in 2003, a firm called ST Microelectronics assigned (2%) of its annual investment for

environmental investments. As a return, its initiatives resulted in reducing electricity consumption by 28%, and water by 45%. Consequently, the firm has saved $133 million. This example shows that considering quality management practices, such as product and service design, employee awareness of eco-efficiency, using quality data that considers environmental issues or introducing process management by using automated technology that considers environmental issues, will result in better sustainability performance (Savitz, 2014).

Third, growth is another aspect of how sustainability can enhance the business. Sustainability can improve reputations and enhance businesses as it attracts customers with sustainability values, supports the introduction of new products and services, increases innovation initiatives, improves customer satisfaction, and suggests forming alliances with business partners and stakeholders. Sustainability helps to improve economic and business growth and helps companies to think creatively about gaining access to new markets. So, it is a powerful engine of economic performance (Savitz, 2014).

Based on the discussion above, this research argues that in order to achieve sustainability successfully and enhanced performance, it is crucial to focus on the quality management relations related to management, customers, employees and suppliers. TQM is a philosophy that positively influences business performance and competitive advantage, as previous research has shown. However, most of these studies have not examined sustainability performance by considering the triple bottom line; and some researchers have considered the three dimensions separately. This research argues that for organisations to enhance their sustainability profitability, protect themselves from environmental and social risks, and operate with greater efficiency and productivity, it is crucial to consider practices that stimulate improvement in areas of quality practices.

Towards Sustainability Spots

There is mutual interest between sustainable organisations and the community, based on operational perspectives. In other words, organisations could find solutions to 'doing good' and 'doing well' by involving the community and social issues in their daily operations (Savitz, 2014). This also allows for quality practices to influence sustainability performance. This research investigates the impacts of quality relations on the triple bottom line by arguing that the way organisations' operations consider quality practice will reflect on sustainability performance. For example, by considering

stakeholders' (employees, community, suppliers) interest, organisations are trying to move towards a position that covers 'doing good', e.g., achieving community satisfaction, and 'doing well' through their performance enhancement, e.g., increasing profitability. Savitz (2014) has discussed the idea of moving toward 'sweet spots', where most companies are trying to get their businesses to. Figure 2-8 and the following examples explain this in more detail.

General Electric (GE) introduced an initiative to work toward sustainability spots. The initiative goes beyond the compliance to benefit shareholders, as well as society. It involves introducing a new clean energy technology by using wind energy that helps to reduce carbon emissions and reduce environmental impacts. At the same time, this technology has increased the company's revenue by using eco-friendly products. Consequently, the company has moved to represent stakeholder concerns closer to business interests (a sustainability spot). Another example of moving toward a sustainability spot is related to a firm called PepsiCo. By introducing a healthy product, its initiatives both introduced a healthier lifestyle and increased their market share. The healthy product was the fastest-growing segment in North America in 2005, 2.5 times greater than the traditional product. Also, Toyota has introduced a hybrid engine as a central strategy in its car manufacturing. This technology is based on the idea of lowering gas consumption, leading to less air pollution and more sales as cars consume less fuel (Savitz, 2014).

The idea is that sustainable organisations do not separate sustainability aims in their daily operations as they find ways to make 'doing well' and 'doing good' interrelated by avoiding any conflict between shareholders' and society's interests. However, it is essential to be aware of the important activities and initiatives that could lead to better sustainability performance. Although firms are moving towards sustainability spots and achieving significant new market positions, it is essential to consider the risks and failures that might influence firms' movement to be sustainable, and which could lead to a failure to fulfil stakeholders' interests. Failing to work with stakeholders and not considering the risks that might harm customers, employees or the community might lead to business failure (Savitz, 2014). It is necessary to make sure that the business is protected by having a good quality management system.
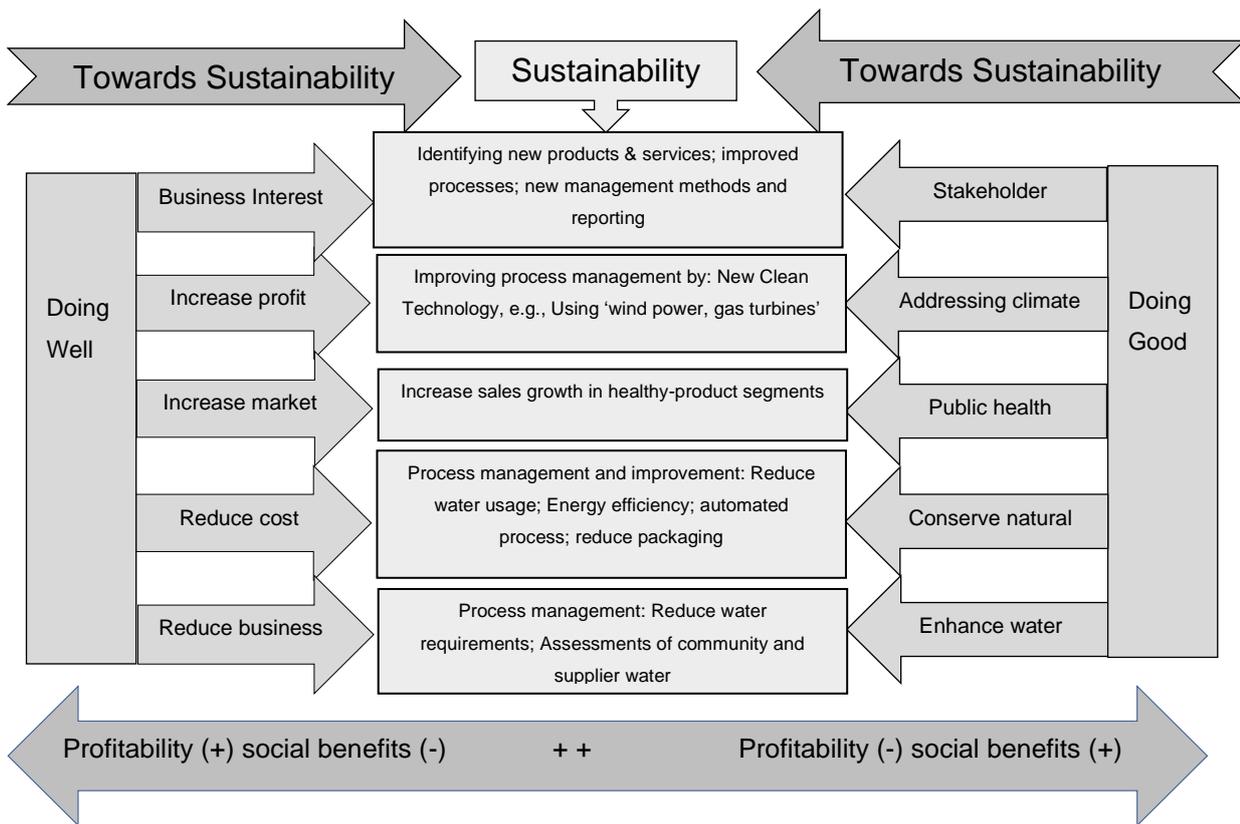
Figure 2-8 Towards Sustainability spots

2.5 Internal and external QM relations and firms' performance

Investigating QM relations and firm performance is problematic as there are no specific categorisations of QM relations. There were various attempts to categorise QM practices such as hard and soft practices as shown in sections 2.1 and 2.2. Also, previous attempts have shown mixed results regarding the direct and indirect relationships (Zeng *et al.*, 2015). This study will clarify the contradictions by investigating the influences of internal and external quality relations on a firm's sustainability performance by categorising the quality management relations internally and externally. Thus, the current study suggests that previous research aimed at identifying the elements of QM practices and performance were not entirely appropriate. This study proposes an approach that is more logical and accurate as it will investigate two categories of QM practices –internal and external relations.

In the current competitive business and globalisation environment, competition is getting tougher due to the increasing customer expectations and demands. This implies the needs to improve the quality requirements. Also, organisations are required to increase business performance and market share in order to fulfil their stakeholders' requirements. Accordingly, quality management seems to be the best approach to enhance business performance, sustainability, and competitiveness because it involves relations that connect management, employees, customers, suppliers and participants. Also, based on the different definitions noted above, it reduces defects, improves profits, and it has the principles required to increase customer satisfaction. In such a scenario, internal and external relations have to integrate and work together to influence business outcomes.

QM relations are found to improve a firm's performance and to enhance its organisational effectiveness and competitiveness (Sánchez-Rodríguez and Martínez-Lorente, 2004). However, critics claim that QM practices cost time and money and increase paperwork (Pekovic and Galia, 2009), and it restricts innovation and adapting to change (Steiber and Alänge, 2013). Nevertheless, Terziovski and Samson (1999) have claimed that QM improves performance. They obtained a significant positive relationship between TQM and organisational performance in the areas of employee relations, customer satisfaction, operational performance and business performance. Based on this, QM is still considered a critical factor in improving performance (Zhang *et al.*, 2012).

Similarly, Sabella *et al.* (2014) have argued that three QM practices (i.e., human resource management, process management and information analysis) are positively related to organisational performance. Also, Ebrahimi and Sadeghi (2013) have argued that the most dominant quality practices are employee management, customer focus and management support (Ebrahimi and Sadeghi, 2013). According to Ebrahimi and Sadeghi (2013), QM practices are considered to be the main performance factor. Chatzoglou *et al.* (2015) have argued that organisations do not consider customer demand as an important motive for ISO implementation. Related to this, Basu and Bhola (2016) identified three QM practices in the IT service of SMEs, including service management, content management, and information and security management. They examined their influence on quality performance and found that they positively influence quality performance.

When discussing QMSs, their influence on financial performance has not always been positive. For example, Link and Naveh (2006) did not find supporting

evidence that ISO14001 leads to improved financial performance. Conversely, ISO 9001 has a positive effect (Chatzoglou *et al.*, 2015). Thus, organisations adopt ISO 9000 because it significantly improves financial performance. However, many companies seek ISO certification because they would not be selected as suppliers if they are not certified. ISO certification may simply be an 'order qualifier'- without certification, companies will not be able to attract business customers. In turn, having a certification will have an impact on financial performance as companies will have access to a wider customer base rather than having new and more efficient processes. Also, because of the different evaluation criteria used by different types of quality awards and standards, this could have affected the performance of organisations differently (Zhang and Xia, 2013). The reasons for having mixed results could be related to different reasons, such as the geographical contexts or industry sector. Therefore, Table 2-14 summarises the literature concerning the relationships between aspects of QM and different business performance outcomes. These studies have revealed both positive and negative pieces of evidence related to this. However, these studies were focused on either a specific sector, context or country. The inconsistency of the results could be attributed to differences in operationalising the QM measurements. For example, quality is measured as one dimension for some studies, whereas it is measured as multiple dimensions in others. In the same vein, performance is sometimes measured as a single measurement, such as financial, while some other research measures it as a combination of organisational and financial performance.

Adapting a QM system alone is not enough for achieving competitiveness or increasing productivity and profit (Manders *et al.*, 2016). However, QM adaptation and awareness of QM concepts are required to investigate other business sectors since it is not enough just to concentrate on manufacturing and service firms (Eriksson *et al.*, 2016).

Table 2-14 Research findings of QM and different business performance outcomes

Author(s)/ year	Country	Industry/ Sector (sample)	Methodology	Quality practices/QMS/	QP	ORP	FP	OP	IN	CS	comments
Anderson *et al.* (1995)	USA	Manufacturing	path analysis	Employee fulfilment						+	
Powell (1995)	USA	Manufacturing & services	correlations	Management commitment; Closer to supplier; Closer to customer; Employee empowerment	+		+				Small sample size; no causation testing
(Adam *et al.*, 1997)	Asia, Europe, and U. S	Not defined	multiple regression	Executive involvement; customers; employee involvement; employee selections; employee satisfaction	+		+				*Results vary across countries; FP is significant but weak (*mainly Europe)
Ahire and O'Shaughnessy (1998)	USA & Canada	Auto manufacturing (449)	multiple regressions	Management commitment; employee training; involvement, participation	ns						There is a positive effect of management on product quality
				Variables are related to customers, suppliers, and workforce aspects.	+						QP is to measure product quality only
Rungtusanatham *et al.* (1998)	Italy	Manufacturing	path analysis	Employee fulfilment						ns	Replication of Anderson et al. (1995) showing different results
Choi and Eboch (1998)	USA	Manufacturing (339)	SEM	TQM practices (HR, quality planning, others)	ns					+	A quality performance is reported as plant performance, including quality, cost, and delivery outcomes
Dow *et al.* (1999)	Australia & New Zealand	Manufacturing	SEM	Employee commitment; shared vision; customer focus	+						
				Supplier relations	ns						

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Author(s)/ year	Country	Industry/ Sector (sample)	Methodology	Quality practices/QMS/	QP	ORP	FP	OP	IN	CS	comments
(Samson and Terziovski, 1999)	Australia & New Zealand	Manufacturing	multiple regressions	Leadership; employee management; customer focus				+			
Douglas and Judge (2001)	USA	Medical hospitals	hierarchical regression	TQM practices (7 factors)			+				
Das *et al.* (2000)	USA	Manufacturing	SEM	Set of quality practices (leadership, training, customer orientation, others)						+	Customer satisfaction is the outcome and it is related to the achievement of the strategic quality objectives.
				The independent variable is related to customer			+				Firm performance measured by financial indicators (market share (increase), ROA)
Brah *et al.* (2000)	Singapore	Services (176)	correlation	TQM practices (top management, customer focus, employee relations, suppler management, others)			+	+			Some TQM items loaded into other factors such as employee involvement and other employee-related aspects, such as reward (management). No causation tests.
Cua *et al.* (2001)	Germany, Italy, Japan, UK and USA	Manufacturing	discriminant analyses	TQM, JIT and TPM (integrated of three approaches); (management commitment Supplier quality management, customer involvement, others)	+						No contextual effect (country)
Kaynak (2003)	USA	Manufacturing & services (214)	SEM	Quality performance (product/service quality, delivery time, cost of sales)			+				
Lai and Cheng (2003)	Hong Kong	Manufacturing & services (1092)	Mean, ANOVA	Quality management (customer, supplier, management, teamwork, others)	+		+				No causation; service firms outperform manufacturing in quality implementation and quality performance; Quality performance includes financial measures (market)

Author(s)/ year	Country	Industry/ Sector (sample)	Methodology	Quality practices/QMS/	QP	ORP	FP	OP	IN	CS	comments
Prajogo and Sohal (2004)	Australia	Manufacturing & services (150)	Path analysis & ANOVA	Leadership, people management	ns						
Fuentes-Fuentes *et al.* (2004)	Spain	Manufacturing & services (273)	SEM	TQM (customer focus, teamwork, employee performance)			+	+			
York and Miree (2004)	-	-	correlation	TQM (Baldrige award)			+*				* significant but weak
Prajogo (2005)	Australia	Manufacturing & services (194)	SEM	TQM practices (leadership, customer focus, people management, others)	+						Measurement model (no differences between services and manufacturing)
Kannan and Tan (2005)	USA & Europe	556 suppliers	correlation	TQM (commitment to quality)	+		ns			+	ROA is not significant; market share is significant
				TQM (supplier capability)	+		ns			+	
Prajogo and Sohal (2006)	Australia	Manufacturing & services (194)	SEM	Different QM aspects related to management, customers, employees, and others					+		
Lakhal *et al.* (2006)	Tunis	Manufacturing (133)	Path analysis	Quality practices (top management commitment, training. Employee participation, supplier management, customer focus, others)							
Sila (2007)	USA	Manufacturing & services (286)	SEM	Different QM aspects related to management, HRM aspects, customers, employees, and others		+	ns				
Prajogo and Hong (2008)	Korea	Manufacturing (130)	SEM	TQM (leadership, customer focus, people management, others)					+		Innovation R&D performance (product quality & product innovation)
Macinati (2008)	Italy	Public Health services (352)	correlation	QMS (top management support, employee participation, supplier management, others)			ns	+			

Author(s)/ year	Country	Industry/ Sector (sample)	Methodology	Quality practices/QMS/	QP	ORP	FP	OP	IN	CS	comments
Arumugam *et al.* (2008)	Malaysia.	Manufacturing (122)		TQM (leadership, customer focus, supplier relationship, people involvement, others)	ns*						* all are insignificant except customer focus
Yang *et al.* (2009)	China	Manufacturing (137)	Path analysis	Communication with supplier	ns						
				Customer management	+						
Sadikoglu and Zehir (2010)	Turkey	Manufacturing & services (373)	SEM	TQM (leadership, training, employee management, supplier management, customer, others)	+			+		+	The three performance indicators were measured as firm performance as one construct
Chatzoglou *et al.* (2015)	Greece	Manufacturing (168)	SEM	ISO 9001 certification	+		+	+			
Zeng *et al.* (2017)	Different countries	Manufacturing (238)	SEM	Soft QM (employee suggestions, training, solving problems groups)					ns*		*Product introduction speed as innovation performance; product innovation is significant
Siougle *et al.* (2019)	Athens	Stock Exchange (113)	Diff-in-Diff econometric approach	ISO 9001 certification			+				
Hernandez-Vivanco *et al.* (2019)	Portugal	247	longitudinal analysis	ISO 9001 +ISO4001+ OHSAS18001			+				

- QP= Quality performance; ORP= Organisational performance; FP= Financial performance; EP= Environmental performance; OP= operational performance; IN= Innovation; CS=Customer satisfaction. (+) = positive association; ns = no significant association

2.5.1 *QM relations according to industry (service and manufacturing)*

As indicated in Table 2-14, most of the TQM research has been focused on manufacturing firms. However, some earlier QM research incorporated service organisations, such as Powell (1995) and Kaynak (2003). As QM is no longer limited to the manufacturing industry, the spread of QM practices has increased to include service and non-profit organisations (Ooi *et al.*, 2011). Also, in terms of the context, most research has been conducted in the USA, especially during the 1990s. However, a few studies have tried to focus on service firms in other contexts. For example, Brah *et al.* (2000) have tested the influence of QM on the operating and financial outcomes for service organisations in Singapore. Also, Sadikoglu and Zehir (2010) have included service and manufacturing firms in their sample. They have found that TQM practices have positive effects on quality performance, operational performance and customer satisfaction. However, they did not provide results of how the results differed between the two sectors.

All in all, research that involves both sectors is still lacking. More research is required to compare the two sectors. Thus, this research examines the effects of the internal and external quality relations in both sectors.

2.6 Business relations theory

The business relations perspective is the main theory used in this research to describe internal and external drivers of sustainability performance. Previous research has identified the importance of investigating quality management (QM) and sustainability, and has suggested that further research examine QM and its relations with different contexts, theories, and the roles of managers in dealing with QM initiatives (Eriksson et al., 2016; Garvare and Johansson, 2010). This research aims to contribute to the body of knowledge on QM and sustainability performance, and uses business relations to describe internal and external quality relations as predictors of sustainability performance dimensions. In this regard, Starik and Kanashiro (2013) have highlighted the need to use theories to address sustainability challenges. Therefore, this study addresses these gaps, aiming to help firms invest more in internal and external quality relations within their operational processes.

The business environment has become increasing competitive and more challenging with the rise of new technology and networks. The traditional market has been replaced with

more technical relations and networks (Möller and Halinen, 1999). This means that firms have to consider their external relations with customers and suppliers in addition to their internal business relations. Business relations as a theory within the business network perspective has become a dominant view represented in marketing studies, as evidenced by the increase in articles focusing on such relationships since 2000 (Möller, 2013). Also, considering relationships has become essential in fostering customer–supplier interactions, which form the core of value creation theory (Möller, 2013). Business relations represent alliances between firms in which resources are unified to achieve mutually compatible goals (Hunt *et al.*, 2002).

Möller and Halinen (1999) proposed four levels of issues in managing business relations. First, the industrial level comprises socially contextualised relationships for individual organisations and requires managers to appreciate both the behaviour of the firm and the behaviours of the firm's network. Second, the network level entails managing the firm's network, which means that firms need to recognise their environments. In other words, firms should form, secure, and change their positions within their network relationships to understand the roles and positions they maintain in these relationships. Third, the relationship level concerns how a firm handles its exchange relationships by managing internal resources and capabilities within its network. The fourth level is related to dyadic exchange relationships, in which business interactions focus on how to control the forces influencing the business relations.

The literature on relationship marketing suggests that communication and interactions can improve positive relationship factors and mitigate negative relationship factors (Trada and Goyal, 2020). For example, better relations with suppliers and customers fostered through communication build trust and confidence, enhance collaboration, and resolve conflicts (Trada and Goyal, 2020). While understanding the context of business relations has been identified as one of the highest concerns in marketing exchange (Bagozzi, 1975), some authors (e.g. Webster Jr (1992) have argued that relationship marketing should be considered to play a changing role in marketing research. In this vein, according to Iacobucci and Hibbard (1999), relationship marketing research should be driven by determining the complexities of business relationships for both businesses and consumer marketing.

The marketing literature has identified a variety of business relationships. For example, there are integrally reliant relationships that result from close and repeated relational exchanges between businesses (Iacobucci and Hibbard, 1999). These relationships are characterised not only by working in a continuous and independent way, but also by an interest in making long-term relationships, producing results in cooperation, and subsequently generating joint positive outcomes (Iacobucci and Hibbard, 1999). These long-term relationships in marketing are classified into three categories. First, channel relationships and

buyer–seller relationships represent interorganisational phenomena (Stern *et al.*, 1996). These relationships relate to business outcomes, and communication and cooperation between businesses (Iacobucci and Hibbard, 1999). Second, consumer-to-consumer (C-to-C) relationships are formed through word-of-mouth communications. Third, the business-to-consumer (B-to-C) category is characterised by direct and interactive marketing methods and comprises collaborations between business and customers (Pine *et al.*, 2009).

From the supply chain perspective, the concept of relations concerns vertical relations involving many independent organisations and the management of such relationships. Vertical relations seek to achieve goals by using appropriate resources to attain better customer value and create competitive advantage (Hunt *et al.*, 2002). Today, as the number of suppliers has grown, the variety of business relations is considered in terms of a continuum and includes vertical and pure transactions. Operational relations have the same mutual benefits for both parties, which include focusing on a few suppliers and improving processes. The idea behind focusing on a few suppliers is to make communications more effective and to improve response rates (Lehtonen, 2006). This is also compatible with QM and supplier relations practices, which focus on a small number of suppliers (Hietschold *et al.*, 2014).

The success of business relations is based on both parties' ability to achieve expected performance (Lehtonen, 2006). Therefore, business relations theory is appropriate for investigating the relationships between quality relations and sustainability dimensions as it helps firms support communications and interactions between businesses. Also, it helps to understand how firms can improve positive relationship factors and mitigate negative relationship factors (Trada and Goyal, 2020). Similarly, business relations is characterised by supporting alliances between firms such that resources are unified to achieve mutually compatible goals (Hunt *et al.*, 2002).

Business relations, in this research, takes account of six QM practices in meeting sustainability challenges, including those related to management relations (MR), employee relations (ER), supplier relations (SR), customer relations (CR), and quality training (QT). The research goal is achieved by empirically investigating how these aspects of internal and external quality relations can increase social, environmental, and economic sustainability performance. In this regard, recent research has acknowledged the role of QM relations in organisational development (e.g. Ambrosini and Altintas, 2019; Glaister et al., 2018). Thus, improving business relations will improve performance. According to Soliman (2011), achieving and improving performance can be addressed by paying direct attention to customer relations management. Indeed, Opara and Opara (2016) found that there is a significant relationship between customer relations management and market share performance. Likewise, Alawiyah

and Humairoh (2017) found that utilising customer relations management increases companies' financial, marketing, and operational performance. Moreover, management is responsible for influencing customer, supplier, and employee relations, and ensuring effective communications between employees (Daily and Huang, 2001).

Similarly, quality training is a tactical resource related to sustainable competitive advantage, which can drive the success of QM. This includes quality principles, problem-solving skills and teamwork for both managers and employees (Powell, 1995; Tarí et al., 2017). Training itself does not produce an advantage unless it is combined with specific imitable tactics or features such as management support and employee involvement (Powell, 1995). It also increases employees' responsibilities and involvement in problem solving in their work tasks (Kaynak, 2003).

Based on the above discussion, this research contends that managing the firm's internal and external QM relations will result in better sustainability performance. This suggests that firms which manage their internal and external quality relations, including management, employee, supplier, and customer relations, will see improved sustainability outcomes. This allows firms to understand and adapt to business relations and the changing environment, and thus improve their sustainability performance. According to Starik and Kanashiro (2013), the implications of a changing environment, especially in the long term, and the integration of people, organisations, and society are the paradoxical characteristics of a dynamic society. This research tests the role of internal and external quality relations, directly and indirectly, in enhancing social, environmental, and economic sustainability outcomes.

Previous literature has applied the resource-based view (RBV) as a theoretical perspective to illustrate organisational capabilities. However, the RBV has been criticised, especially in operations management (OM) literature. For example, Bromiley and Rau (2016) argue that the RBV does not fit the objectives of OM for various reasons. For example, it uses competitive advantage as a dependent variable, which suggests that only those firms with a competitive advantage should be considered and other performance distinctions should be disregarded. Also, they dispute that competitive advantage exists at the business level but not at the operational performance level and take the view that most RBV research measures firm performance rather than competitive advantage per se. Moreover, RBV resources are imitable and this can be problematic because it is challenging to prescribe measures that firms can readily implement and that are not imitable (Bromiley and Rau, 2016). The applicability of RBV for operations studies and the benefits alternative theories, such as the practice-based view (PBV), have further been discussed in other research, (e.g., Bromiley and Rau, 2016; Hitt *et al.*, 2016).

The QM system is an approach that can improve performance. Even though QM has been a prevailing trend since the 1980s, it is still respected and thought to improve firms' performance, despite the changing competitive environment (Zhang and Xia, 2013). The QM system supports firms in employing their human and physical resources effectively (Hendricks and Singhal, 1997).

This research contributes to theory by explaining the influences of internal and external quality relations on sustainability performance based on a business relations view. Specifically, this study identifies social, environmental, and economic sustainability performance as significant outcomes of QM and quality employee relations as internal factors, and the role of quality customer and supplier relations as external factors. Similar research conducted by Gutierrez-Gutierrez *et al.* (2018) investigated human resource QM practices in relation to strategic outcomes and the development of new products. This research contributes to the stream of business relations research by examining the internal quality aspects related to management, employee, customer, and supplier relations to explain the mechanisms through which internal and external aspects could contribute to firms' sustainability performance.

2.7 Conclusion

All in all, the literature review and discussion above have identified the most critical quality management relations that are associated with internal and external operational activities. This research argues that dealing with internal quality relations is associated with the role of quality management relations and quality employee relations, and extends its influence to other human resource activities, such as quality training. Also, it is critical to consider external quality relations, including customer and supplier quality relations. By considering the effect of internal and external QM relations on TBL, this research contributes to identifying the associations between quality management relations, sustainability dimensions and performance. Few studies have dealt with such an in-depth investigation into the relationships between certain QM relations and sustainability performance. While there has been significant research on QM practices, there has been no research that has examined the associations of the four quality relations and sustainability dimensions in one model.

Furthermore, there has been no agreement in the previous literature regarding the proper categorisation of quality management, which is essential in achieving better sustainability outcomes. The current research provides a model that considers these

relationships. Understanding these relationships may help to lead change and improve efficiency and performance. Also, it will provide theoretical and practical implications for organisations to understand the effects of quality management relations. Siva *et al.* (2016a) claimed that in order to add to the knowledge related to sustainability, it is important to incorporate multiple management methods. This can be applied efficiently by using similar procedures, practices and tools from different systems: for example, integrating quality management practices into a sustainable development system by examining the impacts of quality management relations on achieving better sustainability performance. Thus, considering ISO standards would give some insights into how QMS and quality relations enhance sustainability performance. Another research perspective is to look at the differences between service and manufacturing firms in terms of how quality management relations affect sustainability dimensions. A further consideration is that although the quality management relations might influence sustainability performance, other stakeholder pressures may moderate these relationships. Thus, this research will examine how stakeholder pressure moderates the impacts of quality management relations and sustainability performance.

Thus, to respond to prior calls to investigate the social issues profoundly, and to explore more thoroughly the complexity of quality management systems in driving overall sustainability performance, this research has developed a conceptual framework to summarise the research questions, presented in Figure 2-9. This research has the following aim:

To develop and empirically test a theoretical model that links quality management relations to three dimensions of sustainability performance.

To answer this research question, this research will investigate the following questions:

1. *What effects do internal and external quality relations have on social, environmental and economic sustainability performance?*
2. *What effects do management relations have on internal and external quality relations?*
3. *Do firms perform better in their social, environmental, and economic sustainability performance when there is stakeholder pressure?*
4. *What are the contextual factors that influence the strengths of the relationships?*
5. *What are the moderating effects of some factors, such as ISO certification?*
    1. *Do the linkages between internal and external quality relations differ based on industry (service or manufacturing)?*
    2. *Do firms with quality certifications perform better in their social, environmental and economic sustainability performance?*
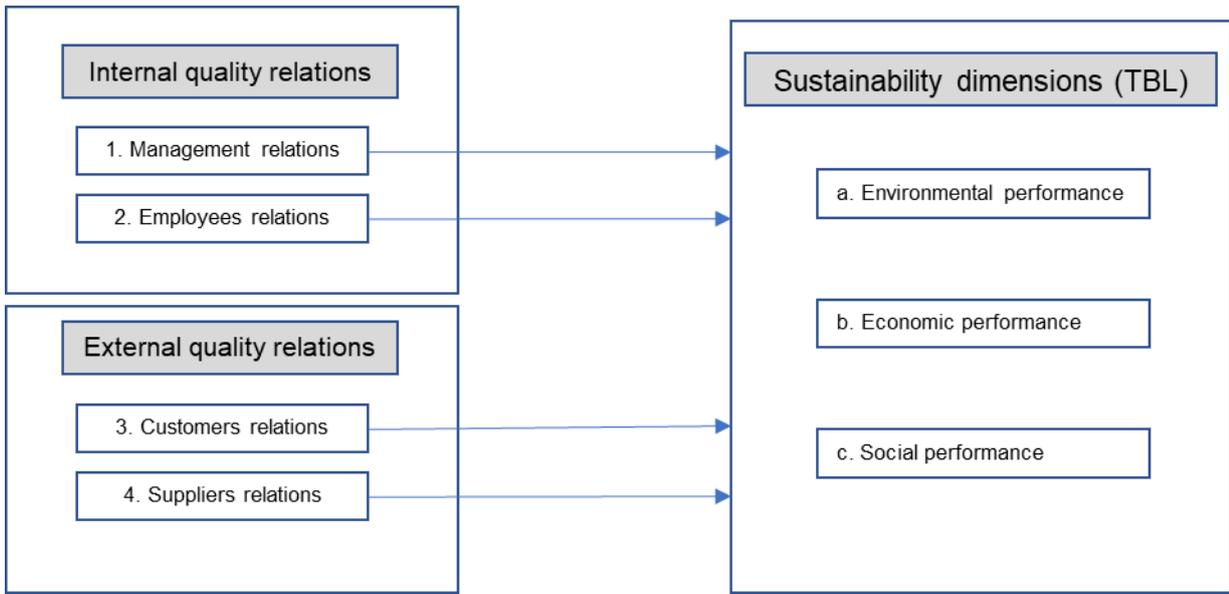
Figure 2-9 Conceptual framework

Chapter 3. Conceptual Framework and Hypothesis Development

This chapter aims to develop a conceptual framework to assist in fulfilling the main research question. This study aims to investigate the roles of quality management (QM) relations in driving sustainable business performance. The chapter starts with an overview of the theoretical background, and the hypotheses are then developed.

3.1 Overview

Previous studies have highlighted a potential linkage between various QM practices and sustainability outcome (Inoue and Lee, 2011; Tarí, 2011; Mehralian *et al.*, 2016). Also, previous research has recommended potential interests for future studies to investigate QM and social responsibility aspects, including social and ethical viewpoints (e.g., Tarí, 2011). This research addresses five specific gaps, as outlined in the following paragraphs.

First, the influence of QM relations on sustainability dimensions, including (social, economic and environmental) have not been investigated simultaneously. The importance of this research is that it looks at the influence of specific QM relations on these three dimensions of sustainability. It is crucial to understand whether the influence of a specific QM practice on a specific sustainability dimension works against the other dimensions. The sustainability dimensions are interrelated (Pullman *et al.*, 2009), but we still do not know if each of the QM practices has a similar or comparable influence on each of them; indeed, QM practices could have different effects on different sustainability dimensions.

Nevertheless, some interesting studies have looked at some relationships that linked QM with one or two dimensions, such as environmental or economic performance. For example, Siva *et al.* (2016a) addressed the association of QM and environmental outcomes and found that QM is suitable for addressing sustainability concerns. However, they did not provide empirical evidence for this relationship. Another example is Pipatprapa *et al.* (2017), who found a substantial outcome of QM on green performance. However, they did not consider different QM practices that could have different effects. Robust and generalisable simultaneous examinations of the three elements usually lack, especially in the social domain, i.e. the dimensions have not been tested in one model. Thus, measuring QM practices concerning all

the three components of (TBL) simultaneously is essential to address and advance theory on QM and sustainability performance.

Second, the existing literature has looked mostly at the direct linkages of QM relations and financial results. Previous debates in the previous work are likely to involve all three elements of the TBL (social, economic and environmental). However, quality practices have been investigated in isolation and have focused mostly on economic outcomes. Pullman *et al.* (2009) argued that the three TBL dimensions are interrelated and Golicic and Smith (2013) found that being socially and environmentally sustainable can yield better performance. However, it is not clear how QM practices influence the three TBL aspects.

The link between different quality practices and TBL elements is missing or underdeveloped. For example, some researchers argue that process management could have a positive or negative influence on sustainability (e.g., Akdere, 2009). Hence, it is crucial to understand more about these relationships and whether they could be explained by other factors, such as environmental and social sustainability. Also, it is essential to explore the extent to which each quality practice has an impact on sustainability outcomes.

Third, the social dimension has been paid less attention than the other sustainability dimensions and examining this aspect would provide further knowledge that has thus far been neglected in sustainability studies. The definition of sustainable development has extended to embrace the social factor by integrating social, environmental and economic considerations. Social sustainability is a component of TBL, and this suggests that the three dimensions (economic, social and environmental) should be tackled together to attain the sustainable approach (Elkington, 1998; 2002). Sustainability broadly embodies a theoretical and relevance concept for managerial decision making. However, in practice, it is of only limited relevance (Brandenburg *et al.*, 2014). This is because there is a lack of social sustainability research, which may lead to erroneous conclusions. Wichaisri and Sopadang (2018) found that sustainable development research from 1995 to 2015 emphasised on two dimensions only, the economic and environmental dimensions. The social dimension has not yet been adequately addressed. Morioka and de Carvalho (2016) found in their systematic review that most papers cited focused on environmental performance rather than social. Thus, further investigation and research need to be conducted to test the relationships involved. This study introduces a group of propositions that connected to overall sustainability dimensions by linking QM relations to sustainability performance (including the social dimension) to contribute to knowledge and enrich the literature on QM and sustainability performance.

Fourth, while the factor of quality practices has extended its scope to include and address issues related to supplier and customer issues (Kaynak and Hartley, 2008), the level of organisations' engagement with sustainability issues, such as social and environmental issues, has obtained insufficient interest, specifically in operations management.

Although sustainable organisations tend to focus on sustainability matters such as environmental issues, employee safety, health and equity by integrating them in their quality plans (Rao *et al.*, 1999), there is still debate regarding how such practices affect firm performance (McWilliams and Siegel, 2001). The goal of QM is to create consistency everywhere in the organisation, not just internally, such as dealing with production systems or humans inside the organisation, but also externally, including the behaviour of suppliers and customers (Boje and Winsor, 1993). By considering different QM practices, this research focuses on those practices representing both internal and external levels. Internal quality practices include top management relations and employee relations, while external practices comprise customer relations and supplier relations.

Fifth, the implementation of a QM system and practices can enhance organisational effectiveness and competitiveness. Based on the RBV, QM advocates argue that it fosters customer satisfaction, internal communication and problem solving, as well as reducing waste and errors and developing better employee and supplier relations. Previous empirical findings suggest that organisations achieve higher organisational and financial performance by implementing practices associated with the QM system (Powell, 1995; Kull and Narasimhan, 2010).

In contrast, investigating QM and sustainability is still controversial due to the contradictory empirical findings. For example, Yeung *et al.* (2006) have revealed that TQM employment is the least significant with financial performance to be. However, they claimed that financial performance could be indirect and could be affected by other factors such as corporate investment decisions or the economic environment. Also, QM has been criticised as it does not offer a positive environment for driving continuous enhancement (Parker, 2003). Besides, Wood (1999) argued that lean production systems require more evaluation and supervision, which puts added pressure on employees and may affect organisational performance. Nevertheless, this study will provide evidence and more theoretical considerations about these ambiguities.

Moreover, previous studies, e.g., Nair (2006); and Chaudhuri and Jayaram (2018) have indicated mixed results. For example, Chaudhuri and Jayaram (2018) found no evidence as

regards to the 'spillover effects' from quality and sustainability initiatives on the performance. Similarly, a Nair (2006) has not indicated any positive results. Nevertheless, these studies are more relevant for manufacturing organisations, and it is essential to investigate if there are different results in service organisations.

Overall, there is no explicit verification for a relationship between QM relations and sustainability dimensions. However, these relationships might be affected by other factors, such as stakeholder pressure. In this essence, some studies have shown that employees may resist the quality system. Also, executing a quality system is costly due to the necessary training and meetings. Thus, such systems do not tend to produce short-term results (Powell, 1995). Given the scope of QM practices and sustainability performance, this study aimed to investigate such issues empirically, based on the hypotheses developed below. It is essential to investigate the linkages between internal and external QM relations and the three dimensions of sustainability. The moderating effect of stakeholder pressure was also examined. This dissertation reported the empirical results related to the below hypotheses from manufacturing and service firms in the UK. The study suggests that sustainability performance can be achieved by focusing on various quality practices.

3.2 Management relations and quality practices (H1a, b, c and d)

Previous literature indicated the importance of management support in creating a quality environment that affects the quality system and driving other quality practices including internal practices (e.g., employee relations) and external practices (e.g., customers relation) (Kim *et al.*, 2012). This study investigates the relationships among different quality management relations (i.e., quality training, quality employee relation, quality supplier relation and quality customer relation), and examines which quality relations directly or indirectly relate to the three sustainability performance (i.e., social, environmental and economic). Higher management commitment to quality which is associated with other quality resources helps an organisation to achieve better performance (Ahire and Golhar, 1996). Indeed, without it is difficult to yield paybacks from other QM practices (Kim *et al.*, 2012). The paths between quality management relation (MR) and other quality relations (QT, ER, SR, and CR) are labelled in Figure 3-1 Theoretical framework, and all hypotheses are addressed in the subsequent sections.

H1a. Management relation (MR) and quality training (QT)

Management is responsible for providing essential assets for quality training (Kaynak and Hartley, 2008). Training as a human resource is considered as a strategic tool that is included in any discussion related to higher performance (Blume *et al.*, 2010). Quality training contributes to improving employees skills and business relations (Zeng *et al.*, 2017). Previous literature indicated the substantial influence of executive responsibility in training and found a significant association between management and training (e.g., Kaynak and Hartley, 2008). That is because the managers determine the proper environmental training programmes to establish the goals (Govindarajulu and Daily, 2004). The role of managers is to promote workforce behaviour to influence change in the organisation by introducing training programmes (Daily and Huang, 2001).

Training as a TQM practice includes different aspects such as problem-solving competencies and quality values for both managers and employees (Powell, 1995; Tarí *et al.*, 2017). Based on the resource approach, training is a tactic resource of sustainable competitive advantage that can drive the TQM success. The training itself does not produce an advantage unless it is combined with specific imitable tactics or features such as management support and employees involvement (Powell, 1995). It also increases the employees' responsibilities and involvements in problem-solving for their job tasks (Kaynak, 2003).

H1a: Management relation (MR) has a positive effect on quality training (QT).

H1b. Management relation (MR) and employee relation (ER)

Managers are responsible for establishing unity in their firms by supporting the work environment, especially employees (Manders *et al.*, 2016). The managers are responsible for influencing employee relations and familiarising effective communications between the employees (Daily and Huang, 2001).

This influence of management quality relation in enhancing employee relations is also supported in different business disciplines, such as marketing. For example, a study by Hartline and Ferrell (1996), found that managers who dedicated quality values are expected to empower their employees. Empowered employees that are related to managers ratings of work performance found to influence employee outcomes and job satisfaction (Seibert *et al.*, 2004).

H1b: Management relation (MR) has a positive effect on employee relation (ER).

H1c. Management relation (MR) and supplier relation (SR)

The relationship between firms and their suppliers in the quality approach is to build a long-term partnership. This relationship is also established by avoiding short-term relationships and selecting the suppliers, based quality values, not lower prices. By facilitating supplier relationships, firms are obligated to be involved in problem-solving and enhancing quality

actions (Phan *et al.*, 2019). Previous literature (e.g., Kaynak, 2003) found support for a direct relationship between management relation and quality supplier relations. Also, the relationship between MR and SR has been investigated in different contexts, such as supply chain, and found positive supports. For example, Theodorakioglou *et al.* (2006) have studied the Greek manufacturing firms and found a positive association of QM as a strong base for supplier management. In this regards, recent research by, Dubey *et al.* (2015), has revealed positive relationships. The role of effective management is to support profitable relationships with suppliers by considering quality management criteria (Kaynak and Hartley, 2008).

H1c: Management relation (MR) has a positive effect on supplier relation (SR).

H1d. Management relation (MR) and customer relation (CR)

Management takes responsibility for enhancing the operational process and providing customers with 'value-added products' (Ahire and Golhar, 1996). The role of the organisation is to determine current and future customers requirements and expectations. Management involvement in setting strategic directions facilitate better organisational performance (Samson and Terziovski, 1999). Managers are involved in designing procedures that create a more customer-focused environment (Ahire and Ravichandran, 2001). Also, the management role is to upkeep customers involvement by arranging customers visits to the firm and surveying customers' requirements with regards to the design perspectives of the products or services (Kaynak and Hartley, 2008).

H1d: Management relation (MR) has a positive effect on customer relation (CR).

3.3 Quality training and employee relation (H2)

The literature on HRM and supply chain management argues that supply chain mechanisms such as training help enhance employees' competences and retention, and consequently improve the firm's economic outcomes (Becker et al., 2010; Yawar and Seuring, 2017). Employee training and development programmes as total quality management (TQM) practices aim to improve employees' knowledge, skills and abilities (Zeng et al., 2017). They also increase their responsibilities and involvement in problem solving and consequently increase their satisfaction (Tarí et al., 2017). Indeed, a study by Brunet and Alarcon (2007) found that offering training programmes for new employees on how to accomplish activities and responsibilities increased their satisfaction. Moreover, it is expected that more qualified and capable employees will reflect on offering a better service and consequently also enhance customer satisfaction (Hartline and Ferrell, 1996). Generally, training is a tactical resource for

sustainable competitive advantage that can drive the success of TQM. The training itself does not produce an advantage unless it is combined with specific imitable tactics or features, such as management support and employee involvement (Powell, 1995). It also increases the employees' responsibilities and involvement in problem solving in their work tasks (Kaynak, 2003). It is expected that more qualified and capable employees will reflect on offering a better service and consequently also increase customer satisfaction (Hartline and Ferrell, 1996; Yong and Wilkinson, 2003).

The value that training can bring to sustainability cannot be underestimated. The TQM system uses charts, graphs and statistical information in employee training, but the employees are also expected to obtain extra environmental and socially focused training, for example on recycling, pollution, and sustainability policy (Rothenberg, 2003). Training programmes also include different aspects, such as health, safety, and sustainability issues, and thus provide employees with information on green procedures, strategies, sustainability benefits, and how to prevent and reduce waste (Mandip, 2012). Thus, implementing a QM system that involves training is likely to increase the success of sustainability efforts. Also, it will allow employees to bring their skills and knowledge up to date with cutting-edge skills and abilities (Flynn, 1994). Therefore, the second hypothesis is formulated as follows:

H2: Quality training (QT) has a positive effect on employee relations (ER).

3.4 QM relations and sustainability performance

Management relations (MR) and sustainability performance

Parast and Adams (2012) empirically show significant findings of the management influence in driving quality citizenship, CSR practices and firm performance. In this regard, Muller and Kolk (2010) addressed quality management relations and ethics that lead to higher corporate social performance. Also, other studies have revealed that the absence of management support leads to sustainability failure (Benavides-Velasco *et al.*, 2014). This suggests that management support is vital for sustainability performance (Parast and Adams, 2012). Some studies have revealed that QM is not necessarily enhanced sustainability performance if there is improper employment of the QM standard (e.g., Benavides-Velasco *et al.*, 2014).

Nonetheless, there are also arguments for a contrary position. For example, De Menezes (2012) does not support the view that QM and involvement from top management necessarily lead to higher organisational performance. He found that some organisations in the

UK do not implement the essential operational requirements of QM, so only a few organisations benefited from the advantages of QM.

However, by taking the view expressed in some studies associating social sustainability performance with employee and customer satisfaction, for example, Longoni *et al.* (2014), it can be contended that the management could have an effect on sustainability performance. In this regards, Longoni and Cagliano (2016b) argued that higher levels of management quality support require more considerable attention to sustainability to achieve customer satisfaction as customer expectations are increasing and firms have to take care not to hurt their relationship with customers (Longoni and Cagliano, 2016b). As long as there is continuous management support, customers will continue to be satisfied. Since customers are part of the community that represents the outer side of social sustainability, this research argues that leadership quality support will positively affect the social sustainability dimension. Another perspective of social sustainability is related to employee satisfaction. The leadership principle entails creating a trusted environment by inspiring, encouraging and involving employees (Manders *et al.*, 2016). Through employee involvement, it is expected that firm managers will stimulate ideas that can enhance sustainability performance, including the social dimension. The challenge for firms today lies in the specific actions that managers can take to cope with social responsibility and stakeholder matters in an effective manner (Epstein, 2018).

Previous research suggests that top management commitment is vital for driving firms' sustainability performance. Existing studies provide exciting findings of strategic management's role in enhancing economic outcome (Akdere, 2009). Therefore, the current study argues that management seems to have an essential role in driving economic sustainability performance.

As for environmental sustainability performance, this study argues that management has a positive effect. Previous research supports this proposition. For example, Daily and Huang (2001) examined the management support and found that it leads to the success of environmental management systems. They claimed that when a new organisational culture is introduced, management is required to play a role to promote employees to engage in the desired behaviour and influence the change. Successful implementation also requires the introduction of reward programmes, quality training and more effective communication throughout the entire organisation (Daily and Huang, 2001). However, the authors did not test this relationship empirically, and they conceptualised top management commitment from a human resource perspective, and according to ISO14000 (Environmental Management System). In contrast, this study empirically tests the relationship and conceptualises

management relations (top management commitment) as a quality practice based on previous QM literature.

One of the main obstacles to environmental sustainability and its improvement is insufficient management support. Management support provides a framework for environmental sustainability. Previous studies support that the more a firm's management support quality initiatives, there are better innovative and environmental strategies. However, none of them has addressed environmental sustainability performance. For example, previous studies have found that it is the role of the managers to determine the proper environmental policies and training programmes to establish in order to achieve environmental innovation (Ramus, 2001; Govindarajulu and Daily, 2004). Also, according to Banerjee *et al.* (2003), quality management commitment enhances corporate environmentalism and is the latent power that boosts firms to implement an internal environmental orientation. Molina *et al.* (2007) consider commitment from top management and department heads to be an interdependent dimension of quality and environment management systems. They describe it as the "acceptance of quality and environmental responsibility by leaders" (Molina *et al.*, 2007, p.213). Managers should ensure that all the existing forthcoming quality and environmental aspects are addressed. Fraj-Andrés *et al.* (2009) claimed that management commitment is necessary to explain the incorporation of environmental issues by the companies because their perception of customers affects firm behaviour. Quality management support is the primary factor in obtaining and developing a product (Dangelico and Pujari, 2010). Based on the above discussion, this study argues that quality management relation affects environmental sustainability outcomes.

All in all, it is essential to know how the relationships identified above vary across the three dimensions of sustainability. This study argues that top management support, as a quality practice, affects sustainability performance, directly and indirectly. Thus, according to the above arguments and findings, this research proposes the following hypothesis:

H3a,b,c: Management relations have a positive direct and indirect effects on (a) environmental sustainability performance, (b) economic sustainability performance and (c) social sustainability performance.

Quality training (QT) and sustainability performance

Training is primarily part of human resource literature and it is linked positively to employee performance. Previous literature supports the significance of employee in enhancing employees' skills and retention (Becker *et al.*, 2010). In quality literature, training is considered as one of the important soft quality practices that aims to improve the skills and competences

of the firms' employees (Zeng *et al.*, 2017). Training as part of quality system improves employees' problem-solving skills (Tarí *et al.*, 2017). According to Hartline and Ferrell (1996), training results makes more qualified and capable employees with better satisfaction. Training also has better results and firms' performance as shown in previous literature. For example, Kaynak (2003) found that training increases the employees' responsibilities and involvements in problem-solving for their job tasks. Based on that, it is expected that quality training improves social, environmental and economic performance. As TQM system uses charts, graphs and statistical information in employees training, the employees are also expected to obtain extra environmental and social-focused training such as recycling, pollution, sustainability policy (Rothenberg, 2003). As training programs include different aspects such as health, safety, and sustainability issues, these programs provide employees with green procedures, strategy, sustainability benefits, and how to prevent and reduce waste (Mandip, 2012). Thus, Implementing the quality management system that involves training practice would increase the success of sustainability efforts. Also, it would allow the employees to update their skills and knowledge with cutting-edge skills and abilities (Flynn, 1994). Thus, the next hypothesis is formulated:

H4a,b,c: Quality training has a positive effect on the triple bottom line: (a) environmental sustainability performance, (b) economic sustainability performance and (c) social sustainability performance.

Employee relations (ER) and sustainability performance

ER in this research includes different aspects related to employees relations which have been covered in QM literature, including workforce involvement, empowerment and teamwork. Also, workforce relations as a QM practice refers to the employees' continuous development and growth. It is a quality practice that encourages team problem-solving. It also refers to how supervisors take the role of coaches, rather than giving orders, to enhance the employees' ability to solve problems (Flynn *et al.*, 1995). One of the principles of ISO 9000 is that "[p]eople at all levels are the essence of an organisation and their full involvement enables their abilities to be used for the organisation's benefit" (Manders *et al.*, 2016, p. 43).

Previous literature indicated the importance of considering employee relations in driving sustainability performance. However, the findings are mixed. Jackson *et al.* (2016) realised that QM innovation (including employee issues) is significantly enhancing environmental outcomes, but not with economic performance. Nevertheless, Rao and Holt (2005) stated that firms' initiatives that are coupled with employee empowerment could boost economic performance.

Thus, it is not clear if the ER would affect economic performance alone. In Jackson *et al.* (2016)'s study, QM innovation is a composite construct that includes different aspects, such as management commitment, supplier issues and employee training, making it difficult to judge which quality practice affects each aspect of sustainability performance. Therefore, examining the potential relationships of quality employee relations and sustainability performance dimensions will validate previous findings and develop our understanding of this critical quality variable which might influence sustainability performance.

From a social sustainability perspective, Hutchins and Sutherland (2008) argued that companies should meet the needs of their employees and communities they interact with to achieve sustainability. They stated that firms could foster social impacts by going beyond meeting basic needs and pay attention to other social requirements, such as safety and equity. Also, social sustainability emphasises the importance of managing social resources, such as workforce skills, abilities and social values, which shape societies (Ahmed and McQuaid, 2005). The majority of studies focusing on employees suggest a positive relationship with employee satisfaction (Anderson *et al.*, 1995; Molina *et al.*, 2007; Akdere, 2009). Also, involving employees helps them become socially oriented (Sudin, 2011; Masri and Jaaron, 2017). Training also increases employees' sense of responsibility and involvement in problem-solving as part of their work (Kaynak, 2003) and consequently increases their satisfaction (Tarí *et al.*, 2017). However, there is no direct test of this relationship to be found in the literature. It is important to test workforce quality relations and the social sustainability dimension.

Moreover, it is expected that more qualified and capable employees will reflect on offering a better service and consequently increase customer satisfaction (Hartline and Ferrell, 1996; Yong and Wilkinson, 2003). Involving employees in QM programmes such as Six Sigma can motivate them and increase their morale and job satisfaction (Lang Cheng, 2012; Chaudhuri and Jayaram, 2018). This proposition is also supported by the work of Brunet and Alarcón (2007). They found that development programmes for new employees on how to perform activities and tasks in hotels increased their satisfaction.

However, the influence of employee relations on social sustainability is not uniformly positive. For example, Longoni *et al.* (2014) found mixed results, specifically a negative relationship between teamwork and social sustainability performance, but a positive impact of employee involvement on social sustainability performance. Therefore, this relationship needs to be studied in greater depth.

From an environmental sustainability perspective, ER can be considered a critical element in QM improvement that can boost environmental performance (Jackson *et al.*, 2016). According to Nickols (1998), involving and empowering employees can increase their commitment to improvement. Also, a study by Rothenberg (2003) revealed that active employee involvement in projects positively affects environmental performance. Theyel (2000) argues that firms with involved employees are better than other firms in reducing chemical waste. Involving employees by sharing environmental issues with teams enhances their ability to generate solutions to environmental issues and results in better environmental outcomes (Massoud *et al.*, 2011). Involving employees strengthens their ability to identify environmental issues such as pollution (Boiral and Paillé, 2012), and this may improve environmental sustainability (Renwick *et al.*, 2013). Margaretha and Saragih (2012) argue that involving employees in green HR initiatives and in developing green culture promotes sustainable business and helps firms to work in an environmentally sustainable business fashion. Jabbour and Santos (2008) state that programmes enabling employees to identify environmental issues are essential in terms of empowering them to maintain good environmental practices in organisations. Daily and Huang (2001) investigated some of the HR aspects and employee environmental perceptions. They found that workforce empowerment is linked to perceived environmental outcomes. Also, training programmes may include health, safety and sustainability issues. These programmes should train new employees in green procedures, strategy, sustainability benefits and how to prevent and reduce waste (Mandip, 2012). The value that training can bring to sustainability cannot be underestimated. A QM system uses charts, graphs and statistical information in employee training and employees are also expected to obtain extra environmental and socially focused training, for example related to recycling, pollution and sustainability policy (Rothenberg, 2003).

Although some research finds that ER tends to increase environmental sustainability performance, other studies contradict these the results. Longoni *et al.* (2014) argued that teamwork and workforce involvement do not significantly increase environmental sustainability performance. Nonetheless, this study posits that:

H5a,b,c: Employee relations have a positive effect on the triple bottom line: (a) environmental sustainability performance, (b) economic sustainability performance and (c) social sustainability performance.

3.5 Supplier relations (SR) and sustainability performance

SR, as a quality practice, enhances and maximises quality performance in several ways. One of the critical contributions is selecting criteria that take quality rather than cost. Firms select a small number of suppliers and establish long-term relationships. This approach also allows for more cooperation and knowledge sharing. Suppliers can take part in product design and offer their comments and opinions about quality and performance (Flynn *et al.*, 1995; Powell, 1995). In this essence of RBV, Barney *et al.* (2001) argue that certain firm resources can be socially complex, such as relationships between suppliers and customers and relationships with employees. Firms must reform such relationships all together at the same time, including relationships between managers, suppliers and employees. According to Barney *et al.* (2001), these resources will be beyond the firm's capabilities unless they are subject to direct management (Powell, 1995).

According to the QM literature, it is necessary for any firm aiming to increase performance to employ quality supplier relations. By implementing a QM system, firms are obliged to make efforts concerning specific internal processes and to contribute to fostering and achieving better operational results. For example, firms should try to establish long-term relationships, to engage their suppliers in the design processes and technical training, to set up a rating and evaluation system for suppliers based on quality (Hietschold *et al.*, 2014). Thus, these efforts are expected to allow quality supplier relations to affect sustainability performance positively.

From the economic sustainability performance perspective, to achieve sustainable benefits, firms must develop their relationships with their partners and suppliers. It is essential to create a trusting relationship and share their benefits with their suppliers because this will improve the efficiency of the firm and enable it to obtain sustainable benefits. Also, having good relationships with partners and suppliers could be beneficial because such relationships secure sustained success and facilitate the use of firms' resources to support decision making (Benavides-Velasco *et al.*, 2014). However, Albers Mohrman *et al.* (1995) found no significant influence from supplier collaboration on financial performance. Nevertheless, Kaynak and Hartley (2008) have argued that supplier relations are essential in driving performance because they involve communication and collaboration between firms and their suppliers. Generally, recent studies have suggested that when firms have good relations with their suppliers, it builds supplier retention, avoiding supplier switching. Also, this will help improve economic performance (Pagell and Gobeli, 2009). Nonetheless, there is a shortage of empirical evidence

for this, and thus it is not clear how this quality practice affects the economic sustainability dimension and other TBL dimensions.

Moreover, it is crucial to understand the influence of SR on social and environmental dimensions. It is vital to ensure SR when selecting and developing suppliers. To achieve long-term sustainability performance, businesses should deal with social and environmental influences (Chardine-Baumann and Botta-Genoulaz, 2014). It is crucial that firms evaluate their suppliers and help them deal with social issues. According to Wiengarten *et al.* (2017a), to improve environmental performance, firms should achieve greater interactions among their suppliers. It is expected that SR as a QM practice will create an environment facilitating the firm's dealings with suppliers. Consequently, it will be reflected positively in improving sustainability outcomes (Seuring and Müller, 2008).

Therefore, this study argues that focusing on SR will enhance social and environmental sustainability. Accordingly, it is crucial to test the relationship between supplier relations as a quality dimension and its influence on the TBL. The following hypothesis is formulated:

H6a,b,c: Supplier relations will have a positive effect on (a) environmental sustainability performance and (c) social sustainability performance.

3.6 Customer relations (CR) and sustainability performance

This study proposes that CR as a quality practice can enhance sustainability performance. According to the QM literature, firms maintain relationships with customers in order to receive input on product or service design. These relationships are established through communication links, such as frequent meetings, visits and customer feedback (Flynn *et al.*, 1995), as well as determining and meeting customers' requirements inside and outside the firm (Powell, 1995). According to Manders *et al.* (2016, p. 43), one of the values which are related to customer focus within the ISO 9000 system is: "[o]rganizations depend on their customers and therefore should understand current and future customer needs, should meet customer requirements and strive to exceed customer expectations". As the need for sustainability has become universal, customers' requirements and public values are considered to be significant drivers of sustainability (Bi, 2011). Business is becoming increasingly globalised, and firms are experiencing more pressure from customers. Social and environmental demands are driving firms to implement recent technologies to continue being competitive (Taylor and Vachon, 2018). Over past decades, QM systems and ISO standards have been seen as new

management technology exerting an impact on operations management. CR as a quality practice is concerned with obtaining positive or negative feedback (through corrective actions) on quality and a company's processes (Kim *et al.*, 2012; Hietschold *et al.*, 2014). Prior studies have argued that improving customer service leads to improved outcomes (Waldersee and Luthans, 1994). However, the role of CR as a quality practice affecting sustainability performance is little understood.

This research articulates economic sustainability performance through the concept of CR. Previous research has found that customer focus results in better financial outcomes and enhanced customers loyalty (Shrivastava, 1995; Longoni and Cagliano, 2016a). It also increases earnings and allows to obtain market improvements (Anderson *et al.*, 1995; Kaynak, 2003). When firms aim to improve their customers and suppliers, they tend to improve their sustainable practices (Longoni and Cagliano, 2016a). Storbacka (1994) claimed that the underlying assumption is that if the quality of service is improved, customer satisfaction is improved, which drives profitability. Thus, economic sustainability performance is improved.

As regards to the environmental sustainability viewpoint, possessing specialised knowledge about customers and their requirements allows companies to have a better understanding of their product choices and operating systems. Also, this makes it possible to identify customers' ecological orientations and produce environmentally friendly products that are suited to their customers. In turn, Chardine-Baumann and Botta-Genoulaz (2014) suggest that having well-developed relations with customers allows them to adapt to the firm's products or services. Such results provide a strong indication that a customer focus is vital in driving environmental sustainability performance.

As for social sustainability, the concept of the 'customer' incorporates a much wider range than traditionally, extending the society (Parast and Adams, 2012). According to Epstein and Roy (2001), it is crucial for companies that are trying to promote sustainability performance, for example by reducing CO_2 emissions, to take further steps, such as considering their customers. Companies should know how to strike a balance for their customers between sustainability actions over time. One initiative to enhance sustainability improvement is to improve customer satisfaction and retention through the efficient use of recycled material. In this essence, QM has been found to improve customer satisfaction (Parast and Adams, 2012). Also, in the QM literature, firms engage their customers in service and product design processes (Hietschold *et al.*, 2014). From the social sustainability point of view, socially trustworthy organisations must deliberate sustainability principles and value their product and service life cycle (Sarkis *et al.*, 2010b). Social sustainability at a corporate level adds benefit to

societies by increasing the human capital of people, including aspects such as health and education (Dyllick and Hockerts, 2002; Labuschagne *et al.*, 2005). As customers are part of the community and society, it is expected that a customer focus will increase social sustainability performance. Labuschagne *et al.* (2005) emphasised that stakeholder participation (including customers) includes the provision of information and stakeholders influencing issues. Information provision is concerned with providing information to communities about the company's operations. Also, to facilitate stakeholder influence over the product life-cycle, it is significant to improve communication with customers, suppliers and other supply chain members (Sarkis *et al.*, 2010b).

The role of CR as a quality practice is concerned with customer feedback and complaints and encourages companies to put in place operative procedures for determining external customers' issues (Samson and Terziovski, 1999; Hietschold *et al.*, 2014). Nevertheless, few studies dealt with social sustainability performance, especially related to employees, workplace safety and health (Jilcha and Kitaw, 2016). The role of CR should be tested to guide corporate actions to improve sustainability outcomes. Therefore, the following hypothesis is formulated:

H7a,b,c: Customer relations have a positive effect on (a) environmental sustainability performance, (b) economic sustainability performance and (c) social sustainability performance.

3.7 Moderating effects (Stakeholder pressure)

Stakeholder pressure is investigated as a potential moderator of the relationships between QM relations and sustainability performance. This possible moderator may play an important role and help to explain the contradictory links between QM relations and sustainability outcomes. One of the reasons that this research suggests is that the possible moderation effects are caused by external stakeholder pressures. The implementation of QM relations and considering stakeholder pressure may enhance the potential positive effects of QM on sustainability outcomes. Wilson and Campbell (2016) argued that it is necessary to involve stakeholders in quality practices. Also, according to Hörisch et al. (2014), the importance of stakeholder theory lies in the fact that it plays an important role in addressing sustainability challenges. This research tests whether stakeholder pressure can mitigate the positive effects of QM relations on the triple bottom line (TBL).

The direct effect of stakeholder pressure on sustainability performance has been recognised in previous studies (Sarkis et al., 2010a; Wolf, 2014). According to McWilliams et al. (2006), corporate social responsibility could be a consequence of pressure from stakeholders such as NGOs and consumers. Also, Kramer and Porter (2006) have argued that social concerns could affect the strategic and operational effectiveness of organisations.

Thus, this study assesses the effect of stakeholder pressure on the primary relationships between QM variables and sustainability performance dimensions. Companies can use QM practices either to respond to or to prevent stakeholder pressure. For example, a customer focus as a quality aspect is concerned with the importance of involving customers in product or service design, which may affect how companies consider sustainability issues. This means that pressure from customers, as stakeholders, can affect the way in which companies interact with their customers. The greater the pressure from the customer, the greater the customer focus and the better the sustainability performance.

Stakeholders are categorised in the literature as internal and external (Sarkis et al., 2010a). Internal stakeholders comprise employees and management, while external stakeholders comprise customers, shareholders, society, public opinion, government, the media, etc. Pressure from internal or external stakeholders can threaten a company's image and customer relations (Sarkis et al., 2010a). Also, such pressure could affect sustainability performance. For example, management commitments and employees play a significant role in implementing operational sustainability practices. This means that adopting a new environmental plan requires support from employees and management. As for pressure from external stakeholders, companies are required to comply with regulations to avoid threats that could affect their public image or customer relations (Sarkis et al., 2010a). For example, implementing a QM system that exploits environmental operational practices could protect companies from regulatory threats and pressures (Sarkis et al., 2010a).

In this research, the moderating effects of external stakeholder pressure, i.e. from non-governmental organisations (NGOs), governments and media, are tested. Internal stakeholders, namely employees and management, are not included in the analysis. This is because they, as part of internal quality relations, are considered independent variables and including them could lead to conflicts in the analytic procedures. It is more manageable for firms to cope with internal pressures, but more challenging to control external pressures. This implies that analysing the role of stakeholders is not about the firm itself, but rather the other groups and individuals who have relationships with the firm (Freeman, 2010). According to Bhaduri and Selarka (2016), firms need to consider the broader perspective of their stakeholders. Wu et al. (2017) argue that stakeholder theory is used in sustainability research to describe the

external motives related to firms' sustainability goals. It concerns satisfying various groups and individuals, such as suppliers, customers, governments, and competitors. As various stakeholders have different interests, it is the firm's role to make the proper decisions to respond to the stakeholders' expectations. Another reason for considering external stakeholders is that stakeholder theory is associated with issues that are related to image, reputation, brand, and values. This explains the growing societal pressures which inspire firms to respond to environmental and social demands. For example, government regulations put more pressure on firms to address sustainability issues; failure to respond to these issues can be costly and result in penalties, such as fines and even closure (Crane et al., 2019). Also, NGOs and governments are both sources that force firms to change their corporate social responsibility (CSR) agendas (Pedersen, 2015, pp. 9-11). Organisations feel obliged to fulfil stakeholders' demands (Block and Wagner, 2014).

The impact of QM standards, such as ISO 14001, on firms' performance, depends on external stakeholder involvement. External stakeholders include customers, community, distributors and regulatory agencies (Delmas, 2001). Most of the previous research has explored the effect of stakeholder pressure on environmental performance. For example, a study by Lannelongue and González-Benito (2012) found that firms' employment of an environmental management system (EMS) is a response to pressures from stakeholders. However, it is essential to examine the role of stakeholder pressure in the presence of quality relations. Also, this study explores the moderating effect of stakeholder pressure in the case of significant relationships between quality relations and the social sustainability dimension. A recent study by Taylor and Vachon (2018) suggests that pressure from stakeholders, i.e. NGOs, could improve communications between firms and their suppliers. That would mitigate deficiencies and improve social issues such the human capital and equity. As there is still an ongoing debate about the link between stakeholder pressure and social sustainability performance, it is essential to investigate these relationships within quality management research. Therefore, the following hypotheses are formulated regarding moderating effects:

H8: Stakeholder pressure (SP) is a significant moderator in the relationship between management (MR) relation and the TBL: (a) environmental sustainability performance, (b) economic sustainability performance and (c) social sustainability performance.

H9: Stakeholder pressure (SP) is a significant moderator in the relationship between employee relation (ER) and the TBL: (a) environmental sustainability performance, (b) economic sustainability performance and (c) social sustainability performance.

H10: Stakeholder pressure (SP) is a significant moderator in the relationship between supplier relation and the TBL: (a) environmental sustainability performance, (b) economic sustainability performance and (c) social sustainability performance.

H11: Stakeholder pressure (SP) is a significant moderator in the relationship between customer relation and the TBL: (a) environmental sustainability performance, (b) economic sustainability performance and (c) social sustainability performance.

3.8 Sector (manufacturing and services)

The service and manufacturing sectors are expected to achieve different sustainability performance from QM practices. The hypothesis testing will consider different results according to the sector. This study seeks to identify the differences as regards to sustainability dimensions between service and manufacturing firms with strong implementation of a QM system. The prior work has examined the influence of QM on business performance, but the results are unconvincing as there were contradictory results (Tarí *et al.*, 2017). A QM system could be applied in any sector, including service and manufacturing firms (Dean Jr and Bowen, 1994), as it leads to improvements in products, services, competitiveness and business performance (Baird *et al.*, 2011). Generally, despite the contradictory results concerning the role of QM in driving sustainability performance, there is an agreement that QM can play a role in influencing different sustainability performance dimensions.

In this regard, Lee *et al.* (2003) found that firms with QM systems perform better in terms of customer and people outcomes. Also, Zhao *et al.* (2004) found that service firms with a developed quality system perform better as regards to employee satisfaction and business performance. Sustainability tends to be noticed in operating contexts that apply to manufacturing firms more than services due to manufacturing product types, wastes and emissions. Few studies have covered sustainability in service firms (e.g., Hasan, 2013). Aslo, Robson *et al.* (2002) obtained a positive association between TQM initiatives and sustainability performance among 450 UK service firms. Although QM could be applied in different sectors, it is not yet clear if the effects of different QM practices vary across different sustainability performance dimensions. There is no unique empirical work that has examined and compared the influence of QM relations on sustainability performance in the two sectors. In an effort to fill this gap, the hypotheses outlined above are tested with a view to reporting differences across service and manufacturing firms. The results will provide statistical evidence of the influence of QM relations in relation to sustainability dimensions in the manufacturing and service sectors.

3.9 Theoretical framework

The theoretical framework is presented in Figure 3-1. Building on the RBV, the influence of quality relations on the three dimensions of sustainability performance is investigated.
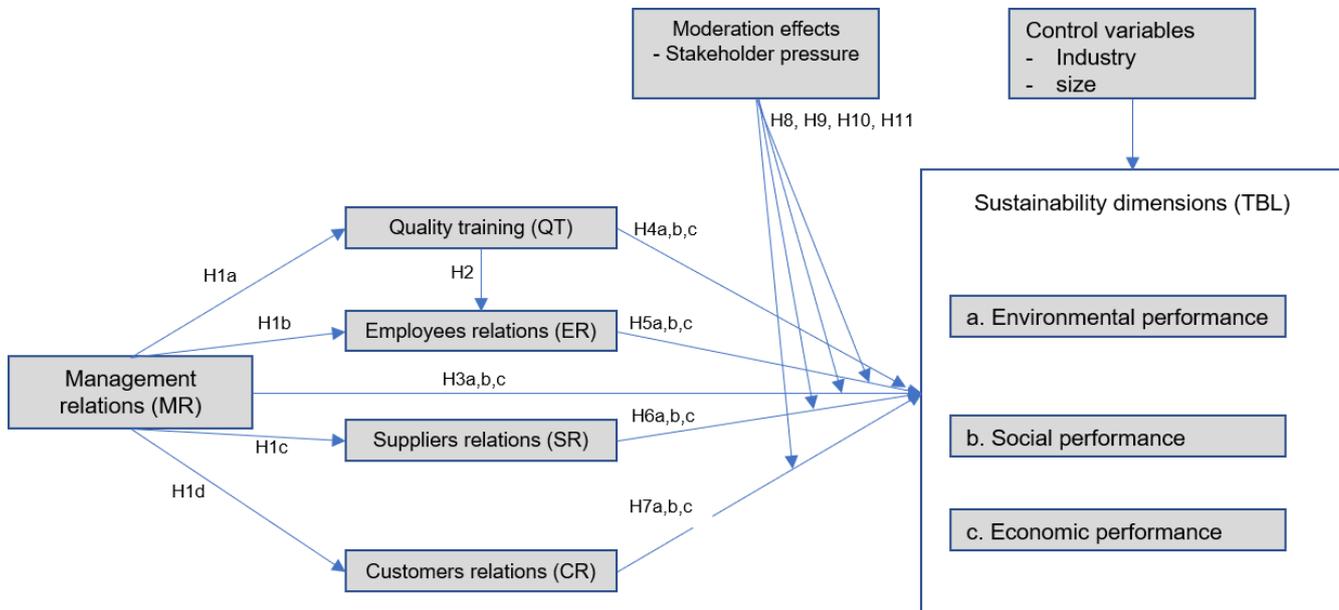
Figure 3-1 Theoretical framework

3.10 Framework validation

The theoretical framework (Figure 3-1) was validated to confirm and clarify the objectives and questions of this research, which is examining the roles of quality management relations on sustainability dimensions. The views were collected from five expert managers from different firms' sizes and sectors by conducting interviews. The managers have managerial roles and proper organisational knowledge. The minimum experience of the executives is ranged between thirteen and forty years, and they have either an executive or director roles within their firms. With regards to the characteristics of the firms, the sizes of the firms are measured in the number of employees. One firm has 51-100 employees, two firms have 101-500, and two firms have more than 501 employees. The interviews were carried via conference calls, by either video or telephone.

The previous literature review and hypotheses development work has led to developing a number of questions and sub-questions for these validation procedures. Most of the questions

were predetermined according to some findings in the literature review. These interviews have provided additional insights beyond the purpose of validation and clarification of the questions. These insights could be summarised in the following sections.

Quality management relations

As indicated in the literature review, for the scope of this research, these practices took two-dimensional views, the internal view that considers the human relations such as management, training and employee relations; and the external view that considers supplier and customer relations. To validate this understanding, the participants were asked about the quality practices implemented in their companies. Although all the participants recognise all the quality practices found in the literature, the importance and considerations of those practices are varied. The participants support the theoretical perspective as these results revealed that some quality relations are given more attention by the participants, such as customer focus, training, and supplier relations. However, other practices, such as employee relations are less considered or mostly ignored. The literature about quality management and its measurements have been well established. Nevertheless, according to the participants, they have pointed out the importance of having regular meeting with top clients, conducting surveys, customer review and feedback.

Sustainability Dimensions

According to the participants, all sustainability dimensions and initiatives, including social sustainability, are recognised. Generally, as the participants suggest, in spite of the importance of economic performance to the companies, other sustainability dimensions are becoming more important as well. There are specific sustainability initiatives that are giving more attention to companies. As for social sustainability, the managers emphasised the importance of two social perspectives, internal and external. The internal consideration is involved with investing more in employees. The companies pointed out that it is important to work with internal staff to make sure that they are continuously developing. For instance, a manager has said: *"Social workplace accountability we have invested in people, so working with internal staff to make sure that they're continuously developed."* Also, companies look at social issues such as equality and diversity through organisations. One manager has stated: *"So we're looking at that and looking at ourselves, and looking at equality and diversity, right through the organisation, from the very top, right through to that, starting with our Board."* The external perspective is more related to the local community as companies are trying to serve and maintain good relationships with the local communities through their operations. The companies observe their

culture to make sure it is suitable for the community, for example, by having suitable programmes and activities with the local schools. A manager has stated: *"We work with local schools as well. So, we are available for schools to come out and talk. What we're embarking upon at the moment, is quite a major exercise in looking at our culture and our operations; To seek indeed we are well due to serve communities, who do not currently have anything to do with us".*

As for the environmental sustainability dimension, the participants emphasised the importance of having products that have locally produced ingredients, reducing the impact on the environment by trying to reduce the effect in the design of its products, and having an environmental policy and plan. Also, they stressed on employee's involvement in environmental sustainability initiatives.

To confirm the theoretical relationships between quality management relations and sustainability dimensions, the participants were asked to state whether quality practices influence sustainability or not; and to explain what quality practices greater sustainability performance have, by looking at sustainability dimensions (social, economic and environmental). Generally, the respondents pointed out that the quality management system, in general, is critical for sustainability. For example, one of the managers stated: "*having 14001, we are looking to see: Are we using the most of environmentally-friendly products we can? We are taking materials from sustainably managed forests. And, is there an alternative to the plastic? Can we use cardboard instead? Is it recyclable, is it already recycled?".* Also, the participants support the view that quality suppliers relation allows for achieving better environmental sustainability by conducting company visits to suppliers to make sure that they are trading in an ethical manner. Another company suggests using specific criteria in selecting suppliers. This suggests that the quality supplier relation reflects on better sustainability performance:

"So, we go out and visit them and make sure that they are trading in the same manner that we trade. We are checking to make sure that standards as well as environmental, social work plays responsibility… are ethical?"; "We have a system to register specific suppliers. We select suppliers by using specific criteria and specifications. Employees are involved in choosing the best suppliers. Suppliers are selected according to their product effect on the environment, safety and health." As for the customer focus, they suggest that customer focus reflects on better social sustainability performance as it enables companies to understand various communities and customers and to consider their expectations. They argued that customer focus allows to do more sophisticated segmentation of the market and achieve better

economic sustainability. *"We've got a new customer relationship management system, a CRM system, which enables us to do much more sophisticated segmentation of our market. So, we know who's coming, we know why they are coming, we know the sorts of things they like when they come here."* As for the employee relation, they emphasised its importance as it allows for achieving better sustainability performance. For example, when a company involves and manages its employees in the new projects by training them, this allow to achieve better environmental and social sustainability performance, as one of the participants stated that *"Employees are involved and trained when, e.g., building new stations, choosing a specific pump, risk assessment, value engineer.*

As for the QMS and quality certifications, the participants argued that as quality certifications demonstrate firms' quality qualification, they might influence sustainability performance. According to Hahn (2013), certifications are useful in building awareness of stakeholders' expectations by conducting a comprehensive analysis of the sustainable society issues. Also, they assist organisations in focusing on social responsibility (Castka and Balzarova, 2008). Accordingly, this study considers the effect that these certifications might have when examining the relationships between QM relations and sustainability dimensions. According to the participants, their companies are certified with more than a quality management system, including ISO 9001, ISO 26000 and ISO 1400. Others have integrated quality systems. As those quality certifications demonstrate firms' quality qualification, they might influence sustainability performance.

Generally, the results of the framework validation process, it is confirmed that quality relations could be the main drivers for sustainability performance by considering the management roles in quality implementation, employee involvement in quality practices, training, focusing on customer; having good relations with clients and suppliers; considering customers' requirements about the products' ethical issues; understanding various communities and customers by to trying to make what you do accessible, relevant, and interesting to everybody; and by making sure that product is robust and attractive. The interview results provided some understandings of the quality relations that might influence different sustainability performances. Also, to take advantage of the information derived from those participants, some quotes will be used to facilitate the discussion section and could support the results derived from the survey results.

Chapter 4. Research methodology and design

4.1 Introduction

This chapter discusses the research methodology which was used to generate knowledge that helped to answer the questions of this research. The research methodology is an approach that employs methods and tools to meet the research goals of an individual research (Adam and Healy, 2000). It is important that the research questions are clear, so it is easier to choose a suitable research methodology and data collections procedures. Yin (2003) argued that the research methodology depends on the research goals, scope, research questions and research limitations. According to Sreejesh *et al.* (2013), the research design methods depends on the objectives, costs, availability of the data and the importance of the decision. To recap, the main objective of this research is to examine the influence of internal and external QM relations on sustainability performance within UK firms. Specifically, it aims at investigating the effects of management and employee relations, as the internal factors; and customer and suppliers, as the external factors of quality relations.

Moreover, this study investigates the moderation effect of stakeholder pressure and examines if quality practices affect sustainability differently based on service or manufacturing sector type. This research objective assumes that the reality (sustainability performance) and the researcher are separated. This implies that reality is independent and objective from the researcher's viewpoint. The research methodology discusses an unconventional method; however, it argues the rationale and philosophical assumptions, which clarify the views of the researcher in terms of ontological and epistemological perspectives. These philosophical assumptions are essential guidance for the research inquiry (Guba and Lincoln, 1994).

The discussion and research processes of this chapter follow the sequence of an onion's layers, according to Saunders *et al.* (2016) (*see Figure 4-1*). The chapter starts by discussing the adopted research paradigm and adopted approach. Then it discusses the methods that were implemented to carry out the empirical stages, data collection and analysis procedures. Also, this chapter discusses the phases employed for survey development and the rationale for using the appropriate methods.

4.2 Research philosophy (paradigm)

There is a long debate among social scholars about the most appropriate paradigm and there is no agreement about the best approach to establish simple selections of methods. However, considering a philosophical basis allows the researcher to have a clearer research design (Easterby-Smith *et al.*, 2012). Also, understanding the nature of a paradigm allows a researcher to determine both the important issues and the methods available to tackle them (Deshpande, 1983). Nevertheless, it is important for the researcher to understand the most appropriate philosophical stand to derive a suitable research method. The paradigm or research philosophy is related to the process of developing a piece of knowledge on a specific topic and the nature of that knowledge (Saunders *et al.*, 2016). The philosophy of knowledge is related to the theoretical background of the quest for knowledge, and it is combined with assumptions concerning ontology, epistemology, knowledge acquisition, axiology and methodology (Ponterotto, 2005; Teddlie and Tashakkori, 2009). These are a group of interconnected "assumptions about the social worldview" that manage action and provide a philosophical framework that determine selection of "tools, instruments and methods" applied in the research (Ponterotto, 2005, p. 128; Creswell, 2014, p. 6). According to Guba (1990, p. 107), "a paradigm is a set of fundamental beliefs" that represent "the worldview that defines the nature of the world". It is the way humans try to make sense of the surrounding world (Saunders *et al.*, 2016, p. 134). It is "a set of linked assumptions about the world which is shared by a community of scientists investigating that world" (Deshpande, 1983).
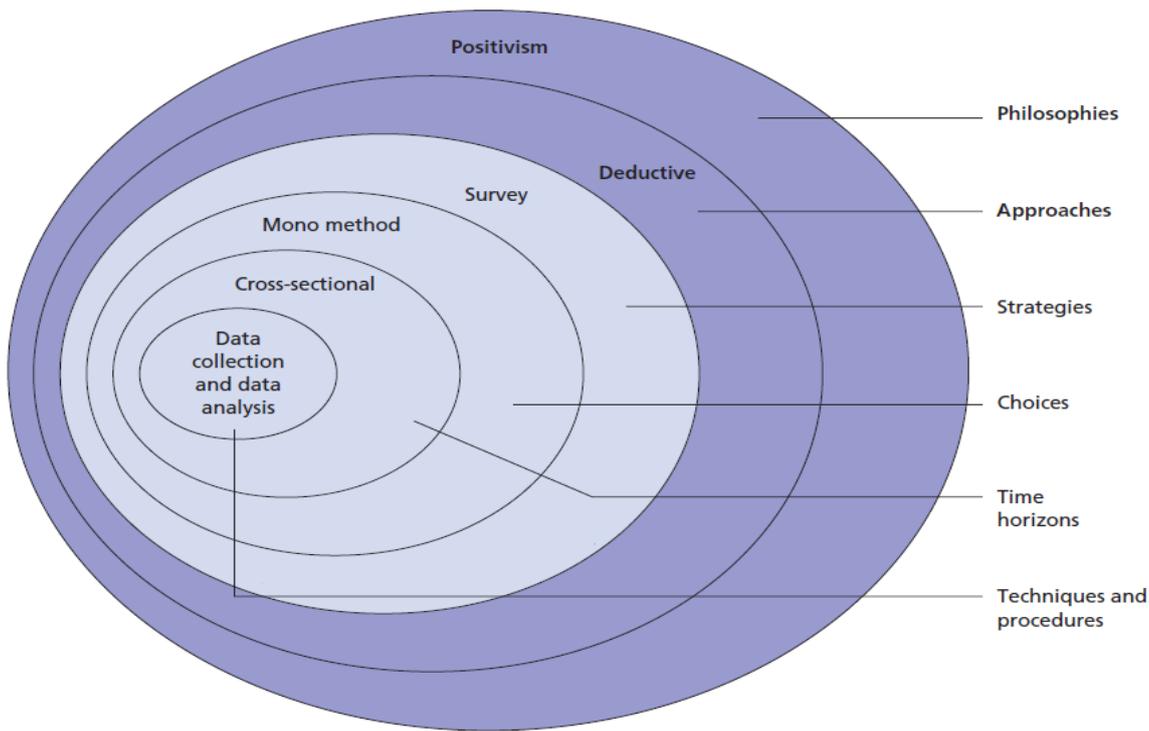
Source: Saunders *et al.* (2016, p. 134)

Figure 4-1 Research onion's layers

4.3 Philosophical assumptions

The philosophical assumptions in the social sciences are associated principally with ontology, axiology, and epistemology (Creswell, 2014). Ontology is related to the nature of reality (Saunders *et al.*, 2016). It is about the question of the existence, and it is related to "assumptions which concern the very essence of the phenomenon under investigation" (Burrell and Morgan, 2019, p. 1). According to Burrell and Morgan (2019), ontology has two positions, subjectivism and objectivism. Objecticivsm assumes that there is an independent reality. It means that there is no connection between the researcher and the social actors, and the reality is not affected by the views of the participants (Saunders *et al.*, 2016). This viewpoint of objectivism created some limitations regarding interpretations of the results and the role of the participants. Objectivists depend on pre-validated theories which are integrated to form new causal relationships.

Conversely, subjectivism is "understanding that individuals attach to social phenomena", and it is related to "the view that social phenomena are shaped" and result from the perceptions of the participants' actions, thus, it is crucial to study not only the situation but also social details

(Saunders *et al.*, 2016, p. 151). This also implies that there are multiple realities as participants have their own reality (Collis and Hussey, 2013).

Axiology is an assumption that is related to the roles that values play in the researcher's research choices (Saunders *et al.*, 2016). It is about the ontological assumption. For a positivist researcher, research is value-free as the researcher has an objective position with no connection with data as he/she is independent. On the other hand, for interpretivism, the researcher is value bound and connected to what is being researched (Collis and Hussey, 2013; Saunders *et al.*, 2016).

Epistemology is the researcher's view about what forms acceptable knowledge, in a specific area of research (Saunders *et al.*, 2016). The literature demonstrates a number of research philosophies and paradigms. However, two main research paradigms were identified, positivism and interpretivism (Collis and Hussey, 2013). Positivists are concerned only about phenomena that can be observed, measured and validated (Collis and Hussey, 2013; Saunders *et al.*, 2016). It is about the reliability of observations and generalisability of the results (Sekaran and Bougie, 2016). On the contrary, interpretivism aims to understand and investigate the differences and behaviours of humans roles. It is also about understanding the views of those groups under research (Bryman and Bell, 2015; Saunders *et al.*, 2016). The below table summarises the two main philosophies, positivism and interpretivism according to ontology, epistemology, axiology and methodology.

Table 4-1 Positivism and interpretivism paradigms

	Positivism	Interpretivism
Ontology	Reality is objective and independent, based on the researcher's view	The researcher's view is subjective and socially constructed. Reality is not separated from the researcher, and it is multiple as seen by participants under study
Epistemology	The researcher is independent of the research and focuses only on observable phenomena, causality and generalisations	The researcher is interactive with the research and focuses on details of the situation with subjective motivating actions
Axiology	The researcher is value-free and independent of the data	The researcher is part of the research and research data
Methodology	A large number of samples for measurement (quantitative and qualitative), experimental or theory statistical testing, hypotheses, facts reporting	A small number of samples for investigations (qualitative), report meaning not facts, verbal and description analysis
Research reliability and validity	The data is reliable if the results are replicated. The collected data represent a true measure of reality	The data is reliable if the results determine interpretive awareness, and the findings are defensible

Source: Based on Guba and Lincoln (1994); Collis and Hussey (2013); Creswell (2014); Saunders *et al.* (2016).

4.4 The methodological assumptions

Subsequent to selecting the research paradigm, a researcher has to choose the research methodology that is suitable to achieve the research objectives (*Figure 4-2*). The methodology is the philosophical system that builds the method of conducting the research (Guba, 1990). Various research methodologies could be identified, including qualitative, quantitative or a mix of the two (Creswell, 2018). Both approaches, quantitative and qualitative, are based on ontology and epistemological scientific philosophies (Guba, 1987).

The qualitative methodology is associated with interpretivism methodology. This approach is related to exploring and understanding a meaning that is attributed to a research problem, and the assumptions of this methodology are based on a worldview (Sale *et al.*, 2002). Smith (1983) stated that reality is multiple, and truth could be found based on participants' construction of reality. As the reality is not separated from the researcher (Guba and Lincoln, 1994), the researcher's view is subjective and socially constructed, and there is a great interaction between the researcher and the researched object. The data is usually collected in the participants locality. The qualitative epistemology is subjective, and the social reality cannot be value-free as it is mind-dependent (Smith, 1983). The interpretative nature means the

methodology involves methods such as case studies and ethnography, and it employs techniques such observations, focuses groups and interviews. For the data analysis, an inductive style is used that goes from specific to general. This means that the researcher interprets the results and the data collected (Creswell, 2018).

On the other hand, a quantitative approach is derived from positivism that embraces independence from the objective reality of human perception (Sale *et al.*, 2002). It emphasises the ontological position that the researcher and reality are separated and there is only one truth that exists. The researcher is not influenced by (or influencing) the phenomena under investigation. The epistemology assumes that the truth can be detached from "values", and the researcher can attain truth to the level that the research procedures correspond to facts. The truth is a substance of validity, and validity is the correspondence between the data and the reality of what the data revealed independently (Guba and Lincoln, 1994).

This approach is intended to test the objective reality phenomena by examining relationships between variables to generalise causal effects (Guba and Lincoln, 1994). The variables are measured by using instruments to produce data that can be analysed by using serious statistical steps and techniques such as hypotheses testing. For this approach, testing the theory is in a deductive style that has the ability to generalise the findings (Creswell, 2018). The third type of research methodology is to combine the qualitative and quantitative methods. Pragmatists, as opposed to purists, argue that using both methods would offer an enhanced understanding of social phenomenon (Johnson *et al.*, 2007). According to Bickman *et al.* (2009), combining the two approaches in single research is called mixed methods. However, Sale *et al.* (2002) claimed that mixed method research could not "claim to enrich the same phenomenon", as the phenomena under study differs across methods. Overall, the current study argues that both methodologies, qualitative and quantitive, are accepted within operations management research as different articles used each of the three methodologies (Golicic and Davis, 2012).

Philosophical Worldviews

Postpositivist
Constructivist
Transformative
Pragmatic

⟷

Designs

Experiments
Ethnographies
Explanatory sequential

Research Approaches

Qualitative
Quantitative
Mixed methods

Research Methods

Questions
Data collection
Data Analysis
Interpretation
Validation
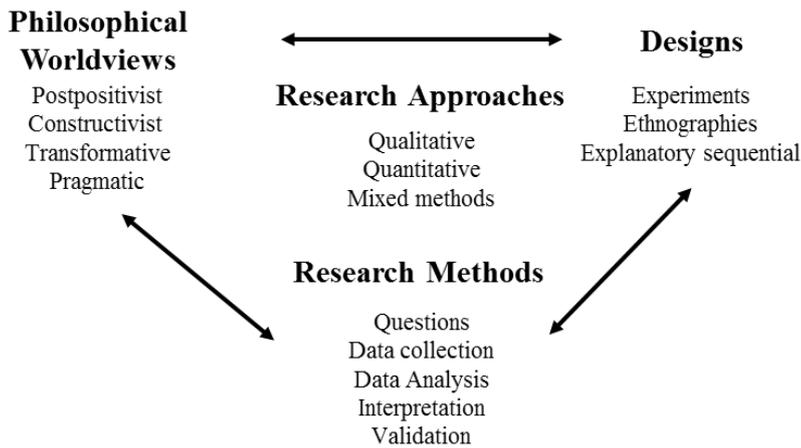
source: Creswell (2018, p. 43)

Figure 4-2 A framework for research

4.5 The current research philosophy and methodology

Based on the above discussions about research philosophies and the methodology debate according to *Figure 4-1*, this study followed the positivist approach. The positivism worldview originated from the work of positivist philosophers and writers such as Comte and Durkheim. The positivist assumptions mostly characterise the traditional research format, specifically quantitative research. The term embodies thinking that recognises the difficulty of being entirely positive as regards the claims of knowledge we create in research related to human behaviour. This philosophy is based on the idea that causes 'determine' the outcomes, such as in experiments. It is also about 'reduction' which is to reduce the ideas to smaller parts or discrete variables that include hypotheses. For a positivist, the objective 'reality' is in existence in the world. The developed knowledge about this 'reality' is based on numeric measurements and observations. The research usually begins with a theory and then collects the data which helps to prove or disprove that theory (Creswell, 2018).

Understanding the underlying philosophical assumptions and paradigms helped to frame and design the processes of this research. According to Meredith (1998), the area of operations management has faced several challenges related to, for example, production, service and quality. Recently, organisations, especially in the manufacturing sector, are obliged to reconsider their operations, management and strategies because of the increasing demands of environmental issues and services (Baumer-Cardoso *et al.*, 2020). The amount of empirical research, specifically survey research, on operation management has increased since the

1980s (Forza, 2002). The motive was to fill the gap between management theory and practice; therefore, research on operation management should contribute to both research and practice. Thus, research should be linked to the real world. Based on this perspective, this study assumes that knowledge is objective, and detached from the researcher. As a consequence, relationships and hypotheses were identified through the hypothetic-deductive approach. The objective view of reality which this research adopted depends on the existence of valid theories that helped to establish the hypotheses (Sale *et al.*, 2002). For this research, implementation of quality management practices is viewed as an external reality that exists independently and can be measured. Besides, this study aims to use and integrate well-established theories to clarify the relations between quality management and sustainability performance. This indicated that using the objectivist view is appropriate. Flynn *et al.* (1990) argued that operations management researchers should be aware of the theory which underlies their work. As for the axiological approach, the researcher took a value-free position as using research questionnaire involves the minimum level of interaction.

Maxwell and Loomis (2003) state though the researcher can potently argue that qualitative and quantitative paradigms are both advantageous and valued; nevertheless, the questions in the research should steer the choice of the appropriate direction. Therefore, the quantitative paradigm is suitable for answering the research questions. Moreover, the aims in this research are to build a framework model and examines its theoretical linkages between QM relations and sustainability dimensions. Therefore, the current research has embraced a confirmatory method, which means to confirm or disconfirm the hypothesised relationships (Hair Jr *et al.*, 2019).

Furthermore, the researcher used well-established scales from previous literature to measure the attributes of the phenomena and employed statistical approaches, such as structural equation modelling, to analyse the data. The presence of well-established scales is the core of confirmatory research. The researcher also used various methods to validate the research survey, such as using pre-testing interviews and a pilot study. Besides, this research conducted moderation, mediation and group analysis. This implies that research that uses Structural Equation Modelling (SEM) technique is generally following a "positivist epistemological" principle (Urbach and Ahlemann, 2010).

In addition, the quality management discipline is an area of interest to the researcher. Besides, the researcher has prior knowledge and experience of the statistical approach as a method of analysis. This helped to make statistical approach a personal preference of this research. According to Creswell (2014), the discipline interest, and the researcher's experience and

preferences are the key aspects in determining a particular paradigm, and are central to the progress of fieldwork (Saunders *et al.*, 2016, p. 132).

4.6 Research approach

Most business research adopts either a deductive or an inductive process. The deductive approach is mostly related to positivism, while the inductive approach is associated with interpretivism. For the deductive theory, the researcher assumes a hypothesis that is exposed to empirical examination and translates it into operational terms. This is also required to agree to the way data is collected. Then, based on the findings, the hypothesis is either confirmed or rejected (Bryman and Bell, 2015). *Figure 4-3* shows the sequence of the deductive approach, which starts with the theory and hypothesis (literature review) and ends with confirming or rejecting the hypothesis (hypotheses results). Further, the inductive method implies a theory is established based on "observation of empirical reality", and overall implications that are generated from specific examples (Collis and Hussey, 2013). The deductive method aims to test a theory, while the inductive approach aims at building a theory. To explain more about the role of theory in research, Malhotra and Birks (2007) highlight some of the differences according to the research type. For example, the role of theory in the conceptualisation research task is to offer a conceptual basis and understanding of the essential processes underlying the problem situations. As for the research design, the role of theory is to suggest the type of theoretical causal relationships or research to be adopted, e.g., casual, or exploratory. The theory is also fundamental in interpreting the results based on previous findings and integrated with the existing literature.

Source Bryman and Bell (2015)
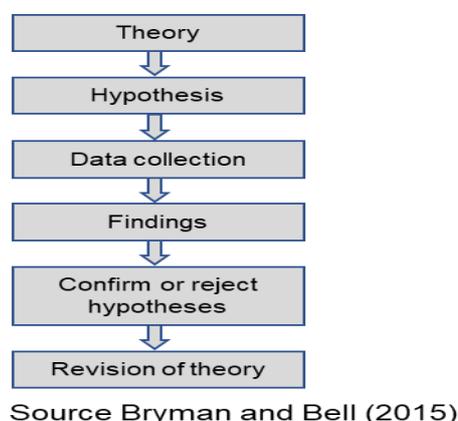
Figure 4-3 The process of deduction

To summarise the distinctions of deductive and inductive approaches, Table 4-2 shows the main differences.

Table 4-2 Main distinctions between indicative and deductive methods

Deductive approach focus	Inductive approach focus
Starts from theory to data collection	The researcher is part of the study
Needs to describe causality	The focus of the research is changed as the research develops
Collects quantitative data	
Uses controls for data validity	The research setting and context is understood clearly
Operationalises concepts	Less necessity for generalisation
Uses a highly structured approach	
The researchers are independent	
Depends on appropriate sample size for generalisation issues	

Source: Based on Saunders *et al.* (2016)

The objective of this research is to investigate the relationships empirically. These relationships are about various quality management relations (i.e. leadership relations, customer relations, supplier relations, employee relations), and the sustainability performance dimensions (economic, social, environmental). Thus, in order to respond to the research questions, a deductive approach is adopted. It is an appropriate method that uses quantitative data to offer insights about the causal relationships between variables.

4.7 Research strategy

Research strategy assists the researcher to answer the research questions. It is a plan for a researcher on the way of answering the research question (Saunders *et al.*, 2016). Choosing a specific research strategy varies according to the type of questions. It also depends on the researcher viewpoints and other constraints, such as the length of the study and availability of data (Sekaran and Bougie, 2016).

Research strategy or the strategy of inquiry is the type of inquiry within qualitative, quantitative and mixed methods approach that gives specific direction and procedures for research. For a quantitative study design, it can be experimental or non-experimental, such as surveys and longitudinal designs. The experimental design is originated mainly in psychology

and applied behaviour analysis, as using experiments is more suitable for that kind of research. It is usually conducted over a longer time for an individual or more than one. The non-experimental design has different forms, such as *causal-comparative* and *correlational* designs. The *causal-comparative* design is one in which the researcher uses two or more groups for compare of a cause that has already happened. The correlational design is to measure the extent by which two or more variables are associated (Creswell, 2018).

As for the current study, it tests the relationships between a group of factors, so a quantitative strategy with a non-experimental design that uses a survey questionnaire is suitable. Using a survey has many advantages. Denscombe (2014) argues that the survey is considered as a popular method that is used in social research. He identified several characteristics of a social survey. One advantage is that it produces the idea of empirical research as it involves collecting data from relevant respondents. Another advantage is that it includes broad coverage of people or things. That explains why it tends to use relatively large samples. It is mostly associated with the quantitative approach as it generates a massive amount of data in a considerably short time with a reasonably low price.

Consequently, this survey method was applied to gather the data required. It is more applicable for collecting data for multiple variables and from a big sample of participants. It is also appropriate as it is relatively inexpensive. According to Neuman (2007), by using a survey, the data is quickly aggregated and analysed. Also, based on the findings, the results could be generalised to a larger population. Besides, a survey has the advantage that it enables the researcher to identify and examine the groups (such as sectors, company size) as well as to identify factors and concepts that are directly observable. Hair Jr *et al.* (2019) argue that collecting quantitative data allows the researcher to identify small and large differences within the data structure.

4.7.1 *Cross-sectional design*

Research design is related to the identification and formulation of the problem (Sarstedt and Mooi, 2014). In general, two types of designs are usually adopted when using a questionnaire or interviews, which are cross-sectional and longitudinal designs (Creswell, 2018). The longitudinal design helps to understand organisations because it provides data on the mechanisms and processes through which changes are created. It involves analysing levels of a phenomenon vertically and horizontally, and interconnections between those levels through time (Bryman and Bell, 2015). Despite this importance, longitudinal designs have some

limitations. De Vaus and de Vaus (2001) point out that they are limited in making representative samples. They also involve substantial administrative costs and require a longer time to collect the data.

Conversely, in cross-sectional design, the data is collected at a single point of time for the quantitative data approach (Bryman and Bell, 2015). This type of design does not have a time dimension, so it does not have the internal validity issues that longitudinal design has (De Vaus and de Vaus, 2001).

This study adopted the cross-sectional design. This is suitable to tests the hypothesised variables between QM and sustainability. This study was not interested in changes in the relationships between the variables at different points of time, but it examines the relationships at a single point of time (Bryman and Bell, 2015). Moreover, positivist philosophy usually uses a cross-sectional design, which is the same for this study. Also, as this study is to fulfil a PhD programme, the time is limited to three to four years.

4.7.2 *Sampling procedure*

Sampling is a method that utilizes a small number of items or a small part of a population to draw conclusions concerning the entire population. Interchangeably, a sample can be counted as a split of a bigger set described as the population (Sreejesh *et al.*, 2013). A crucial point when selecting a sample is that it must help the researcher answer the research questions. In essence, the selected sample should represent the population to allow generalisation about the whole population. However, a population may not be known by the researcher or may be challenging to access. This requires the use of a sampling technique to represent the population (Saunders *et al.*, 2016).

There are two sampling methods available, probability and non-probability sampling. Probability sampling means that the likelihood of selecting any one case is equal and it could be identified in all other cases. This type allows answering of the research question by estimating the characteristics of the population. This technique is suitable when using a survey research strategy. For the non-probability method, it is the opposite, and the researcher does not know the representative sample when he/she selects a case. This, however, does not allow estimation of the characteristics of the population (Saunders *et al.*, 2016).

For the current research, the sampling technique used is representative sampling as it permits answering of the research questions and generalisation of the features of the whole population. It is also a single-stage design in which the researcher possesses the contacts of the population

and can sample the participants directly (Creswell, 2018). The sampling procedure was as follows:

First, identify the target population. The aim is investigating the relationships between quality management relations and sustainability performance of UK firms. The quality management system and sustainability performance are expected to be significant for every company, including service and manufacturing firms. Thus, the target population comprises all service and manufacturing firms in the UK.

Second, determine the sample frame. This is the list of all cases of the target population. By determining the sampling frame, it is easy to select a representative sample. If questions of the research are concerned with firms in a particular sector, a sampling frame from an existing database of firms could be created. By using an existing database to select a sampling frame, it is crucial to be aware of some issues. For instance, individual databases sometimes are not complete, have inaccurate information, or have information that is not up to date. If the database is not complete or inaccurate, this requires exclusion of some cases, thus not allowing the selection of all the cases (Saunders *et al.*, 2016).

Third, select the sampling technique. The selection of the sampling technique depends on several decisions, such as using probability or non-probability sampling. According to Creswell (2018), different forms of samples could be identified. One of these forms is the random sample, in which there is an equal chance a case is selected. Another type is the systematic sample, which is similar to random, but it uses a fraction. It starts by choosing a number and then selects every X number on the list. This X number is based on a fraction, for example, selecting every 20th person. A convenience sample, the final type, is to choose the participants according to their availability and convenience (Creswell, 2018).

For this research, a database of a commercial mailing list from Marketscan Limited (www.marketscan.co.uk) was used. This list has 5000 contact details that cover manufacturing and service organisations. It includes complete information about the companies and managers, such as addresses, phone numbers and email contacts. For a random sampling technique, the selection criteria are as follows:

- Non-duplicated UK companies.
- Sector: manufacturing and service only.

Fourth, determine the sample size. Sample size determination is to specify the quantity of the cases, and then identify the way to measure this number of cases. Although a large sample provides more accuracy in the inferences, it is costly and requires more time (Creswell, 2018). At the same time, using a small sample will not provide results that are suitable for statistical inferences. Thus, it is preferable to balance cost and sample size in order to provide accurate

generalisations., A good sample size is also essential from a statistical point of view. This is because the bigger the size of the sample, the closer the sample is distributed normally. Schumacker and Lomax (2016) argue that in the SEM approach, "the large sample size is required to maintain power and obtain stable parameter estimates and standard errors". It is also crucial to "obtain a chi-square value that would reject the null hypothesis" in SEM. Other scholars argued that a conventional sample size is about two hundred cases (Kline, 2011). Other scholars (e.g., Marcoulides and Saunders, 2006; Harrington, 2009) attributed the sample size to the complexity of the framework, in which the number of items and parameters make the judgment. Nevertheless, most research commonly agrees that 100 to 150 respondents is the minimum acceptable sample size when using SEM technique (Harrington, 2009; Schumacker and Lomax, 2016; Hair Jr *et al.*, 2019). For this study, the sample size is 467, which is considered appropriate based on the above discussion.

4.7.3 *Respondents and unit of analysis*

The unit of analysis in this research is the firm. As the objectives and research questions are related to examining the relationships between QM relations and sustainability, the most suitable unit of analysis is the firm. According to Sekaran and Bougie (2016), research objectives influence the decision about the unit of analysis. Within each firm, the target participants are directors, general managers and executives. The researcher of this study believed that these participants are able to respond properly and accurately as they have enough knowledge about all the related aspects of their firms.

4.7.4 *Method of data collection*

This research adopted the survey strategy by using a questionnaire to collect the data. The survey technique is usually used to gather primary data from a sample of respondents. The primary data are collected to answer the research questions being examined (Dhawan, 2010; Sreejesh *et al.*, 2013). There are advantages to using this method. One advantage is that it enables the research to use quantitative analysis techniques to describe the data, such as descriptive analysis and inferential statistics. Additionally, when statistical analysis between the variables is adopted, it allows the researcher to explain the relationships, for example, the existence of a significant relationship and the strength of the relationship. This also allows the researcher to generate a mode to explain these relationships. Besides, the survey is more

straightforward to control in terms of sampling processes. In addition, it is accessible and cheaper to generate the results from a survey that represents the whole population and generalise the results to the whole population (Saunders *et al.*, 2016).

A web-based survey or an online questionnaire was used as a research design for collecting data. These types of questionnaires are easy and fast as nowadays there are developed software packages and online services such as InstantSurvey, SurveyMonkey, Qualtrics and SurveyPro. The benefit of using the internet is that it provides an accessible communication system to the participants rather than using other channels. It can also cover a wide geographical area as it requires sending of a link to the questionnaire to the participants, who can complete the questionnaire from anywhere at their convenience (Sekaran and Bougie, 2016).

However, there are some disadvantages to using web-based questionnaires. For example, the difficulty in establishing the representativeness of the sample and in generalising the results due to self-selection and low response rates. That is because there is a possibility that respondents who completed the questionnaire may not represent the population. Also, there is sometimes a low response rate which could be a disadvantage. In order to resolve the low response rate, some techniques could be employed, for example, sending a follow-up mail and making the questionnaire brief. Notifying the respondents in advance and administering the questionnaire with a cover letter from a reputed research organisation could also help in increasing the response rate (Sekaran and Bougie, 2016).

Saunders *et al.* (2016) and Bryman and Bell (2015) have offered some recommendations when using online questionnaires. For a lower response rate, they suggested that the research should design the questionnaire in a way that allows assessing the impact of low response participants. It is also important to explain clearly and concisely the purpose of the questionnaire in the covering letter and to use a bright and exciting title and subtitles.

In order to design the questionnaire for this study, an electronic survey design administered by Qualtrics was used to facilitate the preparation and administration of the questionnaire. This system, as do other electronic systems, enables the users to design sophisticated questionnaires, administer the data collection process, check for coding errors, and analyse the data (Sekaran and Bougie, 2016). The questionnaire was posted and launched online on https://www.qualtrics.com/uk/. The host system allocated a unique identification number for each of the respondents to ensure the anonymity of the participants. To ensure the accuracy of the data, the system allowed use of IP address as an internet protocol to prevent taking the survey more than once. In order to persuade the participants to participate and

complete the survey, they were encouraged to include their emails if they were interested in having a report of the findings. To facilitate these procedures, the researcher designed a flyer that shows the purpose and benefits to the respondents, *see appendix 2*. The data collection stage lasted for four months from January 2019 to the end of April 2019. Then the online survey was closed, and data were downloaded in two formats, numeric and text. As for the data analysis techniques, this study used SPSS v25 and AMOS v25.

4.7.5 *Questionnaire design, procedures and content*

A questionnaire is considered the appropriate instrument for this study. It is the most common tool used to collect research data, especially in the social science domain (De Vaus and de Vaus, 2001), and it can provide the required data for hypotheses testing (Kelley *et al.*, 2003). This section illustrates the importance of questionnaire design in the research process and the procedures used for this study. According to Malhotra *et al.* (1996), a suitable questionnaire design enables comparability of the data and increases the accuracy of collecting procedures, while unsuitable questionnaire design may result in response errors. The use of a survey questionnaire is also appropriate to collect firms' performance as this kind of data is limited (Fernández-Viñé *et al.*, 2010). Therefore, this study uses a questionnaire for collecting the data. As regards to the questionnaire content, the theories and literature review were the basis for developing the survey questionnaire. The scales chosen must be established from higher-ranked journals and demonstrate higher reliability and validity. This research has adopted a self-administered technique, which means that the researcher does not intervene with the participants when they complete it. There are two main parts of this questionnaire.

The first part includes questions about the main characteristics of the firms and participants' characteristics. This section consisted of six questions. The first question asked the participants about the sector or industry that mostly matches the one in which their companies operate. The second question sought to identify the company size by asking the participants about the number of employees in their companies. The third and fourth questions were to determine participants job positions and their relevant experience. The fifth question was about the quality certifications that companies have. The sixth question was about the year of establishment of the company.

The second part includes the primary constructs of the research, including four constructs related to quality management, three constructs related to sustainability performance (TBL), and two other constructs for the mediating and moderating constructs.

Table 4-4 provides more details about the number of items for each of the constructs. The questionnaire items were assessed on a five-point Likert scale (1 = strongly disagree, 3 = neither agree nor disagree, 5 = strongly agree). As for the economic performance question, it was assessed according to the change in the past three years. A five-point Likert scale was used (1 = significantly decrease, 3 = no change, 5 = significant increase).

Thus, the researcher assures that the questionnaire is precise and administrable to make sure that the participants fully understood the questions, and no problems could influence the process in terms of the questionnaire presentation, font and structure. For the questionnaire, *see appendix 1.*

For the administration of the survey questionnaire, a web-based tool called Qualtrics was employed. Qualtrics was founded in 2001. It is a private research software company that allows the researchers to carry out many kinds of online data collection, data analysis, marketing and customer satisfaction research. It is also one of the best packages used in survey design (Sekaran and Bougie, 2016). This tool allows the researcher to design the "questionnaire, capture and automatically save the data, and either analyse the data or download it as a file for external analysis" (Saunders *et al.*, 2016, p. 443). This package was used to design and administer the questionnaire. For example, the researcher was able to keep track of the response rate and was able to view the responses. This tool allowed generation of a website link which was sent by email to the respondents. The respondents were sent a cover letter, information about how they were selected, and information about confidentiality and ethical issues.

4.7.6 *The questionnaire structure*

The researcher built the questionnaire in a way that considers the effect of layout and appearance issues such as attractiveness and neatness. These issues are crucial in encouraging the respondents to be involved in the survey. For this research, recommendations made by Dillman *et al.* (2009) as regards to web-based questionnaire format were employed. These recommendations include:

- The web-based survey was introduced with a welcome screen to motivate and highlight the procedures;

- The layout of the questions began with exciting and straightforward questions;

- The layout assured the visibility of the questions and responses at the same time, and the questions were grouped into sections and sub-sections, *see appendix 1.*

4.8 Instrument development (variables and measures)

The factors and variables used in the questionnaire have an existing measurement. In addition to drawing on theoretical backgrounds, quantitative research needs to use valid and reliable measurement items. The empirical articles published in academic journals provide information about the constructs, how they were measured and how they were developed. In chapter three, this research identified the theoretical basis and framework, and identified the scope of the research. This section deals with instrument development. According to Hinkin (1995), for item generation, the main concern is content validity in that the measure must adequately capture the area of interest. There are two approaches for item generation which are the inductive or deductive approaches. For the inductive approach, researchers usually develop scales by asking the participants to describe some aspects of behaviour or express their feelings about their firms, while for the deductive approach, researchers derive items based on a theoretical phenomenon under investigation through literature review, or by using theoretical definitions to guide developing the items (Hinkin, 1995; Schwab, 2013). In this essence, MacKenzie *et al.* (2011) argue that, subsequent to conceptually defining the construct, the items are generated from several sources such as literature review, deduction from the theoretical definition, previous empirical studies, experts suggestions, interviews, focus groups or existing measures (MacKenzie *et al.*, 2011, p. 304). For the quality management practice measurements, the literature has covered these constructs extensively. This allowed a logical selection to be made between available measures, saving time and allowing verifying of the findings (Saunders *et al.*, 2016).

In contrast, sustainability measurements and related scales are rare, as few scholars have dealt with this construct. Some items were adapted to make them suitable for the study objectives. Straub (1989) argues that using pre-validated items decreases the risk of mis-specification, makes use of a theory, and strengthens the results. In total, the questionnaire consisted of 48 items, see *Table 4-3.*

Table 4-3 Variables of the current study

Variables type	Variable name	Number of items
Independent	Quality management relations	24
Dependent	Sustainability performance	17
Mediating	Quality training	4
Moderating	Stakeholder pressure	3
Total		48

Variables and measures are considered one of the essential elements of research. The below table presents the items that were used in the questionnaire and their sources.

Table 4-4 questionnaire items and sources

Constructs	Items	Label	Source
Management relations (MR)	"Our top management supports long-term quality improvement processes."	QMR1	Saraph *et al.* (1989)
	"Our top management encourages employee involvement in quality management and improvement processes."	QMR2	Cua *et al.* (2001)
	"Our top management takes responsibility for achieving quality performance."	QMR3	Saraph *et al.* (1989)
	"Our top management reviews relevant quality-related issues in top management meetings."	QMR4	
	"Our top management evaluates quality performance	QMR5	
	"Our top management understands quality improvement as a way to focus on long-term profitability."	QMR6	
	"Our top management considers quality improvement as a way to achieve long-term profitability of our organisations."	QMR7	
	"Our top management considers quality improvement as a way to achieve short-term profitability of our organisations."	QMR8	
Employee relations (ER)	"Our company provides a collaborative environment' for employees."	QER1	Valmohammadi and Roshanzamir (2015)
	"Our company facilitates team working to solve problems."	QER2	
	"Our company motivates, supports and involves employees in quality aspects."	QER3	
	"Our company encourages employees to participate in decisions making and planning."	QER4	Powell (1995)
	"Our company encourages employees to increase interaction with customers and/or suppliers."	QER5	
	"Our company encourage employees to participate in improving products, services, and processes."	QER6	

Constructs	Items	Label	Source
Customers relations (CR)	"Customer satisfaction surveys are used for identifying customers' requirements."	QCR1	Terziovski and Samson (1999)
	"Our company uses customers feedback as a method to improve the company's current processes."	QCR2	
	"Our company collects extensive customers feedback."	QCR3	Zhang et al. (2000)
	"Our company is actively seeking customer input to determine their current and future requirements."	QCR4	Sadikoglu and Zehir (2010)
	"Our company systematically and regularly measures customer satisfaction."	QCR5	
	"Our customers are involved in product or service design."	QCR6	Powell (1995)
Supplier relations (SR)	"Our company prefers to establish long-term relationships with our suppliers."	QSR1	Flynn et al. (1995)
	"Our company relies on reasonably few dependable suppliers."	QSR2	
	"Our company provides training/ technical assistance to the suppliers."	QSR3	Saraph et al. (1989)
	"Our suppliers are actively involved in service/product design/redesign processes."	QSR4	
	"Our company considers commitment to continuous improvement in supplier selection."	QSR5	Sadikoglu and Zehir (2010)
	"When selecting suppliers, our company considers quality more important than price."	QSR6	Kaynak (2003)
Social Sustainability Performance (SS)	"Our company provides a healthy and safe work environment."	SS1	Benavides-Velasco et al. (2014)
	"Our company reduces the number of occupational-related accidents/accidents at our facilities."	SS2	Wiengarten et al. (2017a)
	"Our company engages in human resource management activities that promote employee development."	SS3	Lee and Saen (2012)
	Our company strives to conserve the traditional values of local communities	SS4	Benavides-Velasco et al. (2014)
	"Our company strives to conserve the cultural heritage of local communities."	SS5	Benavides-Velasco et al. (2014)
	"Our company builds and fosters a mutually beneficial relationship between the company and the community."	SS6	Lee and Saen (2012)
Environmental Sustainability (ENS)	"Our company strives to protect and restore the environment."	ENS1	Lee and Saen (2012)
	"Our company has initiatives to reduce energy consumption."	ENS2	Wiengarten et al. (2017)
	"Our company has initiatives to reduce water consumption/recycling and reuse of water."	ENS3	
	"Our company has initiatives to reduce waste and emissions from our facilities."	ENS4	
	"Our company has initiatives to reduce purchases of non-renewable materials, harmful, chemicals, components",etc.	ENS5	Paillé et al. (2014);
	"Our company has initiatives to use locally produced supplies."	ENS6	According to pilot interview results
Economic Sustainability	"Profit growth."	ES1	Wiengarten et al. (2017)
	"Market share."	ES2	
	"Market share growth."	ES3	Kaynak and Hartley (2008)
	"Return on investment."	ES4	
	"Return on assets (ROA)"	ES5	Wiengarten et al. (2017)
Quality Training	"Our company encourages employees to attend training programmes."	QT1	Zhang et al. (2000)
	"Our company provides employees with training that includes long-term continuous improvement aspects."	QT2	Kim et al. (2012)

Constructs	Items	Label	Source
	"Our company provides employees with quality-related training, e.g., quality principles, problem-solving, team working", etc.	QT3	Powell (1995)
	"Our company incorporates technological advancements in training programmes."	QT4	Kaynak and Hartley (2008)
	"Government"	Gov	
	"Non-governmental organisations (NGOs) / Society."	Ngo	Sarkis *et al.*, 2010
	"Public media."	Med	

The next sections present the constructs that represent the theoretical framework.

4.8.1 *Management (independent variables)*

In this research, quality management is related to internal and external quality management relations including, management relations (MR), employee relations (ER), supplier relations (SR), customer relations (CR). The adopted items were initially intended to measure total QM relations, specifically within the organisational and operational contexts. These measures of internal and external quality management relations were obtained from previous literature (see *Table 4-4*). The wording of the items was subject to modification to make them suitable for the current study, e.g., "Our company..." was used as a prefix for every item. The measures of internal and external quality management relations were basically obtained from previous studies (see *Table 4-4*). The quality management indicators were assessed on a five-point Likert scale (1 = strongly disagree, 3 = neither agree nor disagree, 5 = strongly agree). Table 4-4 shows the details about all the items and their sources.

Management relations (MR)

This construct is mainly related to top management practices, attitudes and behaviour. It describes how managers create a quality environment that boosts the performance in their firms (Flynn *et al.*, 1994). This construct comprises the term "support" that explains how managers support quality efforts in their firms. Mainly, this construct is a critical quality practice because it influences other quality practices directly and indirectly (Parast and Adams, 2012, p. 451). The items of this construct are operationalised in eight items (*Table 4-4*). According to Saraph *et al.* (1989), management is able to change the work environment to accept the quality values and extend it to the employees. Management relations is also about participation in improvement processes, strategies and quality planning. Managers create the environment for the application of other quality practices such as training. This also plays a role in empowering and motivating employees (Kim *et al.*, 2012).

Employee relations (ER)

Quality employee relations comprise different terms such as employee involvement and empowerment (Ahire and Golhar, 1996), and is basically a human resource factor. This construct is operationalised of six items, based on the employee aspects that are covered in quality management literature. Kim *et al.* (2012) claimed that it is related to employees' involvement and participation in quality efforts, decisions, responsibilities and improvement processes. Employee relations are also related to teamwork selection and workforce management (Flynn *et al.*, 1994). Consequently, previous literature suggests that that employee relations comprise aspects that would facilitate changes in the organisation and are linked to performance as it creates effective communication to achieve the firms' goals (Kaynak, 2003).

Customer relations (CR)

Quality customer relations are associated with identifying firms' customers and their needs. It is about building a closer customer relationship by determining customers' requirements and using these requirements to improve the firms' processes (Flynn *et al.*, 1995; Powell, 1995). It is related to the extent to which firms put emphasis on understanding customers' requirements (Ahire and Ravichandran, 2001). It is considered to be one of the key decision-makers in relations to product requirements (Kim *et al.*, 2012). Close relations with customers require promptly update information about customers' requirements (Kim *et al.*, 2012). It is also found to improve customer satisfaction (Adam *et al.*, 1997). This factor is operationalised in six items.

Supplier relations (SR)

Quality supplier relations represent the implementation of a quality practice that enhances relationships and involves suppliers in firms' processes, products and service development (Kaynak and Hartley, 2008). This construct is related to fostering long-term relationships with suppliers that requires supplier selection based on quality, more than price (Phan *et al.*, 2019). Mutual relationships and collaborations with suppliers help firms to improve their processes and overcome problems (Tarí *et al.*, 2017; Phan *et al.*, 2019). It is also about firms' ability to develop an evaluation system to help firms to achieve their performance objectives. (Liu *et al.*, 2017). According to Lo and Yeung (2018), selecting suppliers is based on quality, for example, selecting those companies with quality certifications such as ISO 9001. This construct is operationalised in six indicators.

Quality training (QT)

Quality training is one of the essential quality practices that deal with internal enhancement of the quality system. It is a human resource QM practice that helps in developing employees'

knowledge, abilities and skills (Gutierrez-Gutierrez *et al.*, 2018). It also includes technical advancement programmes (Kaynak and Hartley, 2008). Quality training includes several aspects related to problem-solving ability, teamwork and quality principles. These training programmes enable the employee to generate valuable ideas for their organisations (Manders *et al.*, 2016). Training in quality approaches is connected with employee empowerment that requires organisations to encourage their employees to be involved in training programmes (Hietschold *et al.*, 2014). This construct is operationalised in four indicators.

4.8.2 *Sustainability performance (dependent variables)*

Scholars have measured sustainability performance in different ways. This variation is because there is a similarity between social performance (CSP), TBL (i.e. social, environmental and economic) and sustainability (Pagell and Gobeli, 2009). For example, CSP focuses on common aspects of corporate responsibility, although environmental responsibility is also included in some research (Pagell and Gobeli, 2009). Recent work has measured sustainability performance based on TBL. For example, Gimenez *et al.* (2012) analysed environmental and social practices on each dimension of the TBL. According to Wiengarten *et al.* (2017a), measuring TBL simultaneously is necessary to advance the theory of operations management performance. In this essence, Longoni *et al.* (2014), in their framework, used two constructs to measure sustainability, which were environmental and social. Wiengarten *et al.* (2017a) have used four items for social and environmental dimensions, and three items for the economic dimension.

This study followed the previous research that operationalised sustainability according to social, environmental and economic dimensions, or as summarised as TBL (Elkington, 1994). The sustainability performance indicators were assessed on a Likert five-point scale (1 = strongly disagree, 3 = neither agree nor disagree, 5 = strongly agree). The following sub-section discusses sustainability performance.

Social sustainability

There is a lack of research that addresses social sustainability as most scholars have focused on economic and environmental dimensions (Wichaisri and Sopadang, 2018). One of the first attempts to measure the three dimensions of sustainability was by McKenzie (2004). He discussed social sustainability issues and attempted to provide a framework for future agendas. The framework operationalised the social dimensions internally to measure customer satisfaction, and externally to measure the company's social reputation. Meanwhile, Pagell and

Gobeli (2009) used an exploratory qualitative approach to examine operational managers' experiences, employees' wellbeing and environmental performance.

The social dimension was related to employee health and safety aspects. Other research has operationalised social sustainability from the customers perspective and in terms of human rights and workplace environment (Chardine-Baumann and Botta-Genoulaz, 2014). Similarly, (Wiengarten *et al.*, 2017a) have operationalised social sustainability based on safety issues related to occupational accidents in manufacturing firms. Also, Lee and Saen (2012) have measured it as a social aspect that comprised two parts: first, human rights, which deals with HR issues such as training and development; second, social influence, which deals with building and fostering mutually advantageous relationships between the company and the society. By focusing on the above research that measured social sustainability, this study has operationalised this construct in six indicators.

Environmental sustainability

Environmental sustainability performance has been measured extensively in previous research. By adhering to earlier research (e.g., Daily *et al.*, 2012; Lee and Saen, 2012; Benavides-Velasco *et al.*, 2014; Paillé *et al.*, 2014; Jackson *et al.*, 2016; Wiengarten *et al.*, 2017a), this study has operationalised environmental sustainability performance with six indicators. The items are related to firms' initiatives in protecting and restoring the environment and reducing energy and water consumption. The items also include aspects related to reducing harmful purchases.

Economic sustainability

Economic sustainability performance was measured based on the past three years change and was assessed based on a five-point Likert scale (1 = significantly decrease, 3 = no change, 5 = significant increase). This construct is defined through five indicators measuring profit growth, market share, market share growth, return on investment, and return on assets (ROA). The ROA measures the ratio of operating profit divided by total assets. Wiengarten *et al.* (2017a) operationalised financial performance as one of the TBL dimensions with three indicators of total sales, profitability and market share. The measurements for this construct were based on quality management and sustainability research including Das *et al.* (2000), Lee and Saen (2012), Benavides-Velasco *et al.* (2014) and Wiengarten *et al.* (2017a).

4.8.3 *Stakeholder pressure*

Stakeholder pressure indicates to what extent stakeholders (government, non-government organisations (NGOs), and public media) have influenced firms' decisions on sustainability management. Sarkis *et al.* (2010a) measured stakeholder pressure by assessing the extent the firms' managers feel pressure from the different stakeholders in implementing environmental practices. Other scholars also measured stakeholder pressure such as Simpson and Sroufe (2014), Abdel-Maksoud *et al.* (2016) and Testa *et al.* (2018). An adapted construct based on the above previous studies is adopted to test the moderation effect of stakeholder pressure for the hypotheses related to the relationships of quality management relations and sustainability dimensions. This construct is measured using a 5-point Likert-type reflective scale (1 = not at all, 5 = very large extent).

4.8.4 *Control variables*

The control variables are related to the indicators that might potentially impact sustainability outcomes. For this study, the confounding variables could be attributed to firm characteristics such as industry (sector type) or the size of the firm. For the industry sector, this study controls for manufacturing and service firms. This study includes a question for the participants to choose the industry that most closely matches the one in which their company operates. For the firm size, the model is controlled by the size of the firms, which is assessed by the "number of employees" (OECD, 2005), and there are three categories of companies size representing the companies that small, medium or big.

4.9 Validity and reliability

Using appropriate and accurate research methods would influence the quality of management and business research. The research design used could also influence the research findings and conclusions. It is essential to use good measure, especially, in marketing research as those measure supposed to measure what they are supposed to measure consistently (Sarstedt and Mooi, 2014). Therefore, researchers need to make sure of the validity and reliability of their research design as it is the most crucial process in evaluating quantitative research (Saunders *et al.*, 2016). The following sections summarise different aspects of validity and reliability and how they led to choosing the appropriate methods in this research.

4.9.1 *Measurement Validity*

Validity is defined as "the appropriateness of the measures used, the accuracy of the analysis of the generalisability of the findings" (Saunders *et al.*, 2016, p. 202). According to Sreejesh *et al.* (2013), validity is defined as the ability of a scale to measure what is intended to measure. Validity evaluates if the measures used are appropriate to assess the phenomenon under investigation, measure what they are meant to measure, and if they are suitable for their intended purpose (Saunders *et al.*, 2016). However, there are other types of validity, such as face validity, content validity, construct validity, predictive validity, and external validity.

Face validity is used to evaluate if the items, based on their "faces", appear to assess the concept they are supposed to measure (Saunders *et al.*, 2016; Sekaran and Bougie, 2016). It refers to the collective agreement of the experts and researchers on the validity of the measurement scale (Sreejesh *et al.*, 2013). However, some researchers consider this type of validity as the weakest component, and it is a basic index of content validity (Sekaran and Bougie, 2016). Mainly, it can be established by asking other people or experts in the area of research if the items reflect the concept or not (Bryman and Bell, 2015).

Another type of validity is called content validity. It evaluates if the concept has an adequate number of items, and if these items represent the area of the research (Sreejesh *et al.*, 2013; Saunders *et al.,* 2016). In a questionnaire survey, it refers to the extent that questionnaire offers acceptable reporting of the investigated questions (Saunders *et al.*, 2016). Therefore, to make a judgment of content validity is to review literature using a careful definition of the research. The questions in the questionnaire are also assessed by using a group of individuals and experts (Saunders *et al.*, 2016).

Another type of validity is related to construct validity. It is to generalise from a set of questions or items to a construct level. It is similar to content validity, but this type testifies if the constructs, including the items, are measuring what they are intended to measure. If there are different constructs used to measure the same construct, the correlations between these scales is called convergent validity. However, if various scales are used to measure different constructs, the correlations between the scales are called discriminant validity (Saunders *et al.*, 2016). In order to confirm that the items are the most appropriate for each dimension, factor analysis as a multivariate technique can be used (Sekaran and Bougie, 2016).

For example, a researcher needs to pay attention to interpreting the absence of relationships between the two constructs. That is because it might indicate that either the theory used to deduce it is not relevant, or the measure used for that construct is invalid (Bryman and Bell, 2015).

Predictive validity is another way of testing validity. It indicates if the items are able to make true predictions and to differentiate among individuals concerning a future criterion. For example, if the questionnaire questions are to predict customers' future buying behaviours, then the test is to validate the extent to which the responses are truly predicting customers' buying behaviours (Saunders *et al.*, 2016). To assess this kind of validity, correlational analysis can be established.

Although it is widely accepted that it is difficult for a research strategy to adopt most of the types of measurement validity, it is essential to consider a variety of strategies that could maximise different aspects of measurement validity. The nature of this study is quantitative as the researcher needs to link causal relationships between the constructs. The following steps were considered to ensure that the maximum issues of validity are examined.

For face and content validity, the researcher relied on a rigorous literature review, and adopted items that have been used in highly ranked research, more especially those published in higher quality journals, and where the validity is already tested. For the construct validity, two tests are used. The first one is convergent validity which was established through conformity factor analysis. The second one is the discriminant validity test which will be established by testing the square root of the Average Variance Extracted (AVE). It will also be established by correlations between the construct and other latent constructs. The predictive validity is tested as SEM is used to establish causal links between constructs. SEM is considered a useful tool for predictive validity. Finally, external validity is established. As a quantitative research strategy was adopted, it adopted a random sampling approach. This approach is suitable to generalise the findings to the population.

4.9.2 *Reliability*

Reliability means that it is possible to replicate the research design and achieve the same findings (Saunders *et al.*, 2016); in other words, the concept measurement is consistent. Thus, if an earlier research design is replicated, it would achieve the same findings. Bryman and Bell (2015) argue that there are some factors to be considered about reliability. The first factor is stability. Stability is related to ensuring that the measurement is consistent in the long run. The second factor is the internal reliability. It means that the items used in the construct are reliable and related to the same thing. It refers to the consistency of observations. If multiple measurements exist for a construct, it is better to use those with better reliability (Sekaran and Bougie, 2016).

As for the stability, the following procedures establish reliability in the study:

There are multi-items indicators which provide a more natural method of assessing their reliabilities. The questions were reviewed and piloted to minimise wrong wording which could lead to a misunderstanding of the questions. Then the measurements and instrument were checked by conducting Cronbach's alpha test. The measures used in the survey were adapted from highly ranked journals. By considering the above issues, this study is aiming to establish optimal validity and reliability.

4.10 Preliminary and descriptive tests

This study has conducted a range of descriptive analysis, such as data screening and "non-response" bias. First of all, the researcher has screened the data to check the quality of responses related to missing data and dealing with outliers and extreme responses. A descriptive statistical analysis, such as means, mode and the standard deviation, was also run to make sure that the data is well presented. The following sub-sections discuss these tests in detail, and the results are reported in the analysis chapter.

4.10.1 *Non-response bias*

Despite the advantages of conducting online questionnaires, there are some issues with regards to low response rates. This problem makes it challenging to create a representative sample and generalise the findings. In this study, some techniques were used to enhance the response rates and minimise low response as suggested by Sekaran and Bougie (2016). The researcher sent follow-up emails and kept the questionnaire brief. The respondents were notified about the study by a personalised covering letter. Nevertheless, it is very difficult to avoid lower response rates in online questionnaires. Therefore, the researcher had to turn to other methods in order to deal with this issue, such as generalising the results to the respondents only, or by using a statistical adjustment such as weighting the data by observable variables (Sekaran and Bougie, 2016).

For this study, a sample t-test was run to calculate non-response bias and to determine if the responses of non-respondents would be different from those who responded. This test was run by comparing later respondents with those who responded earlier.

4.10.2 *Common method variance (CMV)*

Common method variance is introduced if there is a shared variance among the items (Schumacker and Lomax, 2016). This research is based on 'single' respondents, which are the firms' managers. Additionally, this research used a single online questionnaire. This may introduce common method variance. In this study, procedural and statistical methods are proposed to minimise and control the bias of CMV. These procedures are based on previous studies such as Lindell and Whitney (2001) and Podsakoff *et al.* (2003).

Firstly, the researcher sent a covering letter within the questionnaire to ensure the respondents were aware of the anonymity and confidentiality of the process of data collection. Additionally, the researcher sent the questionnaire to academics and business managers for piloting purposes. As regards the statistical methods, this research used Harman's one-factor test to estimate the existence of CMV bias (Lindell and Whitney, 2001; Podsakoff *et al.*, 2003). According to Podsakoff *et al.* (2003), the primary assumption of Harman's one-factor test is that the CMV exists if a single factor exists and accounts for all the extracted variance. It also occurs if most of the covariances are attached to a single factor.

4.11 Statistical Approach

The data were analysed and the proposed hypotheses were tested. The analysis chapter contains the procedures used to answer the research questions, which include the following steps:

- The primary analysis was conducted using SPSS version 25 to make sure the assumptions of analysis are met.
- The unidimensionality was evaluated in terms of validity and reliability concerns.
- The model fit and model re-specification and estimation were evaluated and assessed using a software package, AMOS version 25.
- SEM technique was used to test the hypotheses and relationships.
- The research hypotheses were tested using SEM.

For SEM users, several methods of analysis could be used, such as regression, path and confirmatory factor analysis (CFA). The aim of using SEM is to examine "theoretical models using the scientific method of hypothesis testing to advance our understanding of the complex relations among constructs" (Schumacker and Lomax, 2016, p. 1).

Schumacker and Lomax (2016) argue that SEM is becoming popular for four reasons. First, is the increased awareness of the importance of using multivariate statistics, as traditional statistical approaches, such as regression, do not test theoretical relationships among multiple variables.

Second, is because of the importance given to the validity and reliability. The measurement error can be a significant problem in research; therefore, SEM considers it when estimating the data, unlike traditional techniques.

Third, the advancement of SEM and its techniques allows the researchers to analyse more advanced and sophisticated theoretical SEM models of complex phenomena.

Fourth, SEM software has become more user-friendly and accessible to use compared to the previous versions.

There is much SEM software ranging from free versions to paid ones. The most used software are AMOS, EQS, SAS, Lisrel, Mplus and others (Schumacker and Lomax, 2016). For this research analysis, AMOS version 25 is used as it is available at the university.

As regards the analysis, data were collected and assessed for the goodness of fit by using a variety of indices. As suggested by Hair Jr *et al.* (2019), indices including chi-square (X^2), comparative fit index (CFI), and the root mean square error of approximation (RMSEA) were used to estimate the goodness of fit. The chi-square results indicate the model fit. If it is close to zero, it means that the matrices are similar, while a significant result means that the hypothesised model does not represent the sample data. There are other approaches to test if a sample variance-covariance matrix is supported by a theoretical model such as a CFA It is used to determine if the variables share common variance in defining a latent variable (Schumacker and Lomax, 2016).

As for the CFI, it uses three indices: Tucker-Lewis index (TLI), the Bentler-Bonett normed fit index (NFI), and the Bentler-Bonett non-normed fit index (NNFI). The best model fit is when these indices are more than 0.090 (Schumacker and Lomax, 2016). Regarding RMSEA indices, they refer to the 'approximation in population', and the best model fit is when the computed value is between 0.05 and 0.08 (Schumacker and Lomax, 2016).

4.12 Ethical issues

It is essential to consider all possible ethical concerns that could arise while conducting a research project that requires access to organisations or people (Saunders *et al.*, 2016). As this research involves human participation, ethical issues are involved. The researcher has

gained permission to commence the project from the research committee at the University of Newcastle. The university helped to facilitate the process by providing online guidelines and a code of ethics. The researcher tried to minimise the ethical issues by taking some actions such as giving the respondents the right to withdraw at any time, ensuring their anonymity and confidentiality, and informing the participants that they could ask questions at any time.

4.13 Chapter summary

This chapter has presented the research methodology that has been utilised. It has also discussed the research approaches and philosophical assumptions. Therefore, it has summarised the approaches that were used to examine the relationships between QM relations and sustainability performance. The procedures of data collection were discussed. Then it discussed the advantages of using AMOS as SEM technique. Additionally, it has discussed different issues, such as sampling procedures, data collection methods, and survey questionnaire development.

Chapter 5. Data analysis

The statistical analysis of data used in this research is presented in this chapter. It starts with data screening that includes examining the missing data, outliers and normality issues. It is crucial to explore the research statistics before conducting the statistical analysis. That allows simplifying the model formulation and examination procedures (Chatfield, 1985).

This chapter starts with data screening that includes outliers, missing data and normality. Then preliminary tests were run to test homoscedasticity, multicollinearity and response rate bias. Next, exploratory factor analysis (EFA) was employed to assess the survey measurement and identify unidimensionality for the survey constructs and model. The next parts present the hierarchical regression results, which include running linear regression. Then the final part introduces the SEM results that consist of the measurement and structure assessments. This part also presents the hypotheses testing results. The last parts present the multigroup analysis findings and moderation results. The analysis was done using SPSS 25 and AMOS 25 software.

5.1 Data screening

The importance of data screening lies in ensuring that the data is accurate, complete, and suitable before conducting the analysis. It helps in identifying any issues with the data (Sekaran and Bougie, 2016; Hair Jr *et al.*, 2019). This research checked and evaluated the data for data entry errors, missing data, and outliers. It is essential to scan the dataset for entry errors and outliers as violation of statistical assumptions might be a source data bias or non-significance in the results. Dealing with missing data is also essential before conducting further analysis (Sekaran and Bougie, 2016; Hair Jr *et al.*, 2019).

A mailing list of 5000 was used to send an online questionnaire through Qualtrics. There were 423 bounced contacts that were not delivered for reasons such as opting out (unsubscribing) or the wrong address because the manager had left the company, which left 4577 potential respondents. The first and second reminders were sent at two-weekly periods. The timing between sending the invitation and the reminders is important as it gives adequate time for the respondents to respond before sending the first and second reminders, as they might need to address any problems occurring. As stated by Dillman *et al.* (2014), the optimal timing sequence is varied according to the research objectives and the population, ranging from two weeks to one month. Also, emails are usually easy to forget or dismiss when compared to

physical letters. Baruch and Holtom (2008) argued that using automated data collection such as email and web led to a higher response rate than the traditional physical mail.

Thus, as the type of respondents were managers of the organisations, it was assumed that they were extremely busy and might need more time to respond. We decided to send the first reminder two weeks after the first invitation, followed by another two reminders at two-week intervals.

This study was conducted using several steps to increase the response rate by grasping the recommendations suggested by Dillman *et al.* (2014). The email invitation was sent to all respondents, followed by two reminders emails. The invitation emails explained the purpose and the information needed to complete the survey (i.e., URL link). The reminders were sent every two weeks. The content of the reminders was different from the first invitation email as it is important to vary the stimulus across the email contacts. This was because sending the same email might not convince the respondents to reply and could be filtered as spam. After removing the contacts that had already responded from the mailing list, the first reminder was sent. The first reminder emails advised that a survey invitation had been sent. By showing the importance of the study, it also asked those who had not responded yet to do so. The second and third reminders briefly explained the purpose and focused on the importance of the responses from the participants (*i.e., I am writing to you again because my ability to accurately understand more about management practices and sustainability performance depends on hearing from those who have not yet responded. I need your help to ensure the results are as precise as possible).*

After two months of data collection, the researcher received 578 responses, which indicates that it was a reasonable response rate of 12.6 per cent, *see Table 5-1.*

Table 5-1 Response rate

	Total
Number of email invitations	5000
Undelivered	423
Delivered	4577
Total responses received	578
Response rate	12.6%
Usable	467
Non-Usable	111
Usable response rate	10.2%

Further, the unusable responses were eliminated from the data if the values of more than 10% of the responses were missing. Therefore, 467 responses of approximately 10 per cent remained and employed in the analysis procedures. The importance of a large sample size lies in the need to obtain meaningful parameters estimates (Anderson and Gerbing, 1988). The complexity of the multivariate technique also involves a good sample size that provides the statistical power to identify significant results and makes sure that it provides generalisable results (Hair Jr *et al.*, 2019).

5.1.1 *Missing data*

The researcher evaluated the dataset for missing data and found that some of the missing data was related directly to the respondents. Some respondents did not give responses to questions related to financial performance. This is also related to the design of the questionnaire where the option of not answering this was given, by including either 'do not know' or 'not applicable' options. The researcher found the cases with missing data were not of excessive levels, and concentrated in a small subset of variables (Hair Jr *et al.*, 2019). Thus, the researcher adopted a simple remedy for deleting those cases.

All the cases that had in excess of 10% of data missing were deleted and not included for further analysis. The remaining responses with fewer than 10% of the values missing were included. These missing values have limited impact on the data analyses (Hair Jr *et al.*, 2019) as they are spread randomly through the dataset. Following the approach by Hair Jr *et al.* (2019) when dealing with missing data, the researcher evaluated if the missing responses were random by conducting Little's Missing Completely At Random (MCAR). The result of this demonstrated that the patterns of the missing responses are entirely random, as the evidence of non-significant chi-square test is $X^2 = 66.119$, and the P-value is 0.191. This confirmed the randomness of the missing values (Hair Jr *et al.*, 2019). Then the mean substitution method was used as it is widely applied to estimate the missing values and replace them with means (Sekaran and Bougie, 2016; Hair Jr *et al.*, 2019).

Nevertheless, the missing data are not problematic as they do not have a practical impact due to the large sample size. This means that the missing data will not affect performing the multivariate analyses. Besides, the missing data are random and less than 10%, *see Table 5-1*. The remedy was to delete the observations that exceeded 10%.

5.1.2 *Outliers*

Generally, outliers occur in data entry or coding errors or could occur from extraordinary events. However, outliers are not always errors (Sekaran and Bougie, 2016). Moreover, some outliers may occur without explanation, or sometimes they are not very high or low but are unique in comparison to other values. According to Hair Jr *et al.* (2019), they are related to the observations that are significantly different from other observations. A researcher should assess and evaluate the outliers to identify whether to retain or eliminate them according to their context and influence on the results. It is also necessary to check if the outliers are representing the whole population.

For this research, the researcher followed the methods used in literature to detect the outliers as suggested by Hair Jr *et al.* (2019). The multivariate method was used to test the distance of each observation in a multidimensional way. This method assesses each variable's distance from the mean centre throughout other variables, by using Mahalanobis distance (Mahalanobis D^2) in AMOS software. The threshold value for D^2 is 2.5 for smaller samples and 3.5 or 4.0 for larger samples (Hair Jr *et al.*, 2019). The results of this study show that some observations were identified as significantly different, but they were tolerable (appendix 3). These observations were individually examined earlier in the univariate analysis. The researcher decided to retain these observations because the outliers do not characterise the whole population and are not relevant to any part of it, as suggested by Hair Jr *et al.* (2019, p. 85). In these cases, the respondents recorded either low or high responses to the importance of quality management relations. The observations are not recognised as misrepresenting the phenomenon being examined, and there is a minimum level of variability in comparison to the whole population. Thus, the researcher decided to retain these cases within the data.

5.1.3 *Normality*

The distribution is described by kurtosis (peakedness) and skewness (flatness) measures. Both measures are either positive with values above zero, or negative with values below zero to represent the distribution as platykurtic and/or leptokurtic. Nevertheless, with large sample sizes, the influence of a non-normal distribution could be avoided, while the opposite is the case in smaller sample sizes (Hair Jr *et al.*, 2019). The values of the univariate normality are shown in Table 5-3. These values are based on the values of skewness and kurtosis. The results show that there is no item that is substantially kurtotic, or specifically, there is no value is higher than 8. For SEM analysis, it is recommended that the kurtosis values are checked as

high kurtosis values could affect testing of the variance and covariance (Byrne, 2016). One of the key critically assumption for running SEM analysis is multivariate normality, especially in the AMOS environment (Byrne, 2016). According to Field (2013), in big samples, the distribution tends to be normal. To avoid any issue with multivariate non-normality, the researcher ran the data using the 'bootstrapping' function. This function allows generation of more accurate values by creating a large number of subsamples (Byrne, 2016). Hwang *et al.* (2010) also suggested using the maximum likelihood estimation when using SEM (ML). Table 5-2 shows the characteristics of the selected sample.

Table 5-2 Sample characteristics

Factors	Variables	Frequency	Per cent %
Sector	Manufacturing	226	48.4
	Service	241	51.6
Size	Small 1-49	102	21.8
	Medium 50-249	141	30.2
	Big 250-1000+	224	48
Job title	CEO	68	15.8
	General manager	73	15.8
	Quality manager	121	24.7
	Operations manager	59	12.1
	Other managerial positions	144	30.8
Experience (Years)	0-5	102	21.8
	6-10	117	25.1
	11-15	78	16.7
	16-20	64	13.7
	21-30	66	14.1
	30+	40	8.6
ISO 9001 certification	Certified	276	59.1
	Not certified	191	40.9
ISO 14001 certification	Certified	175	37.5
	Not certified	292	62.5
ISO 26000 certification	Certified	38	8.1
	Not certified	429	91.9
ISO 20121 certification	Certified	16	3.4
	Not certified	451	96.6
ISO 45001 certification	Certified	124	26.6
	Not certified	343	73.4
ISO 29001 certification	Certified	3	0.6
	Not certified	464	99.4
SA8000 certification	Certified	31	6.6
	Not certified	436	93.4

5.1.4 *Linearity and homoscedasticity*

The data were tested for linear relationships and homoscedasticity between the variables by using SPSS. According to (Hair Jr *et al.*, 2019), the multivariate methods are grounded on correlations measurements and associations. Therefore, the non-linear association does not represent the value of the correlation, while homoscedasticity means that dependent variables reveal equivalent values of variance with other independent variables (Hair Jr *et al.*, 2019). The researcher did a curve estimation (curve fitting) for all the relationships in the theoretical model, and the results showed that the linearity and homoscedasticity assumptions were met as the relationships were sufficiently linear between dependent and independent variables. This also indicated that these variables could be tested in covariance SEM. As for the homoscedasticity, the researcher used plotting in SPSS (*Figure 5-1*) revealing that the data are homogeneously distributed.
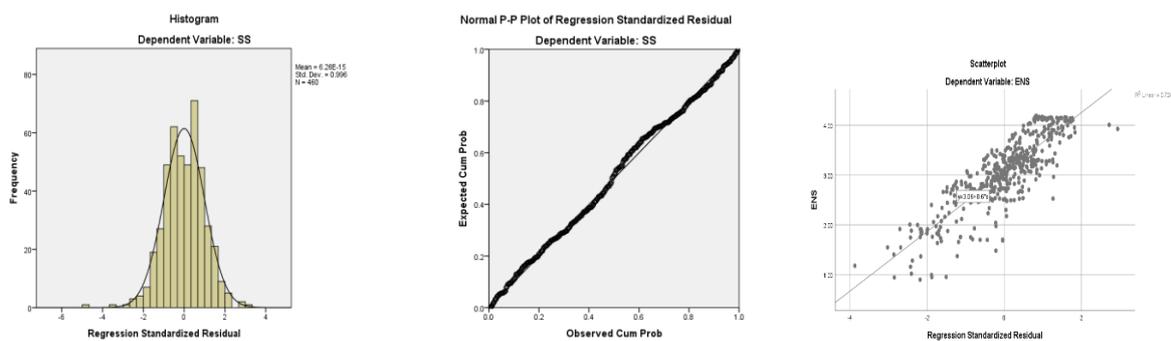
Figure 5-1 Plotting linearity and homoscedasticity

5.1.5 *Multicollinearity*

Multicollinearity exists in multiple regression models in which two or more variables are highly correlated. Multicollinearity causes a problem for multiple regression as it requires more than one predictor (Mason and Perreault Jr, 1991; Field, 2013). Multicollinearity is assessed based on the variance inflation factor (VIF), in which it must not surpass a value of 10 (Hair Jr *et al.*, 2019).

Moreover, having examined and screened the data for errors and making sure that it does not breach the assumptions for multivariate analysis, the internal reliability was calculated and showed satisfactory results. The results of Cronbach's alpha did not surpass the threshold

of 0.70, as suggested in the literature (Nunnally, 1994). Table 5-3 presents the constructs, items and measures before proceeding with further analysis.

Table 5-3 Research constructs and measures

Constructs	Items	Code	Mean	S.D	Skewness		Kurtosis		VIF	Cro. alpha
					Stat.	S,E.	Stat.	S,E.		
Quality management relations (QMR)	Our top management supports long-term quality improvement processes	QMR1	4.01	0.874	-0.916	0.113	0.685	0.225	3.208	.913
	Our top management encourages employee involvement in quality management and improvement processes	QMR2	3.84	0.905	-0.738	0.113	0.208	0.225	3.170	
	Our top management takes responsibility for achieving quality performance	QMR3	3.98	0.891	-0.836	0.113	0.410	0.225	3.395	
	Our top management reviews relevant quality-related issues in top management meetings	QMR4	4.07	0.883	-0.931	0.113	0.614	0.225	2.984	
	Our top management evaluates quality performance	QMR5	4.15	0.862	-1.032	0.113	0.946	0.225	3.413	
	Our top management understands quality improvement as a way to focus on long-term profitability	QMR6	4.00	0.911	-0.833	0.113	0.348	0.225	3.554	
	Our top management considers quality improvement as a way to achieve long-term profitability of our organisations	QMR7	4.03	0.891	-0.819	0.113	0.255	0.225	3.468	
	Our top management considers quality improvement as a way to achieve short-term profitability of our organisations	QMR8	3.56	1.003	-0.322	0.113	-0.484	0.225	1.711	
Quality employee relations (QER)	Our company provides a collaborative environment' for employees	QER1	3.86	0.872	-0.918	0.113	0.992	0.225	3.150	.903
	Our company facilitates teamworking to solve problems	QER2	4.00	0.842	-0.985	0.113	1.292	0.225	3.278	
	Our company motivates, supports and involves employees in quality aspects	QER3	3.84	0.927	-0.804	0.113	0.396	0.225	2.786	
	Our company encourages employees to participate in decisions making and planning	QER4	3.64	0.898	-0.412	0.113	-0.174	0.225	2.310	
	Our company encourages employees to increase interaction with customers and/or suppliers	QER5	3.78	0.883	-0.559	0.113	0.223	0.225	1.997	
	Our company encourage employees to participate in improving products, services, and processes	QER6	3.82	0.810	-0.594	0.113	0.337	0.225	2.219	
	Customer satisfaction surveys are used for identifying customers' requirements	QCR1	3.65	1.072	-0.439	0.113	-0.681	0.225	2.095	
	Our company uses customers feedback as a method to improve the company's current processes	QCR2	3.96	0.913	-0.880	0.113	0.525	0.225	2.544	
	Our company collects extensive customers feedback	QCR3	3.75	1.053	-0.658	0.113	-0.359	0.225	3.368	
	Our company is actively seeking customer input to determine their current and future requirements	QCR4	3.88	0.983	-0.796	0.113	0.139	0.225	2.241	
	Our company systematically and regularly measures customer satisfaction	QCR5	3.89	1.007	-0.891	0.113	0.366	0.225	2.979	
	Our customers are involved in product or service design	QCR6	3.33	1.147	-0.288	0.113	-0.788	0.225	1.549	
Quality supplier relations (QSR)	Our company prefers to establish long-term relationships with our suppliers	QSR1	4.19	0.788	-0.968	0.113	0.995	0.225	1.611	.813
	Our company relies on reasonably few dependable suppliers	QSR2	3.51	1.001	-0.375	0.113	-0.477	0.225	1.276	
	Our company provides training/ technical assistance to the suppliers	QSR3	3.23	0.921	-0.049	0.113	-0.428	0.225	1.903	
	Our suppliers are actively involved in service/product design/redesign processes	QSR4	3.23	0.914	-0.174	0.113	-0.606	0.225	1.972	
	Our company considers commitment to continuous improvement in supplier selection	QSR5	3.54	0.954	-0.343	0.113	-0.493	0.225	2.342	
	When selecting suppliers, our company considers quality more important than price	QSR6	3.24	0.882	-0.063	0.113	-0.506	0.225	2.190	
Social Sustainability Performance (SS)	Our company provides a healthy and safe work environment	SS1	3.35	0.933	0.006	0.113	-0.327	0.225	2.538	.907
	Our company reduces the number of occupational-related accidents/accidents at our facilities	SS2	3.35	1.034	0.005	0.113	-0.862	0.225	2.198	
	Our company engages in human resource management activities that promote employee development.	SS3	3.20	0.972	0.310	0.113	-0.518	0.225	3.009	
	Our company strives to conserve the traditional values of local communities	SS4	3.57	0.930	-0.063	0.113	-0.432	0.225	5.931	
	Our company strives to conserve the cultural heritage of local communities	SS5	3.50	0.941	0.022	0.113	-0.489	0.225	5.946	

Constructs	Items	Code	Mean	S.D	Skewness		Kurtosis		VIF	Cro. alpha
					Stat.	S,E.	Stat.	S,E.		
	Our company builds and fosters a mutually beneficial relationship between the company and community	SS6	3.51	0.932	-0.082	0.113	-0.303	0.225	3.915	
Enviromental Sustainability (ENS)	Our company strives to protect and restore the environment	ENS1	3.70	0.961	-0.472	0.113	-0.209	0.225	2.694	.920
	Our company has initiatives to reduce energy consumption	ENS2	3.77	0.981	-0.719	0.113	0.317	0.225	3.697	
	Our company has initiatives to reduce water consumption/recycling and reuse of water	ENS3	3.56	1.018	-0.301	0.113	-0.518	0.225	3.592	
	Our company has initiatives to reduce waste and emissions from our facilities	ENS4	3.66	1.016	-0.513	0.113	-0.139	0.225	4.629	
	Our company has initiatives to reduce purchases of non-renewable materials, harmful, chemicals, components, etc.	ENS5	3.55	0.987	-0.445	0.113	-0.119	0.225	2.950	
	Our company has initiatives to use locally produced supplies	ENS6	3.22	0.982	-0.062	0.113	-0.307	0.225	1.933	
Economic Sustainability	Profit growth	ES1	3.61	0.787	-0.839	0.113	0.565	0.225	1.944	.903
	Market share	ES2	3.48	0.776	-0.486	0.113	0.422	0.225	3.626	
	Market share growth	ES3	3.44	0.754	-0.544	0.113	0.781	0.225	4.063	
	Return on investment	ES4	3.49	0.754	-0.707	0.113	0.780	0.225	2.972	
	Return on assets (ROA)	ES5	3.45	0.717	-0.293	0.113	0.453	0.225	2.644	
Quality Training	Our company encourages employees to attend training programmes	QT1	3.12	0.983	0.211	0.113	-0.220	0.225	3.475	.920
	Our company provides employees with training that includes long-term continuous improvement aspects	QT2	3.15	1.162	-0.155	0.113	-0.634	0.225	4.784	
	Our company provides employees with quality-related training, e.g., quality principles, problem-solving, team working, etc.	QT3	3.03	1.123	-0.042	0.113	-0.493	0.225	5.247	
	Our company incorporates technological advancements in training programmes	QT4	3.60	0.894	-0.592	0.113	0.141	0.225	2.906	
	Government	Gov	2.87	1.180	0.027	0.113	-0.841	0.225	1.720	.830
	Non-governmental organisations (NGOs) / Society	Ngo	2.54	1.206	0.362	0.113	-0.717	0.225	2.153	
	Public media	Med	2.52	1.217	0.377	0.113	-0.810	0.225	1.729	

5.1.6 *Non-response bias assessment*

This assessment of the sample is required to make sure that those who responded earlier are not different from those who responded later. The researcher used Levene's homogeneity of variance test to assess the sample bias. This test was run by using SPSS ONE-WAY ANOVA analysis, and some items were used. The results show that most of the items are not different as most of the variables were not significant $p > .05$ (Field, 2013), which indicates that the early respondents are different from those who responded afterwards.

Table 5-4 Homogeneity of variance

	Levene's Statistic	DF1	DF2	Sig.
QSR1	3.721	1	504	.054
QSR2	.504	1	504	.478
QSR3	.008	1	504	.927
QSR4	.446	1	504	.505
QSR5	.008	1	504	.928
QSR6	2.293	1	504	.131

5.2 Measurement model assessment

Following previous work in operation management literature (Liu *et al.*, 2017), this research has performed exploratory factor analysis (EFA) to help identify the underlying structure, relationships or unidimensionality (groupings) of QM and sustainability variables. For this analysis, the maximum likelihood (ML) extraction method was used to obtain the factors. Then the rotation was set as Promax, and Kappa's value was set as 4. Next, the descriptive correlations matrix used was reproduced as was the Kaiser-Meyer-Olkin test (KMO), which was below 1. The coefficient display format was suppressed in small coefficients by the absolute values below >0.3 in order to make it easy to identify the factors. The findings of the EFA as related to all the factors, including, MR, ER, SR, CR, SS, ENS, STKP and QT are shown in Table 5-5.

Based on the results of the EFA, it is found that all factors have significant loading factors above 0.4 on only one factor, except for QSR1, QSR2, QCR6, ENS6, SS1 and SS2 which have cross-loadings on more than one factor. These items were removed and not included for further analysis. Subsequently, the factors were assessed by estimating the confirmatory factor analysis (CFA). This method evaluates the measurement model and the model relations between the observed measures and the constructs. It is a tool that allows the researchers to modify the model and also to further develop theories (Anderson and Gerbing, 1988). Therefore, it was recommended as the most precise tool to determine the unidimensionality and validity (Anderson and Gerbing, 1988).

Table 5-5 EFA results

Items	1	2	3	4	5	6	7	8	9
QMR1	0.778								
QMR2	0.556								
QMR3	0.860								
QMR4	0.765								
QMR5	0.768								
QMR6	0.860								
QMR7	0.844								
QMR8	0.482								
QER1		0.773							
QER2		0.902							
QER3		0.763							
QER4		0.728							
QER5		0.709							
QER6		0.722							
QT1								0.788	
QT2								0.894	
QT3								0.938	
QT4								0.683	
SS3						0.665			
SS4						0.931			
SS5						0.995			
SS6						0.898			
ENS1			0.760						
ENS2			0.899						
ENS3			0.929						
ENS4			0.918						
ENS5			0.771						
ES1				0.783					
ES2				0.857					
ES3				0.891					
ES4				0.769					
ES5				0.725					
QCR1					0.756				
QCR2					0.752				
QCR3					0.891				
QCR4					0.667				
QCR5					0.848				
QSR3							0.798		
QSR4							0.853		
QSR5							0.782		
QSR6							0.760		
GOV									0.717
NGO									0.897
MED									0.754

5.2.1 *Confirmatory factor analysis results*

The measurement model was evaluated according to the recommended criteria for SEM models. These common criteria include chi-square, GFI, AGFI, RMSEA and RMR (Lomax and Schumacker, 2016). By using AMOS 25, CFA with reflective indicators was performed to estimate coefficients. The estimation method used was the maximum likelihood. ML is appropriate if the data deviates from the assumption of the normal theory. The initial finding of

the measurement model is displayed in *Figure 5-2*. These results show a logical measurement for the constructs of the current study. Four or more indicators estimated all the latent variables. The initial model fit indices demonstrated a reasonable fit as the indices variances were positive.
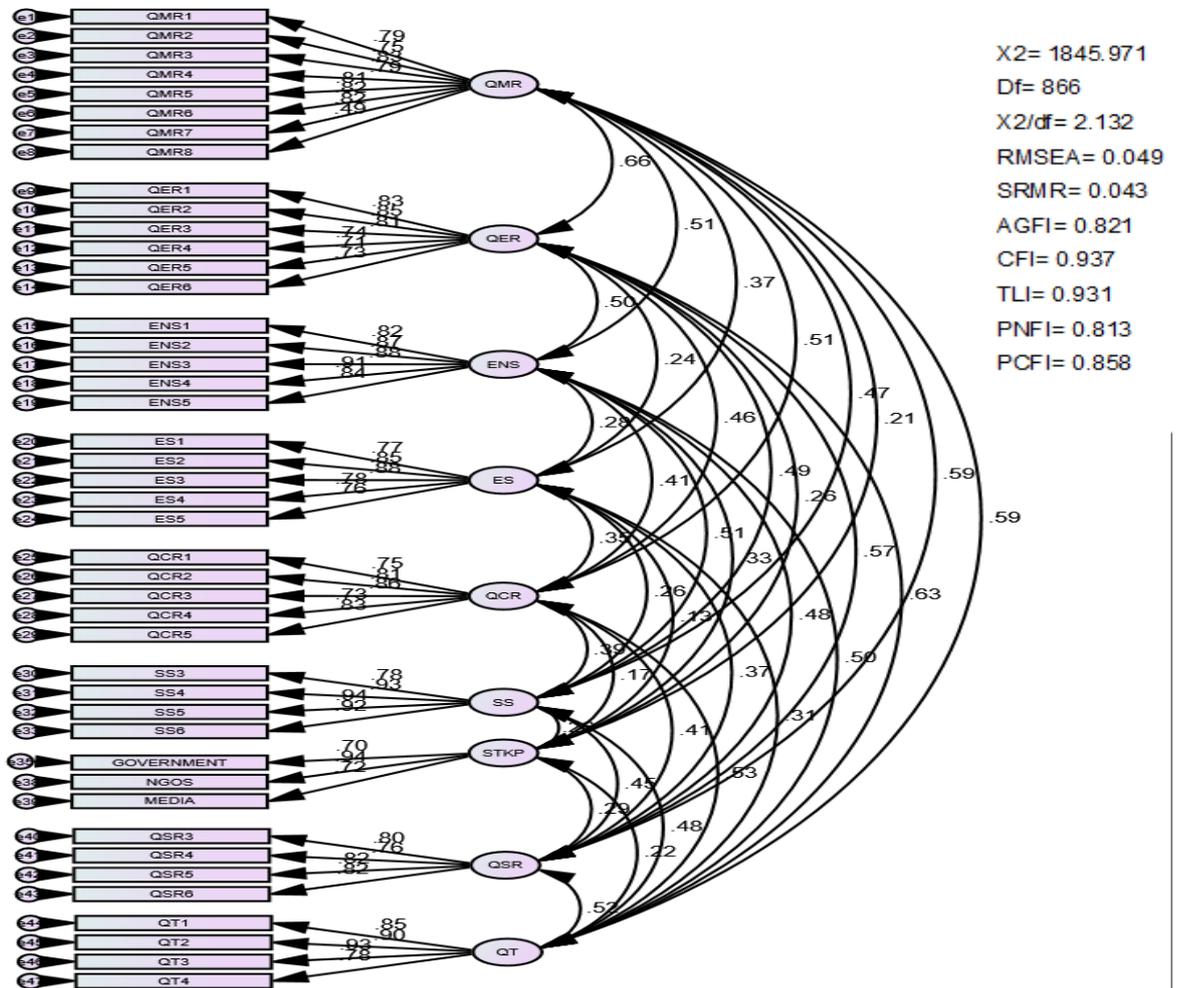
Figure 5-2 Measurement model (initial)

Moreover, the results showed that X^2 = 1845.971 with 866 degrees of freedom and a significant level at less than 0.001. This suggested rejecting the model. However, it is recommended that not only X^2 is considered as the fit index. Other fit indices showed acceptable values, i.e. CFI = 0.937; SRMR = 0.043; RMSEA = 0.049. Although these indices, except AGFI and PNFI, represent an acceptable model fit, other results could be considered for further improvements.

5.2.2 *Model re-specification process*

Due to the complication of having a measurement model with accepted fit indices, there are several approaches offered to researchers, such as proposing a computing nested model, but theoretically justification would enable the researchers to determine the best model fit. Another approach is to modify the model by deleting or adding paths, so the model fit is adjusted to the best fit. Nevertheless, this research has tracked the suggestions by Hair Jr *et al.* (2019), for the best assessments:

Stage one: factor loading assessment

The first stage of the re-specification process is to assess the standardised factor loadings of the observed variables. The items are designed to measure the latent constructs, and each group of items should exhibit the higher factor loadings with their construct. Hair Jr *et al.* (2019) argue that the cut-off point of the factor loadings is to exceed 0.5 in order to establish construct validity. Therefore, the initial assessment showed that some items are candidates for deletion, including item QMR8 (*Figure 5-2*).

Stage two: residual matrix assessment

The second step of the re-specification assessment is to examine the residual matrix values through the results of the standardised residual covariances. The results do not show any patterns that are larger than 2.58 (Byrne, 2016), but there are statistically significant discrepancies with the covariance between the items SS3 and QT4, which scored 3.200.

Stage three: modification of indices assessment

One of the methods to detect any model mis-specification issues is by considering modification indices (MI). MI are commonly used by researchers as they provide more direct parameters of mis-specified indices (Byrne, 2016), *see Table 5-6.*

Table 5-6 Modification Indices (MI)

			Modification indices	changes
e23	<-->	e24	120.197	.126
e21	<-->	e22	94.583	.083
e6	<-->	e7	91.942	.134
e4	<-->	e5	77.556	.127
e1	<-->	e2	41.980	.105

Accordingly, by considering the results of the first step of assessing factors loading modification indices, the goodness of fit could be improved by deleting the items with lower factor loadings. Therefore, the items QMR2 and QMR8 were removed.

5.2.3 *Re-specified measurement model assessment*

Based on the initial measurement model assessment, two items were deleted, which were QMR2 and QMR8. Thus, the re-specified measurement model consists of 40 items. These 40 items are distributed as follows: six items for MR, six items for ER, five items for CR, four items for SR, four items for SS, five items for ENS, five items for ES, four items for QT and three items for STKP.

The model was then evaluated based on outer loadings. Any loading that has a value between 0.4 and 0.7 was a candidate for deletion, which helps in improving the composite reliability or the AVE (average variance extracted). Nevertheless, in some cases, these lower loading items might contribute to content validity so they might be retained (Hair Jr *et al.*, 2019). Next, following the re-specification process and deletion of the problematic items, the CFA and model fit assessment was run again (*Figure 5-3*). The results of the re-specified process showed that the model had significantly improved the convergent validity, Cronbach Alpha and the AVE. As these are all reflective measurements, deleting some of the items will not affect the nature of the construct (Diamantopoulos and Siguaw, 2006). The model fit indices of the re-specified model show that the fit is better than the primary fit indices within the initial model, see *Table 5-7*.

Table 5-7 Measurement model results (Model fit results)

Index		Threshold	Overall Model
Chi-square (X^2)		> 0.05	1609.500 (DF = 783; p =.000
X^2/Degree of freedom (DF)		Between 1 and 3	2.056
Absolute fit indices	RMSEA	< 0.06	0.048
	SRMR	< 0.08	0.041
	PClose	> 0.05	0.883
	AGFI	> 0.08	0.834
Incremental fit indices	CFI	> 0.90	0.945
	TLI	> 0.90	0.939
Parsimony fit indices	PNFI	> 0.05	0.817
	PCFI	> 0.50	0.859
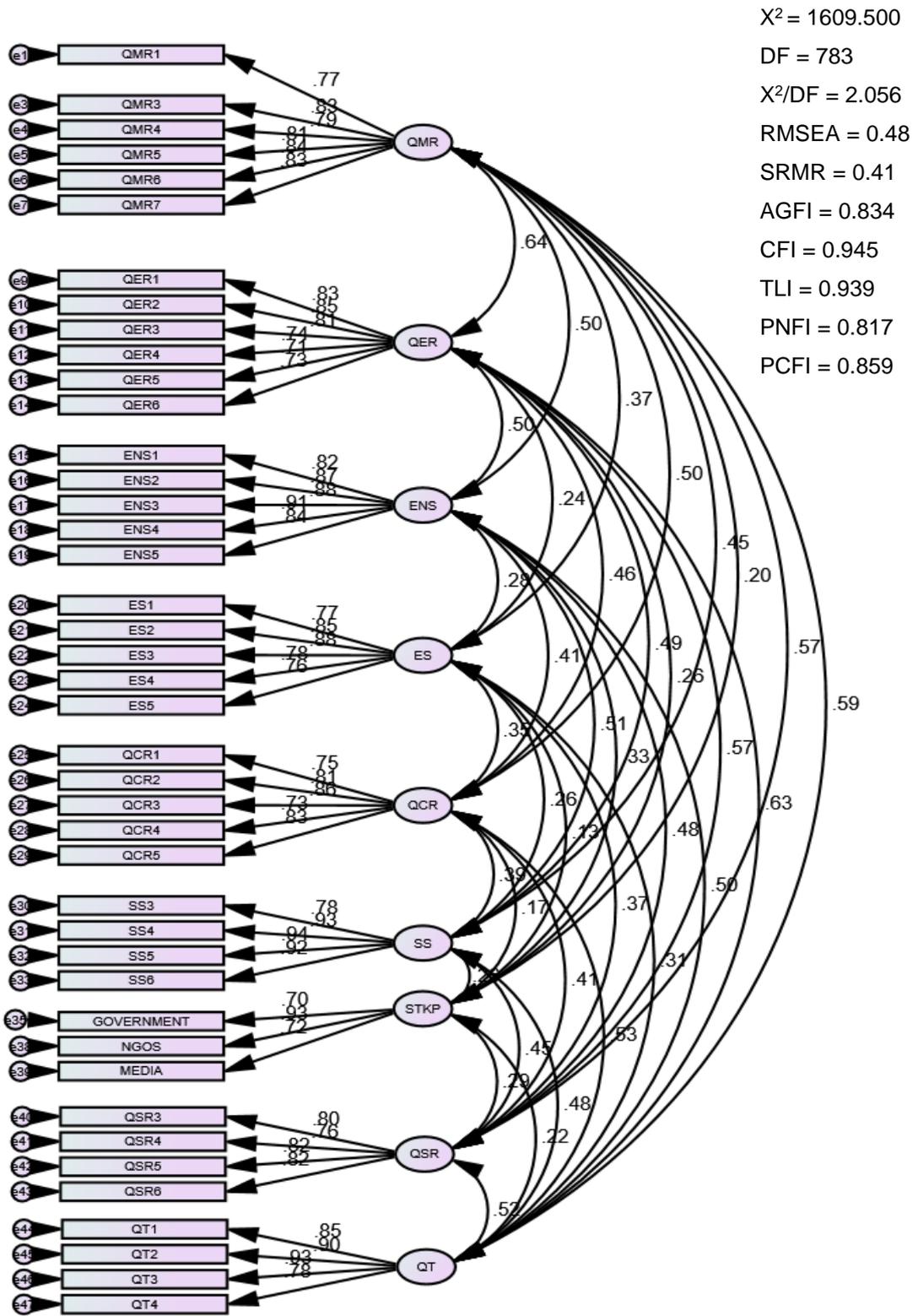
Figure 5-3 Measurement model (refined)

The results of the regression weights of all the variables show that the loading factors were between 0.703 and 0.935, suggesting statistically significant at 95% confidence in the regression weights.

5.2.4 *Measurement model fit's assessment (construct validity and reliability)*

The following sections present the procedures to assess the measurement model and its validity and reliability. Construct validity indicated how items actually perform in their relationships with other variables, while the reliability evaluates the extent to which a group of items measure the same underlying construct. Both construct validity and reliability are employed by researchers for assessing convergent and discriminant validity (Petter *et al.*, 2007; Henseler *et al.*, 2015). Convergent validity and discriminant validity are two measures that are used as part of construct validity. However, convergent validity is related to the extent two measures of constructs that are theoretically related, are actually related. As for discriminant validity, it examines whether the measurements or latent constructs that are not supposed to be related are actually not related (Zhu, 2000). Achieving convergent and discriminate validity allows assessment of unidimensionality. Unidimensionality is related to describing a measurement scale that has one dimension in which a group of indicators form a scale that measures one thing (Hattie, 1985).

Table 5-8 Cronbach Alpha, CR, AVE, MSV, MaxR(H), and correlations matrix

	Cronbach's Alpha	CR	AVE	MSV	MaxR(H)	MR	ER	ENS	ES	CR	SS	STKP	SR	QT
Management Relations (MR)	.920	0.920	0.658	0.406	0.922	**0.811**								
Employee Relations (ER)	.903	0.903	0.609	0.406	0.910	0.637 ***	**0.780**							
Environmental Sustainability Performance (ENS)	.937	0.937	0.749	0.263	0.941	0.502 ***	0.499 ***	**0.865**						
Economic Sustainability Performance (ES)	.906	0.905	0.656	0.139	0.914	0.373 ***	0.241 ***	0.278 ***	**0.810**					
Customer Relations (CR)	.896	0.898	0.639	0.284	0.905	0.504 ***	0.463 ***	0.408 ***	0.351 ***	**0.799**				
Social Sustainability (SS)	.939	0.942	0.804	0.263	0.956	0.452 ***	0.495 ***	0.513 ***	0.262 ***	0.390 ***	**0.896**			
Stakeholders pressure (STKP)	.920	0.834	0.630	0.112	0.900	0.201 ***	0.258 ***	0.334 ***	0.130 *	0.170 **	0.261 ***	**0.793**		
Supplier Relations (SR)	.876	0.876	0.639	0.330	0.878	0.572 ***	0.574 ***	0.482 ***	0.373 ***	0.411 ***	0.449 ***	0.294 ***	**0.799**	
Quality Training (QT)	.920	0.924	0.754	0.403	0.936	0.587 ***	0.635 ***	0.496 ***	0.309 ***	0.533 ***	0.485 ***	0.219 ***	0.524 ***	**0.868**

- CR = Composite Reliability; AVE = Average Variance Extracted; MSV= Maximum Shared Variance.

5.2.5 *Convergent and discriminant validity assessments*

The underlying idea of convergence validity is the convergence between the indicators of the same construct. The convergent validity was assessed by adopting the CFA method and estimating the measurement model (Anderson and Gerbing, 1988). For this research, the measurement model includes four constructs of quality relations, three constructs of sustainability performance, one construct for quality training, and one construct for the stakeholder pressure. These constructs were estimated by using AMOS 25. The convergent validity was evaluated based on the factor loadings and in terms of the AVE values (Hair Jr *et al.*, 2019).

Factor loadings mean that the constructs are strongly defined by their items (Petter *et al.*, 2007; Byrne, 2016). According to (Hair Jr *et al.*, 2019), factor loadings are considered significant if they are more than 0.5. As *Table 5-9* shows, the standardised loading for all the factors exceeded 0.05, which is the lowest acceptable level. Thus, the measurement model could be considered as an accepted measurement model. The average percentage of variance (AVE) was then calculated to assess convergent validity. It was calculated by taking the loadings of the items on the construct to calculate the average of squared loadings and divide them with the number of the items within the same construct. The main idea of AVE is to estimate the amount of variance taken from the items due to the measurement error. Table 5-8 shows that all the AVE scores are accepted as they are greater than 0.5 (Hair Jr *et al.*, 2019). As regards to the construct reliability, it is measured by the coefficient Cronbach's alpha, which is considered as an essential and prevalent statistic (Cortina, 1993). According to Hair Jr *et al.* (2019), a value of .7 or higher is considered a good indication of construct reliability. The results showed that construct reliability is satisfactory (*see Table 5-8).*

The calculations indicated accepted results as regards the individual validity assessment criteria. As *Table 5-9* shows, the regression weight for the first items of all the constructs is fixed at one and they do not have standard errors (or critical ratios). The other items, on the other hand, are associated with significant critical rations at the level .001. The results also support more convergent validity, as shown in the C.R. column, which shows that the unstandardised coefficients exceed the standard error by more than 17 times.

As for the discriminate validity, it is generally an accepted measurement, and it is common practice to test concepts or measurement of constructs that theoretically are unique to phenomena that represent that construct, and not to other constructs. In other words, it is to demonstrate that measures that are not related are actually not related (Henseler *et al.*, 2015;

Hair Jr *et al.*, 2019). In this study, it was used to compare the square root of the AVE of the latent constructs and the correlations of other constructs, as suggested by Fornell and Larcker (1981).

Table 5-9 Standardised/unstandardised regression weights, SMC, SE, and t-test

Items		Construct	St Est.	SMC	Est.	S.E	C.R	Sig.
MR1	<---	MR	.770	.614	1.000			
MR3	<---	MR	.825	.857	1.093	.057	19.081	***
MR4	<---	MR	.793	.818	1.041	.057	18.173	***
MR5	<---	MR	.812	.725	1.040	.056	18.712	***
MR6	<---	MR	.836	.669	1.133	.058	19.399	***
MR7	<---	MR	.830	.667	1.099	.057	19.227	***
ER1	<---	ER	.828	.582	1.000			
ER2	<---	ER	.853	.637	.995	.045	22.022	***
ER3	<---	ER	.810	.521	1.040	.051	20.394	***
ER4	<---	ER	.741	.874	.922	.051	17.988	***
ER5	<---	ER	.710	.494	.869	.051	17.003	***
ER6	<---	ER	.729	.847	.818	.046	17.608	***
ENS1	<---	ENS	.824	.892	1.000			
ENS2	<---	ENS	.870	.869	1.078	.046	23.259	***
ENS3	<---	ENS	.879	.606	1.130	.048	23.631	***
ENS4	<---	ENS	.910	.688	1.168	.047	24.987	***
ENS5	<---	ENS	.841	.537	1.047	.048	22.030	***
ES1	<---	ES	.771	.748	1.000			
ES2	<---	ES	.851	.656	1.088	.056	19.593	***
ES3	<---	ES	.884	.565	1.098	.054	20.435	***
ES4	<---	ES	.778	.575	.966	.055	17.609	***
ES5	<---	ES	.758	.605	.895	.052	17.074	***
CR1	<---	CR	.752	.781	1.000			
CR2	<---	CR	.810	.725	.917	.052	17.743	***
CR3	<---	CR	.865	.595	1.130	.059	19.030	***
CR4	<---	CR	.733	.707	.894	.056	15.893	***
CR5	<---	CR	.830	.828	1.036	.057	18.215	***
SS3	<---	SS	.779	.773	1.000			
SS4	<---	SS	.932	.758	1.145	.049	23.430	***
SS5	<---	SS	.944	.679	1.174	.049	23.827	***
SS6	<---	SS	.920	.532	1.133	.049	23.020	***
GOV	<---	STKP	.703	.505	1.000			
NGO	<---	STKP	.935	.549	1.360	.090	15.108	***
MED	<---	STKP	.722	.656	1.060	.073	14.491	***
SR3	<---	SR	.798	.728	1.000			
SR4	<---	SR	.763	.685	.948	.055	17.327	***

Items		Construct	St Est.	SMC	Est.	S.E	C.R	Sig.
SR5	<---	SR	.817	.690	1.060	.056	18.804	***
SR6	<---	SR	.818	.700	.980	.052	18.828	***
QT1	<---	QT	.852	.659	1.000			
QT2	<---	QT	.905	.628	1.255	.048	26.398	***
QT3	<---	QT	.926	.681	1.242	.045	27.475	***
QT4	<---	QT	.783	.592	.836	.040	20.641	***

St Est.= Standardized regression weight; SMC= squired multiple correlations; Est.= Unstandardized factor loadings estimates; S.E.= standard Error; C.R Critical Ratio

The results demonstrate that each construct was correlated with its items, and not with other constructs within the same model. As *Table 5-8* shows, the values that are represented in the diagonal correlations matrix characterise the AVE or the square root values for each construct. The results showed accepted discriminant validity assessment as the AVE values are larger than their correlations with other constructs. Moreover, the discriminant validity could be achieved when the AVE is higher than the MSV (maximum shared squared variance). The calculations show good results as it is indicated (*Table 5-8*).

Although the Fornell-Larcker measure shows that the square root of the AVE is higher than any of the inter factor correlations, this study also used another measurement to evaluate the discriminant validity. It is called the heterotrait-monotrait ratio (HTMT) and was suggested by Henseler *et al.* (2015). Based on the results as it was run by using AMOS software, the discriminant validity was high. The threshold of the values is less than >1, where the results show that the values are less than the strict threshold required of > 0.85, *see Table* 5-10*.

As for the values of the correlation, *Table 5-8* presents the results and shows significant relationships among all the quality constructs and sustainability performance dimensions.

Table 5-10 HTMT results

	MR	ER	ENS	ES	CR	SS	STKP	SR	QT
MR									
ER	0.637								
NS	0.509	0.494							
ES	0.377	0.246	0.278						
CR	0.512	0.474	0.413	0.346					
SS	0.472	0.520	0.539	0.272	0.424				
STKP	0.160	0.241	0.302	0.083	0.170	0.256			
SR	0.567	0.571	0.486	0.370	0.412	0.464	0.272		
QT	0.594	0.655	0.516	0.314	0.546	0.530	0.232	0.530	

5.2.6 *Measurement invariance*

As this study uses two groups for the sector type, manufacturing and service, the measurement model invariance test was applied. The measurement invariance is a statistical approach to indicate that the same construct is being estimated across defined groups. Thus, the two groups (service and manufacturing) were evaluated to make sure that they measured the same underlying construct. The assessment was based in the configural, metric and scalar invariance during the CFA validation process, as suggested by Byrne (2016, p. 227). As for the configural invariance, the data was divided between the two groups, manufacturing and service. When both groups are tested together without any paths constraints, the model fit indices showed that there is an adequate fit for both sectors. Then, the metric invariance was tested by constraining the paths to be equal and then testing the constrained and unconstrained paths to identify the chi-square differences. The result of the measurement weights between the two sectors was not significant, DF = 31; X^2 = 32.569; P = 0.390. Therefore, the metric invariance was accepted as the difference between constrained and unconstrained paths are not significant (based on the chi-square).

Consequently, it could be argued that the model does not differ across the two groups, and it could be considered for further analysis. As for the scalar invariance, where the intercepts were constrained, some factor loadings were constrained as the test did not achieve acceptable values. Thus, the model was improved by relaxing some indicators (no constraints between the two groups) in order to achieve a partial scalar invariance (Byrne, 2016). The unconstrained

items are QER4, QER5, QCR1, QCR3, SS3, SS6, QT1 and QT2. Generally, the results were adequate for the purpose of the research (Steenkamp and Baumgartner, 1998). As for the model fit, it was tested again to make sure that it achieved an adequate fit with both groups. It meant that the invariance test was passed using the configural invariance test, and the model is meaningful for subsequent tests (Vandenberg and Lance, 2000). The result shows that the model fit was good when the model was assessed with both groups unconstrained.

5.2.7 *Common method variance (CMV) assessment*

This research employed Harman's single factor test (Podsakoff *et al.*, 2003) to identify the existence of CMV. This test has been used across operations management research, e.g., Jayaram *et al.* (2010); Longoni *et al.* (2014); Wiengarten *et al.* (2017a). The test was run using SPSS's factor analysis by conducting an exploratory factor analysis (EFA). All the items were extracted by using principal axis factoring and by fixing the number of factors to one. The results showed that the single factor extracted a total number of 34.097 of the total variance. As it is far from 50%, this study could conclude that there is no threat of CMV.

5.3 Regression analysis: main effects, moderation and control variables

To test the hypothesis, this study applied linear regression and multiple regression analysis as employed in the operation management literature (e.g., Zhu and Sarkis, 2004; Liu *et al.*, 2017). Multiple regression analysis is one of the most widely used statistical procedures for both scholarly and applied marketing research (Mason and Perreault Jr, 1991). The descriptive statistical results and correlations were reported in *Table 5-3, Table 5-8 and Table 5-9*. According to Schumacker and Lomax (2016), the next step after establishing and confirming all the issues related to the reliability and validity of the measurement model is to test the causal relationships. The following sections report hierarchical regression results for each of the main effects, moderations, and interactions.

Management relations (MR) on other quality relations (H1a, H1b, H1c, H1d)

The results of the regression of management relations on other quality relations, including quality training, employee relations, customer relations and supplier relations are shown in Table 5-11. Management relations have significant positive results on all of the quality relations. MR has positive effects on quality training, employee relations, customer relations and supplier

relations with P-value < 0.001, and F = 300.244; 412.900; 198.314; and 299.616 respectively. The adjusted R^2 was 0.391 for the quality training, 0.469 for quality employee relations, 0.297 for customer relations, and 0.391 for supplier relations. The results of the adjusted R^2 show higher proportions of the variance for QT, ER, CR, and SR that is explained by management relations.

Table 5-11 Regression results (MR) and other quality relations

	Quality training (QT)	Quality employee relations (ER)	Quality customer relations (CR)	Quality supplier relations (SR)
Quality management relations (MR)	0.626***	0.686***	0.547***	0.626***
R^2	0.392	.470	0.299	0.392
Adjusted R^2	0.391	0.469	0.297	0.391
F	300.244***	412.900***	198.314***	299.616***

Quality training (QT) on employee relations (H2)

Table 5-12 demonstrates the regression results of the effect of quality training on employee relations. The results show a positive relationship with p-value = 0.001; F = 398.268. The adjusted R^2 was 0.460, which represents a higher proportion of the variance for quality training that is explained by employee relations.

Table 5-12 Regression of MR and quality training

	Employee relations (ER)
Quality training (QT)	0.679***
R^2	.461
Adjusted R^2	0.460
F	398.268***

Management relations (MR) and sustainability performance (H3 a,b,c and H8)

The findings of the regression for the relationships between management relations and sustainability performance are shown in Table 5-13. As for the control variables, firms' size has significant positive results on environmental sustainability performance and social sustainability performance, while sector has significant negative results on environmental sustainability performance and positively significant relationships with social sustainability. It seems that in

the sample of UK firms, the biggest companies contribute to environmental sustainability outcomes. Similarly, UK manufacturing and services firms contribute differently to social and environmental sustainability performance.
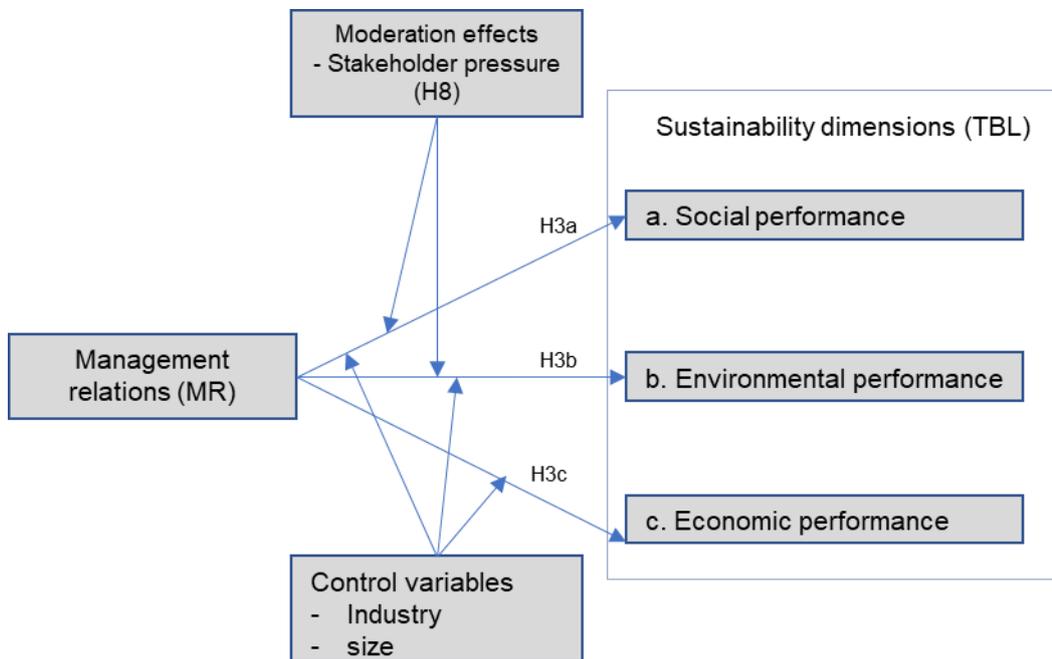
Figure 5-4 Conceptual model (MR)

This research found the main effect of management relations and the three dimensions of sustainability performance was significantly positive *(Figure 5-4).* As shown in Model 2 in Table 5-13, the management relations has positive and significant relationships with ENS, SS, and ES, thus supporting H1a, H1b, and H1c. Stakeholder pressure also seems to positively affect social and environmental sustainability performance (see Model 3).

As for the results of the moderating effects related to stakeholder pressure, the results were mixed, as shown in Model 4. First, there was no statistical evidence of the moderation effect of stakeholder pressure on social and economic sustainability in Model 4. Nevertheless, there was negative and significant evidence of stakeholder pressure moderation of MR on environmental sustainability. It means that stakeholders pressure reduces the positive relationship between MR and environmental sustainability performance *(Figure 5-5).*

Table 5-13 Regression results (MR)

	Environmental Sustainability Performance (ENS)				Social Sustainability Performance (SS)				Economic Sustainability Performance (ES)		
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3
Firm size	0.132**	0.153***	0.141***	0.139***	0.066	0.084*	0.076†	0.076†	0.043	0.052	0.027
Sector	-0.037	-0.059	-0.080*	-0.084*	0.137**	0.118**	0.104*	0.104*	0.018	0.010	-0.014
Main effect											
MR		0.544***	0.488***	0.462***		0.477***	0.440**	0.438***		0.309***	0.192*
Moderator											
STKP			0.256***	0.275***			0.172***	0.173***			0.101†
Interaction											
MR_STKP				-0.089*				-0.115			
R^2	0.020	0.315	0.377	0.384	0.021	0.248	0.276	0.276	0.003	0.168	0.171
Adjusted R^2	0.016	0.310	0.371	0.377	0.017	0.244	0.270	0.269	-0.001	0.162	0.164
F change	4.683**	199.251***	45.936***	5.269*	5.073**	139.914***	17.806***	0.013	0.739	91.635***	1.630

Note: betas are the standardised coefficient. $† p < 0.100; *p < 0.05; **p < 0.010; ***p < 0.001$
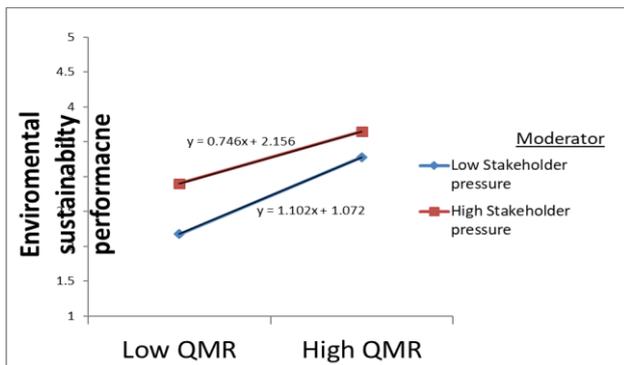
Figure 5-5 Moderation effect (MR & ENS)

Quality Training (QT) and sustainability performance (H4 a,b,c)

The relationships between quality training and sustainability performance variables and regression results are shown in Figure 5-6 and Table 5-15 are all positive and significant. Quality training has significant positive results on all of the sustainability outcomes. QT has positive effects on environmental, social, and economic sustainability performance dimensions with P-value < 0.001, and F = 66.530; 54.763; 198.314; and 19.766 respectively. The adjusted

R2 was 0.276 for the environmental performance, 0.257 for social performance, and 0.108 for economic performance. Thus, the results support H4a, H4b, and H4c.
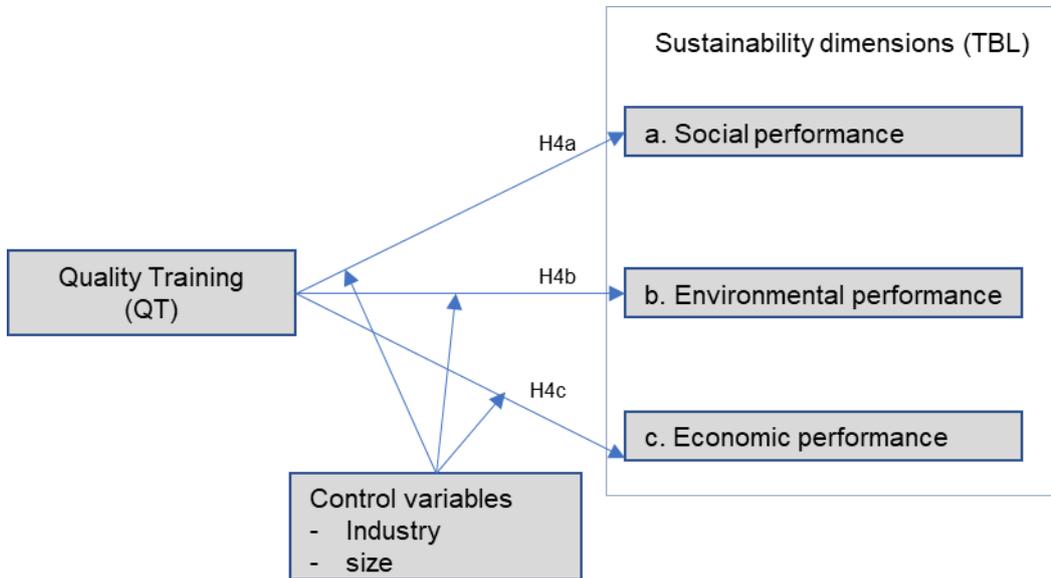
Figure 5-6 Conceptual model (QT)

As for the control variables, firm size has positive and significant results only on environmental sustainability performance (EN) with P-value < 0.05., and no significant results on other sustainability dimensions. This implies that big UK firms contribute most to environmental sustainability. Correspondingly, UK manufacturing firms contribute more than service to environmental sustainability performance as the results of the relationship between sector and sustainability performance was significant P-value < 0.010.

Table 5-14 Regression results (QT)

	Environmental Sustainability Performance		Social Sustainability Performance		Economic Sustainability Performance	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Firm size	0.132**	0.097*	0.062	0.029	0.058	0.035
Sector	-0.038	-0.115**	0.107*	0.035	0.015	-0.034
QT		0.552***		0.504***		0.336***
R^2	0.020	0.301	0.014	0.262	0.003	0.114
Adjusted R^2	0.016	0.297	0.010	0.257	-0.001	0.108
F change	4.704*	66.530***	3.318*	54.763***	0.787	19.766***

*Note: betas are the standardised coefficient. † p < 0.100; *p < 0.05; **p < 0.010; ***p < 0.001*

Employee relations (ER) and sustainability performance (H5 a,b,c and H9)

The relationships between management relations and sustainability performance dimensions are shown in Figure 5-7, and the regression results are shown in Table 5-15. As regards the control variables, firms size has a significant positive result on environmental sustainability performance (EN) with P-value < 0.001, and significant positive results on social sustainability performance with a p-value < 0.1, while the sector has no significant impact on economic sustainability performance. It seems that in the sample of UK firms, the biggest companies contribute most to environmental sustainability.
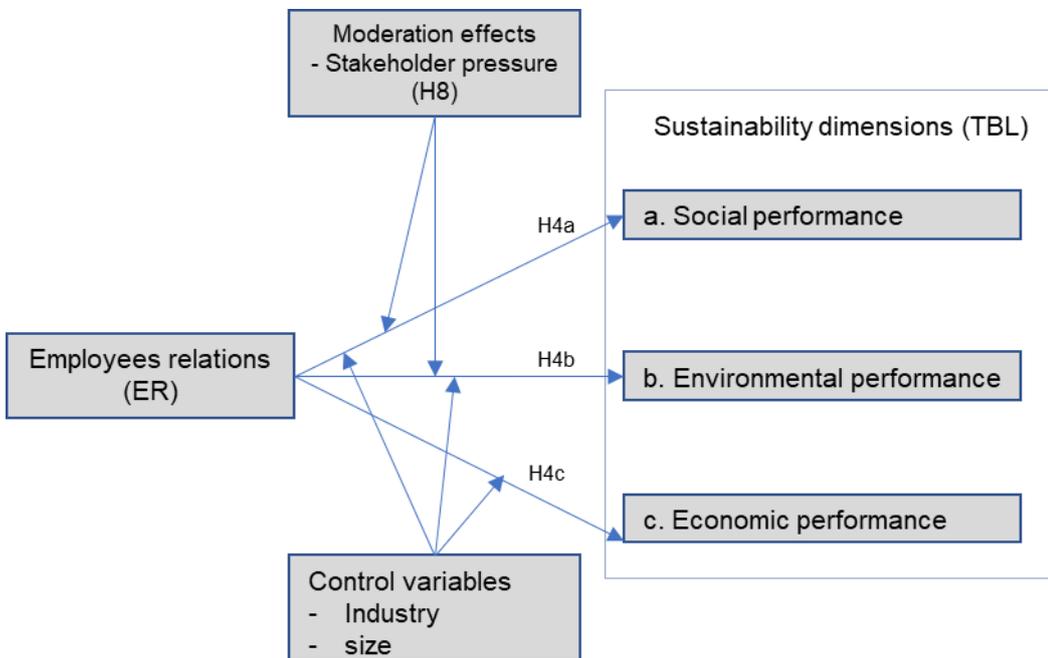
Figure 5-7 Conceptual model (ER)

As regards to the main effects and as shown in Model 2 in Table 5-15, employee relations (ER) has a significant positive relationship with EN, which supports H3a, H3b and H3c.

Table 5-15 Regression results (ER)

	Environmental Sustainability Performance				Social Sustainability Performance				Economic Sustainability Performance			
	Model 1	Model 2	Model 3	Model 4		Model 1	Model 2	Model 3	Model 4		Model 1	Model 2	Model 3
Firm size	0.132**	0.141***	0.131***	0.131***		0.066	0.0874†	0.068†	0.071†		0.056	0.060	0.057
Sector	-0.037	-0.105**	-0.119**	-0.119**		0.137**	0.074†	0.065†	0.068†		-0.002	-0.035	-0.039
Main effects													
ER		0.552***	0.488***	0.484***			0.519***	0.481**	0.505***			0.270***	0.249***
Moderator													
STKP			0.230***	0.232***				0.137**	0.123**				0.074
Interactions													
ER_STKP				-0.015					0.083*				
R^2	0.020	0.319	0.368	0.368		0.021	0.287	0.304	0.310		0.003	0.075	0.080
Adjusted R^2	0.016	0.315	0.362	0.361		0.017	0.282	0.298	0.303		-0.001	0.069	0.072
F change	4.683**	203.803***	35.346***	0.146		5.073**	172.300***	11.354**	4.268*		0.739	35.810***	2.528

*Note: betas are the standardised coefficient. † $p < 0.100$; * $p < 0.05$; ** $p < 0.010$; *** $p < 0.001$*

As for the moderation results related to stakeholder pressure (STKP), they were unexpected, as shown in Model 4, Table 5-15. The results did not detect any moderating effects of STKP on ENS and ES (Model 4). Surprisingly, STKP positively moderated the effect of ER on SS. The stakeholder pressure reinforces the positive relationship between ER and SS *(*Figure 5-8*).*
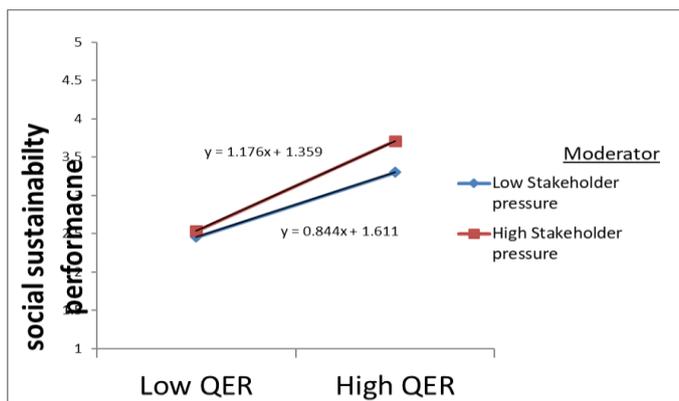
Figure 5-8 Moderation effect (MR & SS)

Supplier relations (SR) and sustainability performance (H6 a,b,c and H10)

Figure 5-9 shows the conceptual model of the relationships between QM relations and sustainability dimensions. The regression results are revealed in Table 5-16. As for the control variables, firms' size has a significant positive result on environmental sustainability performance (EN), while the sector type has no effect of on social and economic sustainability performance. The sector has significant positive results on social sustainability performance.

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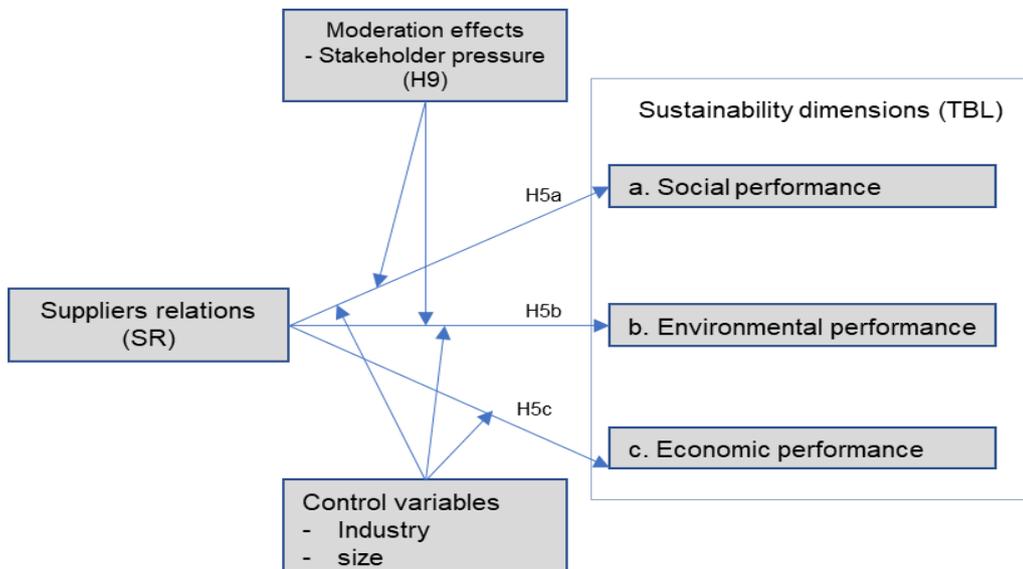
Figure 5-9 Conceptual framework (SR)

This research found significant positive impacts on the main effects of supplier relations on the three dimensions of sustainability performance. As shown in Model 2 in Table 5-16, supplier relations (SR) has significant and positive relationships with ENS, SS and ES, thus supporting H5a, H5b and H5c. As for the moderation result of the stakeholder pressure, as reported in Model 4 (Table 5-16), it was found that STKP positively moderated the effect of SR on ENS. At the same time, it did not influence the effect of SR on SS and ES. The influence of stakeholder pressure reveals that STKP diminishes the positive relationship between SR and ENS *(see* Figure 5-10*).*
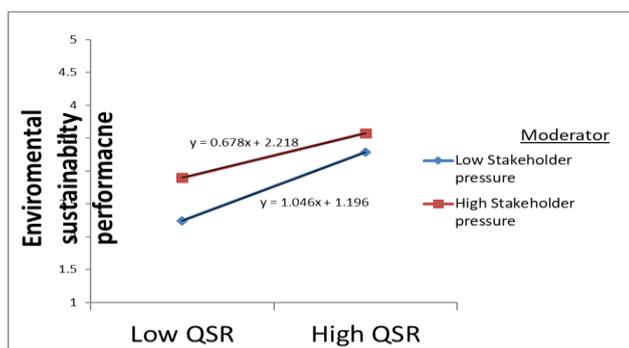
Figure 5-10 Moderation results (SR & ENS)

Table 5-16 Regression results (SR)

	Environmental Sustainability Performance					Social Sustainability Performance					Economic Sustainability Performance			
	Model 1	Model 2	Model 3	Model 4		Model 1	Model 2	Model 3	Model 4		Model 1	Model 2	Model 3	
Firm size	0.132***	0.120**	0.114***	0.108**		0.066	0.055	0.051	0.053		0.056	0.047	0.047	
Sector	-0.037	-0.055	-0.072†	-0.072†		0.137**	0.121**	0.111**	0.111**		-0.002	-0.015	-0.016	
Main effects														
SR		0.524***	0.454***	0.431***			0.481***	0.441**	0.446***			0.410***	0.407***	
Moderator														
STKP			0.216***	0.235***				0.125**	0.121**				0.010	
Interactions														
SR_STKP				-0.092*					0.023					
R^2	0.020	0.294	0.335	0.343		0.021	0.253	0.267	0.267		0.003	0.171	0.171	
Adjusted R^2	0.016	0.289	0.329	0.336		0.017	0.248	0.260	0.259		-0.001	0.166	0.164	
F change	4.683*	179.578***	28.748***	5.430*		5.073**	143.381***	8.768**	0.296		0.739	93.839***	0.050	

*Note: betas are the standardised coefficient. † p < 0.100; *p < 0.05; **p < 0.010; ***p < 0.001*

Customer relations (CR) and sustainability performance (H7 a,b,c and H11)

This section presents the results of the effect of customer relations on sustainability performance *(*Figure 5-11*).* The results of the regression are shown in Table 5-17. As for the control variables, it seems that firm size does not affect the relationship between customer relations and sustainability performance. Nevertheless, firm size has a significant positive result on environmental sustainability performance (ENS) with a P-value < 0.1. The sector type has mixed results. There is a significant adverse effect on social sustainability performance and significant positive results on environmental sustainability performance, while there is no effect of the sector on economic sustainability performance.
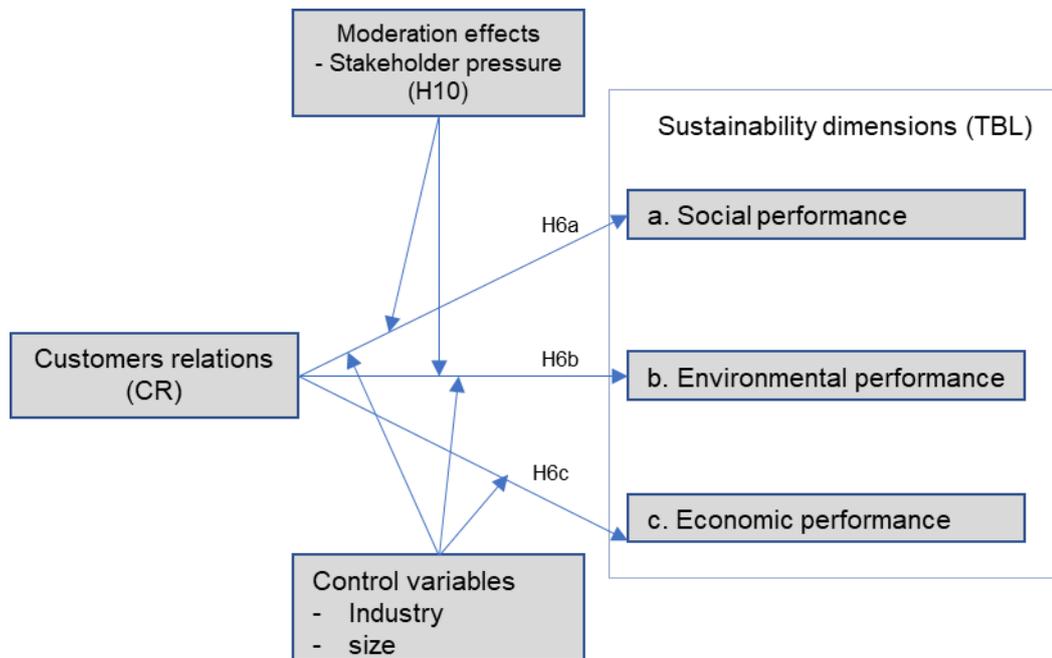
Figure 5-11 Conceptual framework (CR)

Table 5-17 Regression results (CR)

	Environmental Sustainability Performance					Social Sustainability Performance					Economic Sustainability Performance			
	Model 1	Model 2	Model 3	Model 4		Model 1	Model 2	Model 3	Model 4		Model 1	Model 2	Model 3	
Firm size	0.132**	0.079†	0.075†	0.072†		0.066	0.016	0.014	0.014		0.056	0.010	0.008	
Sector	-0.037	-0.079†	-0.101*	-0.104**		0.137**	0.098*	0.083*	0.083*		-0.002	-0.038	-0.044	
Main effects														
CR		0.437***	0.384***	0.369***			0.407***	0.370**	0.373***			0.385***	0.371***	
Moderator														
STKP			0.296***	0.300***				0.203***	0.202**				0.076†	
Interactions														
CR_STKP				-0.087*					0.444					
R^2	0.020	0.207	0.290	0.298		0.021	0.183	0.223	0.223		0.003	0.148	0.154	
Adjusted R^2	0.016	0.201	0.284	0.290		0.017	0.178	0.216	0.215		-0.001	0.143	0.146	
F change	4.683*	108.954***	54.498***	4.858*		5.073**	91.831***	23.458***	0.197		0.739	78.808***	3.058†	

*Note: betas are the standardised coefficient. † $p < 0.100$; *$p < 0.05$; **$p < 0.010$; ***$p < 0.001$*

As for the main effects, this research found significant positive relationships between customer relations (CR) and the three dimensions of sustainability performance. As shown in Model 2, Table 5-17, the management relations has a significant and positive relationship with ENS, SS, and ES, thus supporting H7a, H7b, and H7c. Also, the result related to the stakeholder pressure

was significantly positive and related to firms' social and environmental sustainability performance (*see Model 3,* Table 5-17).

The moderating effects were mixed, as shown in Model 4, Table 5-17. First, the results from the statistics did not detect any moderating influences of stakeholder pressure on social and economic sustainability in Model 4, while the results found that stakeholder pressure negatively moderated the relationship between CR and environmental sustainability. Stakeholder pressure dampens the positive relationship between CR and ENS, (*see* Figure 5-12)*.*
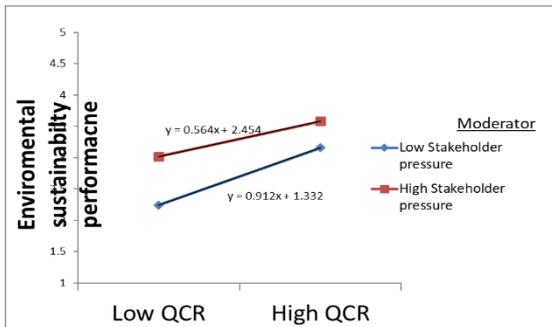
Figure 5-12 Moderation results (CR & ENS)

Considering that a hierarchical linear regression approach might not exclusively utilise all the intensity of the study's statistics, the confirmatory structural assessment was applied using AMOS 25. By using this method, we expected that the hypothesised model would enhance the robustness of data. Using SEM in social science research has grown substantively. This is because it offers the researcher a comprehensive tool to evaluate and adjust their theoretical models and also to further develop theories (Anderson and Gerbing, 1988). According to Preacher and Hayes (2008), a SEM approach, unlike regression analysis used by SPSS, explicitly models measurement error. It allows testing of hypotheses using the latent variables instead of measured items. Also, it offers advanced and probably more precise path approximations, and it is a technique that allows analysis of interrelated associations among the constructs (Tabachnick *et al.*, 2007).

5.4 Confirmatory structural assessment & hypotheses testing

The structural analysis intends to investigate causality as regards to the relationships among various independent, moderating, mediating and dependent variables.

The independent and mediating variables were derived from the quality management stream, while the dependent variables were adopted from sustainability development literature. All the variables were integrated with business relations perspective and sustainable development to explain the employment of quality management relations in driving sustainability performance.

The following sections present the statistical findings of the structural regression model and hypotheses as regards to the theoretical framework. To proceed with the hypotheses testing and evaluating the model structure, this study employed SEM using IBM AMOS 25. The setting was adjusted as a maximum likelihood (ML) parameter estimation method. Figure 5-13 shows the conceptual model and hypotheses for this research.
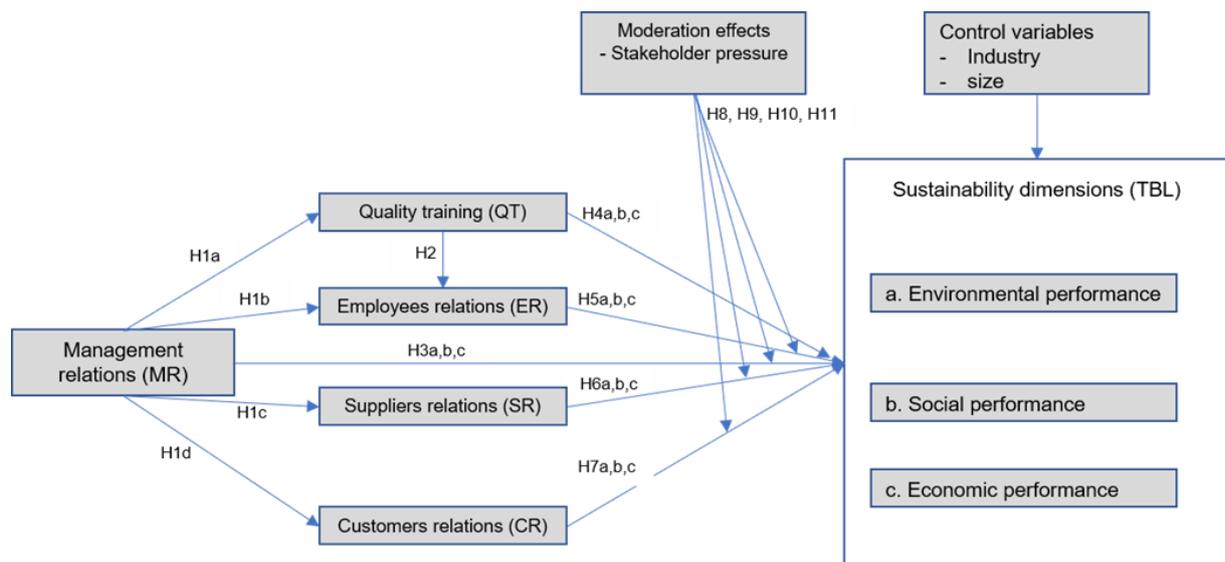
Figure 5-13 Research Model and Hypotheses

The structure regression model presents the intricate paths and shows the causal mechanisms of this research, including direct and indirect effects. Different criteria were employed to determine and evaluate the model structure, including fit indices, parameter estimates and squared multiple correlations coefficients. For the model fit evaluation, fit indices verify how well the model fits the sample data by establishing the best model which has the greatest fit and indicates how the suggested theory fits the data. These indices include chi-square, CFI, P-value and RMSEA. The parameter estimates or coefficients were tested to explain the effects and changes on the dependent variables. Besides, the squared multiple correlations (R) coefficients were estimated. The R coefficients determine the proportion of the total variation explained by the model for each of the latent variables.

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As is acknowledged in the preceding sections, the scales used to estimate the latent variables as they are defined in the measurement model indicated acceptable findings in terms of reliability and discriminant validity. Therefore, the indicators for every factor were joined to form a single composite factor. The measurement model also confirmed that values related to the critical ratio (C.R.) exceeded 1.96, which implies that the parameter coefficients are significantly different from zero. Besides, the standardised coefficients did not exceed the absolute value 1.0, and there were no negative error variances. That confirmed that the structure model does not have issues related to outliers, under-identification, or sampling (Anderson and Gerbing, 1988; Bollen, 2014).

The results for the chi-square (X^2), however, showed that it is significant, which suggests rejecting the model. Nevertheless, there is a debate about relying on the X^2's significance because of its sensitivity to discrepancies related to increasing the sample size. Therefore, other fit indices offer inclusive assessments of the goodness of fit (Schermelleh-Engel *et al.*, 2003; Vandenberg, 2006; Lomax and Schumacker, 2016; Hair Jr *et al.*, 2019). Nevertheless, the ratio of X^2 to the degree of freedom (DF) was acceptable (1715), and it is within the range of threshold of 3.0 according to Kline (2011), and 5.0 according to Hair Jr *et al.* (2019).

Table 5-18 Model fit indices for the structure model

Index		Thresholds	Overall structural model fit indices
Chi-square (X^2)		> 0.05	1715.230 (DF = 752; p = 0.000
X^2/Degree of freedom (DF)		Between 1 and 3	2.281
Absolute fit indices	RMSEA	< 0.06	0.052
	SRMR	< 0.08	0.067
	AGFI	> 0.08	0.821
	PClose	> 0.05	0.110
Incremental fit indices	CFI	> 0.90	0.933
	TLI	> 0.90	0.927
Parsimony fit indices	PNFI	> 0.05	0.814
	PCFI	> 0.50	0.856

The fit indices for the structural model revealed an acceptable structure model, as shown in Table 5-18. These results indicated that there is a reasonably good fit of the index with the data, in terms the absolute, incremental and parsimony fit indices, as shown in Table 5-18. As for the standardised regression weights for each of the variables loading onto its construct, they

revealed that all the indicators are statistically significant with their corresponding latent constructs. The factor loadings were between 0.710 and 0.944.

5.5 Hypotheses testing

As the conceptual model *(*Figure 5-13*)* shows, there are seventeen main hypotheses, plus four hypotheses with moderation effects. The main hypotheses are focused on the relationships between internal management relations, employee relations, customer relations, supplier relations, quality training, social sustainability, economic sustainability and environmental sustainability.

The hypotheses results of the primary relationships, mediations, moderations and confounding effects are discussed in the below sections.

The key research question was to inspect the impacts of QM through quality relations on sustainability performance. By building on business relations view, this study claim that firms' quality relations characterise the critical business relations which allow the firms to achieve better sustainability performance. The theoretical framework and hypotheses which were established in this research were tested and reported using SEM.
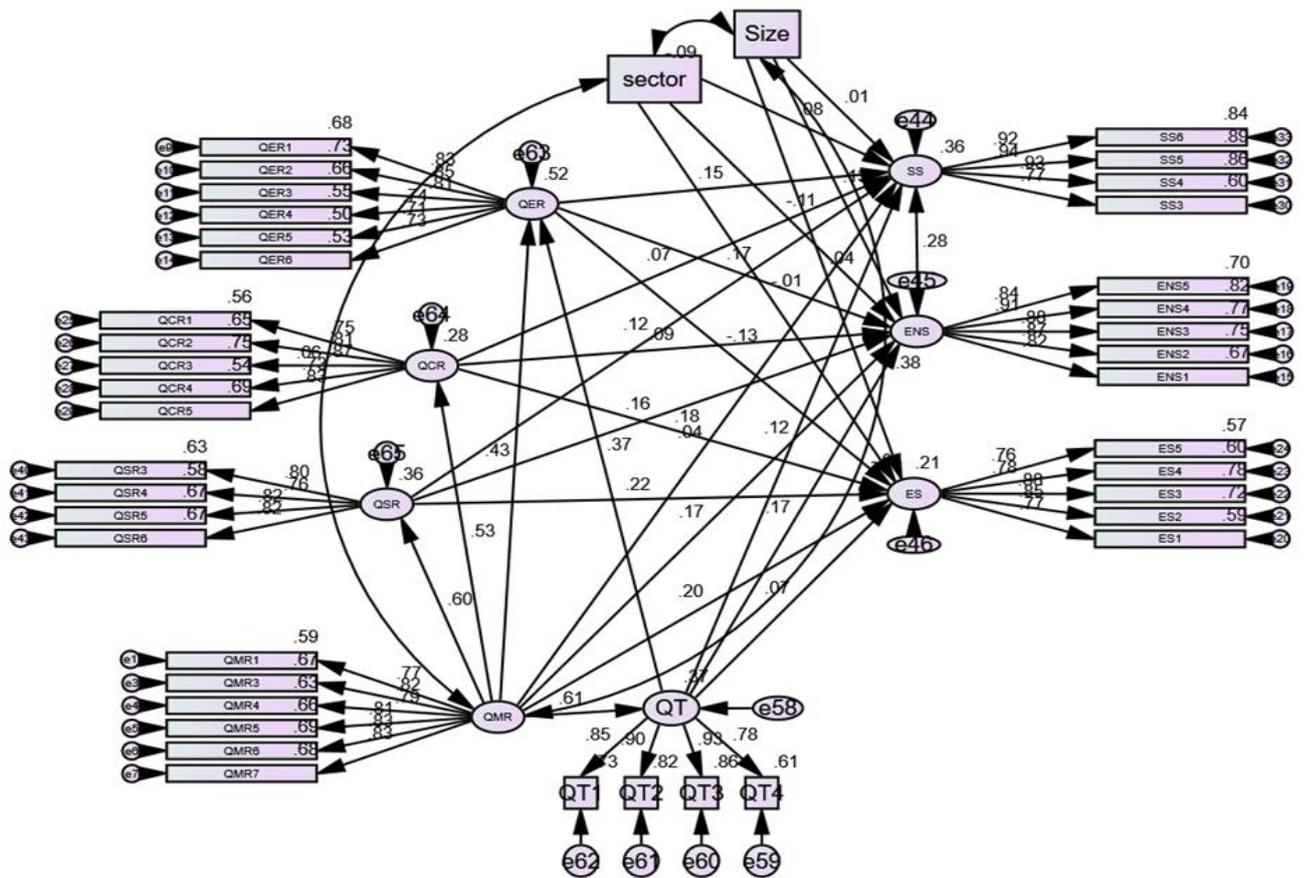
Figure 5-14 Structural framework

The above figure represents the structural paths model. It shows the research hypotheses and relationships between independent and dependent latent variables (Figure 5-14). The first step of the structure model assessment is to evaluate the squared multiple correlations (SMC). SMC values are the amount of independent variances (endogenous) that are explained by the dependent variables (exogenous). The greater SMC values represent a higher explanatory power of the dependent variables. As for the quality variables, the SMC values are 0.519, 0.374, 0.360 and 0.282 for ER, QT, SR and CR, respectively. Therefore, the results show that more 52% of the variance of employee relations was explained by management relations. Moreover, about 37% of the variance of quality training, 36% of the variance of quality supplier relations and about 28% variance of the customer relations were explained by management relations.

As for the sustainability performance, it was found that about 38% of the variance of the environmental sustainability performance was explained by ER, MR, QT, SR and CR. and 32%

of the variance of social sustainability performance was determined by MR, ER, SR and CR. Finally, more than 21% of the economic performance was explained by MR, ER, SR and CR. The results, as shown in Table 5-19, present the path coefficients of the hypotheses. These results were evaluated according to the t-values or the critical ratios and showed strong support for the theoretical model.

There are seventeen hypotheses. Fifteen of the predictions were significantly supported, while two predictions were not considerably supported. Generally, the results show that the hypotheses were supported at three different levels of significance ranging from $P < 0.001$, represented by t-values that were greater than 2.58, to $P < 0.05$, represented by the t-values that were greater than 1.96.

Management relations (MR) and other quality relations (ER, SR, CR and QT)

The results of MR as a predictor of other quality practices (ER, SR, ER and QT) showed strong positive significant associations and supported H1a, H1b, H1c and H1d. The strongest relationships were MR and SR ($\beta = 0.655$; $p < 0.001$) followed by MR and QT ($\beta = 0.638$; $p < 0.001$), MR and CR ($\beta = 0.636$; $p < 0.001$), and lastly between MR and ER ($\beta = 0.463$; $p < 0.001$). These results indicated an interdependency between quality relations. The implications of the results are examined in the discussion chapter.

Table 5-19 Hypotheses and path testing results

Hypothesis	Paths			Standardised β	S .E	T-value	Results
H1a	MR	→	QT	0.638	0.054	11.729***	supported
H1b	MR	→	ER	0.463	0.057	8.067***	supported
H1c	MR	→	SR	0.655	0.058	11.305***	supported
H1d	MR	→	CR	0.636	0.064	9.976***	supported
H2	QT	→	ER	0.463	0.057	8.067***	supported
H3a	MR	→	ENS	0.192	0.090	2.133*	supported
H3b	MR	→	SS	0.097	0.088	1.096	Not supported
H3c	MR	→	ES	0.183	0.080	2.289*	supported
H4a	QT	→	ENS	0.191	0.056	2.950**	supported
H4b	QT	→	SS	0.183	0.064	2.860**	supported
H4c	QT	→	ES	0.063	0.057	1.103	Not supported
H5a	ER	→	ENS	0.193	068	2.821**	supported
H5b	ER	→	SS	0.205	.067	3.039**	supported
H5c	ER	→	ES	-0.111	.060	-1.853	Not supported
H6a	SR	→	ENS	0.182	.059	3.107**	supported
H6b	SR	→	SS	0.179	.058	3.103**	supported
H6c	SR	→	ES	0.181	.052	3.478***	supported
H7a	CR	→	ENS	0.085	.048	1.750	Not supported
H7b	CR	→	SS	0.086	.048	1.813	Not supported
H7c	CR	→	ES	0.135	.043	3.128**	supported
Control	size	→	ENS	0.127	.038	3.317***	-
Control	size	→	SS	0.045	.038	1.193	-
Control	size	→	ES	0.028	.034	.822	-
Control	sector	→	ENS	-0.173	.061	-2.847**	-
Control	sector	→	SS	0.077	.060	1.284	-
Control	sector	→	ES	-0.014	.053	-.260	-

*p < 0.050; ** p < 0.010; *** p < 0.001*

Management relations (MR) and sustainability performance

The standardised estimated path coefficient of the relationships between MR and social sustainability performance showed insignificant results ($\beta = 0.079$; $p > 0.05$), whereas there were positive relationships between MR and environmental sustainability ($\beta = 0.192$; $p < 0.05$), and between MR and economic sustainability ($\beta = 0.183$; $p < 0.05$). These results support H3a and H3c, but do not support H3b.

Employee relations (ER) and sustainability performance

The results of the relationships between ER and social and environmental sustainability performance were positively supported ($\beta = 0.205$; $p < 0.01$) and correspondingly significant ($\beta = 0.193$; $p < 0.01$), while the ER did not show significant results with economic sustainability performance ($\beta = -0.111$; $p > 0.05$). Based on these results, H4a and H4b were supported, while H4c was not supported.

Supplier relations (SR) and sustainability performance

The standardised estimated paths coefficient of the relationships between SR and SS, ENS and ES were positively significant. SR was the strongest determinant of ENS ($\beta = 0.182$; $p < 0.01$). As for the effect of SR on SS and ES, they were $\beta = 0.179$; $p < 0.01$, and $\beta = 0.181$; $p < 0.001$ respectively. Based on these results, the hypotheses H5a, H5b and H5c were all supported.

Customer relations (CR) and sustainability performance

The results of the relationships between CR and three sustainability performance dimensions were mixed. The standardised estimated path coefficient of the relationships between CR and social sustainability performance was insignificant ($\beta = 0.085$; $p > 0.05$). As for the relationship between CR and environmental sustainability, it was also insignificant ($\beta = 0.085$; $p > 0.05$). The relationship between CR and economic sustainability was strongly significant ($\beta = 0.135$; $p < 0.01$). These results supported H6a and did not support H6b, and H6c.

5.6 Mediation results

The mediation effect is related to the hypothesised causal chain in which the effect of an independent variable is indirectly related to a dependent variable that goes via a third variable

(mediator), or an intervening variable. As is shown in the below figure, the mediation is related to the additional variable (M) in the main relationship between the independent variable (X) and dependent variable (Y). The relationship (a) signifies the relationship between (X) and (M), the relationship (b) shows the relationship between (M) and (Y). At the same time, the path (c) represents the relationship between (X) and (Y). A mediator variable is in a causal sequence between two variables. Therefore, when the regression coefficient between X and Y is reduced due to the control of the variable M, a mediation occurs (MacKinnon *et al.*, 2007).
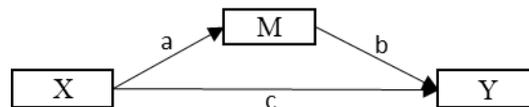
Figure 5-15 Mediation model

To identify the mediation effect, three regression equations should be tested. Firstly, the regression between X and Y, without including the mediator, should be calculated. Secondly, the relationship between X and M is regressed to identify the path (a). Thirdly, the mediator is included while testing the relationship between X and Y. Based on the results, the mediation is considered as partial if there is a significant relationship between X and Y but it is reduced, whereas it is considered as a full mediation if the relationships are statistically significant or equal to zero (while including the variable M). Finally, there is no mediation if the significant relationship between X and Y remains when the mediator variable (M) is included (Hair Jr *et al.*, 2019).

Nonetheless, the approach of Baron and Kenny (1986) tends to reduces statistically the power to detect the mediation, regardless of its simplicity (MacKinnon *et al.*, 2007), and it is considered misleading (Zhao *et al.*, 2010). Another approach which has been readily adopted by scholars is related to examining the significance of the indirect effect (Sobel, 1982; Sobel, 1986) where a formula is used to calculate the standard error of the mediation relationship (MacKinnon *et al.*, 2007). This approach, however, is criticised as some of the simulation results showed bias between different sample sizes (MacKinnon *et al.*, 2007). Lately, as the statistical theory has developed due to the advancement of computer software, the bootstrapping method, or resampling method, has proven to be more capable of controlling type 1 error and low power issues when testing direct and indirect relationships (MacKinnon *et al.*, 2007; Preacher and Hayes, 2008). This approach produces a large number of samples by selecting

cases that are equally distributed in every random sample. The bootstrapping method is considered more accurate than other traditional mediation analysis that requires many assumptions (MacKinnon *et al.*, 2007).

Both the hierarchical regression or SEM models can be employed to test the mediating effect. However, the hierarchical regression model is subject to measurement errors, while the SEM approach deals with measurement error as it uses latent variables with multiple indicators. The SEM approach offers unbiased estimates of mediation as it uses bootstrap confidence intervals (Cheung and Lau, 2008).

This study employed the SEM approach with bootstrapping 2000 and a 0.95 confidence interval to test the mediation effect. First, the direct relationship was tested without including the mediators to get their standardised coefficients (β) and the significance levels. Next, the relationships were tested again, including the mediators and with the bootstrap function activated. As for the full mediation, there should be a significant direct relationship between the independent and dependent variables without including the mediator, while, when the mediator is included, the direct effect becomes insignificant and the indirect relationship is significant. In contrast, the partial mediation effect occurs when all the path results indicate significant relationships (Zhao *et al.*, 2010).

The results related to direct and indirect effects are presented in Table 5-20. The standardised estimates (β) were employed to estimate the mediating impact of quality management relations (ER, SR and CR); for the relationships between management relations (MR) and SS, ENS and ES; and for the quality training mediating effect on the relationship between MR and ER.

Employee relations was found to fully mediate the relationship between MR and SS ($p < 0.001$); and partly mediates the relationship between MR and ENS ($p < 0.01$), while there is no mediation effect of ER between MR and ES. As for the mediation effect of SR, it is found that it has a full mediation effect on the relationship between MR and SS ($p < 0.01$), and partly mediating effect between MR and ENS ($p < 0.01$), and MR and ES ($p < 0.01$). As for the mediation effects of CR on the relationship between MR and sustainability, the results were mixed. There is a fully mediating effect between MR and SS and partly mediating effect between MR and ES, while there is no mediation effect between CR and ENS. The results for the quality training (QT) mediation results in MR and ER relationship showed that there is a partial mediating effect of QT.

Table 5-20 Direct and indirect effects

Direct path			Direct effect (standardise)	Indirect path					Direct effect (W/M)	Indirect effect	Results
MR	→	SS	0.134*	MR	→ ER	→	SS		0.125	0.126***	full
MR	→	SS	0.134*	MR	→ SR	→	SS		0.125	0.129**	full
MR	→	SS	0.134*	MR	→ CR	→	SS		0.125	0.072*	full
MR	→	ENS	0.207***	MR	→ ER	→	ENS		0.203**	0.122**	Partial
MR	→	ENS	0.207***	MR	→ SR	→	ENS		0.203**	0.131**	Partial
MR	→	ENS	0.207***	MR	→ CR	→	ENS		0.203**	0.072	Partial
MR	→	ES	0.202*	MR	→ ER	→	ES		0.218**	-0.040	Partial
MR	→	ES	0.202*	MR	→ SR	→	ES		0.218**	0.122**	Partial
MR	→	ES	0.202*	MR	→ CR	→	ES		0.218**	0.091*	Partial
MR	→	ER	0.675***	MR	→ QT	→	ER		0.423***	0.250***	Partial
*p < 0.050; ** p < 0.010; *** p < 0.001*											

5.7 Multi-group moderation analysis: Sector (Manufacturing and Service)

The below table shows the characteristics of respondents according to sector. This research included the service and manufacturing sectors. The group analysis between the services and manufacturing sectors was tested to identify how the effects of quality management relations on sustainability are different across the sector. The first step was to make sure that both groups (service and manufacturing) are measuring the same underlying latent variables. Therefore, the measurement model was verified in terms of configural, metric and scalar invariance during the CFA validation process (see section 5.2.6).

Table 5-21 Sector characteristics

Sector	Frequency	Percentage

Manufacturing	226	48.1
Service	241	51.6
Total	467	100

The multi-group model was tested according to the sector type; the path differences were tested by using a plugin in AMOS (Gaskin and Lim, 2018). This plugin allows running the models as many as the number of the paths in the model. The plugin runs every path, constrains each path separately and checks if there is a chi-square difference by comparing every path of the constrained and non-constrained models.

The results of this test demonstrate differences according to the model and local levels. The model level (global test) shows that the model differs across groups. That was evident because the chi-square was significant, which means that the model does differ across sectors. For the unconstrained model, X^2 = 2522.077, DF = 1440, for the constrained model, X^2 = 2555.442, DF = 1457 and p-value = 0.010. As the p-value of the chi-square difference test is significant, it means that the model does differ across sectors.

Then every relationship was tested across the groups, as shown in Table 5-22. The table provides the standardised estimates for the manufacturing and service groups. It also shows whether these estimates are significant and at what level. The next columns show the differences in the regression weights for each path and the p-value for each difference. The last column shows the interpretations for each of the paths. These findings are in response to the research question about how the relationships between quality relations and the three dimensions of sustainability performance are different across service and manufacturing firms. These results will be discussed in more detail in the discussion chapter.

Generally, the relationship between MR and ER was stronger for service firms. Similarly, the effects of ER on SS and ENS, and SR on ES, are stronger for service firms. The impact of MR on ENS and ES are stronger for manufacturing firms. The impact of CR on SS is only significant for manufacturing, while the impact of CR on ENS is only significant for service. The relationships between other paths did not show any differences between service and manufacturing firms.

Table 5-22 Path results according to sector type

Path Name			Manufacturing Firms	service Firms	Difference in Betas	P-Value for Difference	Interpretation
MR	→	QT	0.577***	0.649***	-0.072	0.396	These paths revealed that there are no differences between service and manufacturing firms.
QT	→	ER	0.380***	0.347***	0.033	0.899	
MR	→	SR	0.624***	0.578***	0.046	0.821	
MR	→	CR	0.500***	0.551***	-0.051	0.116	
MR	→	ER	0.377***	0.495***	-0.117	0.086	This path is significant for both sectors but the relationship is stronger for service firms
ER	→	SS	0.145†	0.388***	-0.243	0.022	The positive relationship between SS and ER is stronger for service.
ER	→	ENS	0.113	0.372***	-0.258	0.018	The positive relationship between ENS and ER is stronger for service.
ER	→	ES	-0.133	-0.029	-0.104	0.377	There is no difference
CR	→	SS	0.136†	0.107	0.029	0.909	The positive relationship between SS and CR is only significant for manufacturing.
CR	→	ENS	0.106	0.130†	-0.024	0.736	The positive relationship between ENS and CR is only significant for service.
CR	→	ES	0.205**	0.192*	0.013	0.583	These paths revealed that there are no differences between service and manufacturing firms.
SR	→	SS	0.286**	0.130†	0.156	0.377	
SR	→	ENS	0.229**	0.163*	0.066	0.810	
SR	→	ES	0.065	0.361***	-0.296	0.044	The relationship of this path is stronger for service firms
MR	→	SS	0.093	0.106	-0.012	0.739	There is no difference between service and manufacturing firms
MR	→	ENS	0.356***	0.034	0.321	0.070	The relationship of this path is stronger for manufacturing firms
MR	→	ES	0.394***	-0.009	0.404	0.008	The relationship of this path is stronger for manufacturing firms

† p < 0.100; * p < 0.050; ** p < 0.010; *** p < 0.001

5.8 Control variables

This section examines the control variable results and presents the potentially significant differences in quality relations that can be attributed to the size of the organisations. The analysis of the relationships between the quality relations and the three dimensions of sustainability performance was done using AMOS. The model is controlled by the size of the companies. Three categories of company size have been used, based on the (OECD, 2005) standard and classifications, (*see* Table 5-23). The responses were divided into three groups according to the number of employees, which represents the size of the firms.

Table 5-23 Firm size

Firm size	Number	Percentage
Small firms	102	21.8
Medium-sized firms	141	30.2
Large firms	224	48.0
Total	467	100.0

The control variable did not show significant social and economic results that could be attributed to the firms' size, but it was significant for environmental performance. Nevertheless, the hypotheses testing results did not change with and without the control variable.

5.9 Quality certification and sustainability performance

Quality certifications were included in the questionnaire to investigate their effect on sustainability performance. This is a response to the question about the effect of quality certifications on sustainability performance. The effects are assessed based on two groups, those with certification or without certification.

Table 5-24 Quality certification characteristics

ISO Type	Certification	Certified				Total
		Yes	%	No	%	
ISO 9001	Quality Management System (QMS)	276	59.1	191	40.9	467
ISO 45001	Occupational Health and Safety (OH&S)	124	26.6	343	73.4	467
ISO 14001	Environmental Management System (EMS)	175	37.5	292	62.5	467
ISO 20121	Sustainable Event System	16	3.4	451	96.6	467
ISO 26000	Social responsibility	38	8.1	429	91.9	467
ISO 29001	Oil and Gas Certification	3	0.6	464	99.4	467
SA 8000	Social Accountability	31	6.6	436	93.4	467

Table 5-24 shows the characteristics of quality certifications across the collected data. As is shown from the number of responses for each of the quality certifications and for data analysis usability testing, this study considers three quality certifications for further analysis, which are ISO 9001, ISO 45001 and ISO 14001.

The descriptive statistics associated with sustainability performance across quality certifications are reported in Table 5-25. For all the quality certifications, it can be seen that the group of firms without quality certifications has the smallest mean level of sustainability performance for all the quality certifications, and the group of firms with quality certifications has the greatest mean level of sustainability performance. Therefore, this study employed the ANOVA test in order to test the relationships of each quality certification and sustainability performance by comparing the two groups, with and without certificates.

Moreover, Levene's F test was performed to evaluate the homogeneity of variances and is reported for each quality certificate result in the following sections. To assess the different nature of the means, the significant levels were reported to make sure that the difference between firms with quality certification and sustainability performance was statistically significant.

The following sections explore the availability of potentially significant differences in sustainability performance dimensions that can be attributed to quality certifications. The analysis of the relationships between different quality certifications and the three dimensions of sustainability performance was done by running the ANOVA test in SPSS. This test allows comparison of the means of each association among ISO certification and sustainability. The test examines the effects by allocating the sample into two groups: with ISO certification and without ISO certification.

ISO 9001 certification

ISO 9001 is related to the quality management standard, or what is known as the QMS. This research argues that achieving ISO 9001 will positively affect improving the three dimensions of sustainability performance. ISO 9001 has been implemented by more than one million organisations in 187 countries, and it is seen as a successful method to boost a QMS (Salgado *et al.*, 2016). As most firms achieve it, the results of the sample collected for this research show that 276 firms, or 59.1% of the sample are certified with ISO 9001. This percentage indicates how important this certificate is for all organisations (*see* Table 5-25*).*

The study tested the differences between those firms that have ISO 9001 and those that do not have it and the effect on social, environmental and economic sustainability performance by using an ANOVA test. The descriptive statistics associated with having ISO 9001 across the three dimensions of sustainability performance are stated in Table 5-25.

It is noticeable that firms which do not hold an ISO 9001 certificate had the lowest mean level of sustainability outcomes *(M = 3.4, 3.42, 3.39* respectively). In contrast, the group of firms with ISO 9001 certifications was associated with the highest mean levels related to sustainability outcomes *(M = 3.8, 3.46, 3.56,* respectively).

For environmental performance, the independent ANOVA test showed significant results: $F = 22.457$, $p <= 0.01$. For the economic sustainability performance, it was also significant, $F = 7.839$, $p <= 0.05$. Therefore, based on these results, the null hypothesis was rejected, and 0.05% of the variance in environmental and economic performance was accounted for by ISO 9001 certification. As for social sustainability performance, the result was not significant. However, the result of the means showed that certified firms are doing better than those with no ISO 9001.

Table 5-25 Relationships between quality certifications and sustainability performance (Mean results)

Quality certificate	Environmental Sustainability			Social Sustainability			Economic Sustainability		
	Mean (certification)		F	Mean (certification)		ANOVA F	Mean (certification)		F
	With	Without		With	Without		With	Without	
ISO 9001	3.8	3.4	22.457***	3.46	3.42	0.261	3.56	3.39	7.839**
ISO45001	3.817	3.583	6.447**	3.582	3.395	4.284*	3.46	3.50	0.42
ISO14001	3.577	3.365	6.577**	3.974	3.447	42.001***	3.580	3.446	4.741**

Significance Indicators: † $p < 0.100$; * $p < 0.050$; ** $p < 0.010$; *** $p < 0.001$

ISO 45001 certification

The ISO 45001 standard aims to assist organisations in improving their occupational health and safety performance. This study expects that the certification will impact the firm performance positively, and impact specifically on the social sustainability performance regarding their employees.

The descriptive statistics associated with having ISO 45001 across the three dimensions of sustainability performance are detailed in Table 5-24. It can be seen that the group of firms that do not hold an ISO 45001 certificate had the smallest mean levels related to environmental and social sustainability performance *(M = 3.85, 3.39 respectively)*, while the group of firms with ISO 45001 certifications had the greatest mean levels related to environmental and social sustainability performance *(M = 3.82, 3.58 respectively)*. Therefore, the null hypothesis was rejected, and 0.05% of the variance accounted for environmental and social performance. For both the environmental and social performance, there were significant results with $F = 6.447$, *p < = 0.01* and 4.284, *p < = 0.05*, respectively. As for the economic sustainability performance, the independent ANOVA did not yield a statistically significant effect, $F = 0.42$, *p > = 0.05*. Generally, it seems that ISO 45001 contributes to improving sustainability performance, *see* Table 5-25*.

ISO 14001 certification

The ISO 14001 standard is concerned with the environmental management system (EMS). This research argues that following the framework that this standard offers would enable organisations to establish environmental performance requirements. Based on the data collected, there were 175 (37.5%) out of 467 firms with a certified ISO 14001 standard, *see* Table 5-24.

Interestingly, the results of the mean test show that ISO 14001 contributes to improving sustainability performance. The results for environmental, social and economic sustainability performance were $F = 6.577$, $p <= 0.01$; $F = 42.001$, $p <= 0.001$; and $F = 4.741$, $p <= 0.05$, respectively. As expected, environmental performance is highly improved. The high F value and robust significant level confirm this result at the p-value of > 0.001. The other certificates, ISO 20121, ISO 26000, ISO 29001, and SA8000, were not included for further analysis due to the small amount of data gathered about them.

5.10 Alternative model

The structural model was developed to examine the quality influences that impact sustainability dimensions. As is shown in Figure 5-14, there are four factors found to explain the variances in sustainability performance. All the paths were found to be positively significant except MR and SS, and ER and ES. However, according to the specification and theoretical basis related to the debate on social and environmental sustainability, it was suggested that environmental sustainability could predict social sustainability; therefore, this path was added. The structure model *(*Figure 5-14*)* showed that 31% of the variance of social sustainability was explained by quality factors before adding the new path.

By adding the new path from ENS to SS, new statistical results were obtained using AMOS v25 *(*Figure 5-16*)*. Table 5-26 compares the fit indices between the primary structure model and the alternative model.

The results related to the alternative model show satisfactory acceptance levels in terms of fit indices, *see* Table 5-26. The chi-square results show that the alternative model has a better fit. Nevertheless, as the chi-square index is sensitive to sample size, other indices are acknowledged to compare the two models. CFI is very useful as a method of comparing the goodness of fit for nested models (Anderson and Gerbing, 1988). The fit indices indicate that the values of the alternative model fit the data better. Nevertheless, the CFI index indicated an

insignificant difference between the primary model and the alternative model (0.935 - 0.933 = 0.002).

Table 5-26 Fit indices (primary and alternative models)

Index		Thresholds	Overall Structural Model fit indices (Primary)	Overall Structural Model fit indices (Alternative model Path (ENS →SS))
Chi-square (X^2)		>0.05	1715.230 (DF=752; p=.000	1678.124 (DF=751; p=.000
X^2/Degree of freedom (DF)		Between 1 and 3	2.281	2.247
Absolute fit indices	RMSEA	<0.06	0.052	0.052
	SRMR	<0.08	0.067	0.063
	AGFI	>0.08	0.821	0.823
	PClose	>0.05	0.110	0.193
Incremental fit indices	CFI	>0.90	0.933	0.935
	TLI	>0.90	0.927	0.929
Parsimony fit indices	PNFI	>0.05	0.814	0.815
	PCFI	>0.50	0.856	0.856

For the squared multiple correlations (R^2), the variance explained by social sustainability performance was 36%, while for the primary model, it was 32%. This indicates that there is a slight increase in variance. Moreover, the relationships were re-estimated and it was found that all the relationships were theoretically supported except for H6b of the path between CR and SS. Table 5-27 presents all the results for both models.
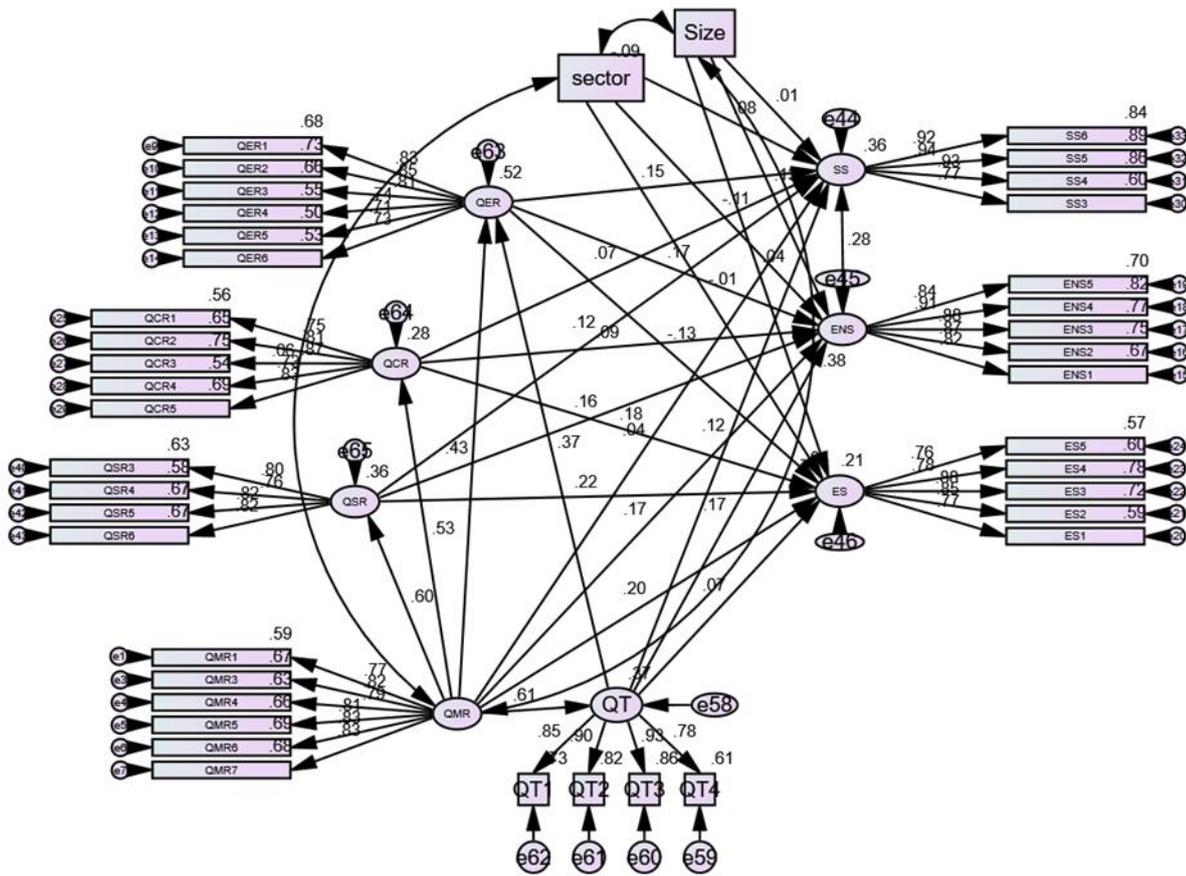
Figure 5-16 Structural model (alternative)

As is revealed in Table 5-27, the results of adding a path between ENS and SS revealed some changes. The path estimates from ER and SS, and SR and SS remain significant but are noticeably smaller than in the primary model.

Table 5-27 Path results (primary model vs alternative model)

Hypothesis	Paths			Primary model estimates		Alternative model estimates	
				Standardised β	T-value	Standardised β	T-value
H1a	MR	→	QT	0.638	11.729***	0.638	11.725***
H1b	MR	→	ER	0.463	8.067***	0.463	8.067***
H1c	MR	→	SR	0.655	11.305***	0.655	11.303***
H1d	MR	→	CR	0.636	9.976***	0.636	9.977***
H2	QT	→	ER	0.381	7.139***	0.381	7.138***
H3a	MR	→	ENS	0.192	2.133*	0.198	2.184*
H3b	MR	→	SS	0.097	1.096 ns	0.045	0.520 ns
H3c	MR	→	ES	0.183	2.289*	0.183	2.292*
H4a	ER	→	ENS	0.193	2.821**	0.188	2.742**
H4b	ER	→	SS	0.205	3.039**	0.152	2.313*
H4c	ER	→	ES	-0.111	-1.853 ns	-0.111	-1.855 ns
H5a	SR	→	ENS	0.182	3.107**	0.176	2.991*
H5b	SR	→	SS	0.179	3.103**	0.127	2.244*
H5c	SR	→	ES	0.181	3.478***	0.180	3.468***
H6a	CR	→	ENS	0.085	1.750 ns	0.084	1.730 ns
H6b	CR	→	SS	0.086	1.853 ns	0.064	1.391 ns
H6c	CR	→	ES	0.135	3.128*	0.135	3.128*
Control	size	→	ENS	0.127	3.317***	0.127	3.307***
Control	size	→	SS	0.045	1.193 ns	0.011	0.292 ns
Control	size	→	ES	0.028	0.822 ns	0.028	.822 ns
Control	sector	→	ENS	-0.173	-2.847*	-0.173	-2.828*
Control	sector	→	SS	0.077	1.284 ns	0.123	2.093*
Control	sector	→	ES	-0.014	-.260 ns	-0.014	-0.259 ns

*$p < 0.050$; ** $p < 0.010$; *** $p < 0.001$; ns=not significant*

Chapter 6. Discussion

The discussion chapter interprets the importance of the research results in light of the research questions by explaining the emerging insights of the research. The main objective was to scrutinise the associations between internal and external quality relations and sustainability performance. The internal quality relations include management relations and employee relations, while external quality relations include supplier relations and customer relations. The sustainability performance indicators include social, environmental and economic performance dimensions. Additional sub-questions aim at, firstly, investigating the role of stakeholder pressure on the three dimensions of sustainability performance, and secondly, assessing the roles of quality certifications on sustainability performance aspects. This study also examined two intervening variables, quality training that mediates quality management relations and quality employee relations, and quality employee relations that mediate the direct relationships of quality management relations and the three dimensions of sustainability performance. Additionally, the current research examined the service and manufacturing context of UK firms to enhance the generalisation of the findings obtained from the survey. In order to accomplish these aims, a model was established to examine the hypothesised relationships. As discussed in chapter three, it was expected that internal and external quality relations would drive positive sustainability performance.

6.1 Research on QM and sustainability

This section discusses the importance of studying QM and its systems in steering sustainability performance. QM research, for scholars and practitioners, has emerged in recent decades as a critical competitive tool that leads to firms' positive performance. Nevertheless, sustaining an excellent position is challenging (Gutierrez-Gutierrez *et al.*, 2018), especially when taking the responsibility to convey and integrate stakeholders concerns into the firm's operations (Yawar and Seuring, 2017). Operations decisions can enhance sustainability performance; for example, prioritising sustainability over durability could affect decisions on product design (Taylor and Vachon, 2018). Quality management is a critical factor in firms' performance. In this essence, quality management and sustainability movements share common interests, such as the focus on continuous improvement and employee empowerment (Rusinko, 2005). More explicitly, firms are likely to be chastised by customers and other stakeholders if they could not fulfil the values and requirements of sustainability (Francés-Gómez and Del Rio, 2008). Hence,

in order to ensure ecological and socially sustainable criteria, firms must facilitate quality management practices to support internal and external capabilities. Quality certifications, such as ISO 9001 and ISO 14001, are also considered fundamental regulations within the QM system. They are standards that emphasise, for example, the elimination of waste which provides support for a sustainable environmental system. However, firms that simultaneously adopt systems such as lean quality should understand how to support their efforts to gain better performance (Fynes *et al.*, 2015). This requires investigating the extent the quality management systems help in achieving better sustainability performance, and what quality certifications could improve sustainability performance. The limited amount of literature which emphasises QM relationships with the three dimensions of sustainability performance is one of the main motives for this research. Besides, the literature is limited as it focuses on environmental performance and neglects the social dimension (Wiengarten and Pagell, 2012). This research offers a framework that considers the three dimensions of sustainability performance. The following discussions are based on the hypotheses, which were developed in chapter three and the findings of the results in chapter five.

6.2 Business relations

Business relations theory is used to describe internal and external drivers towards delivering sustainability outcomes. Business relations interprets the links between six quality management practices and with sustainability performance. The aim of this research is achieved by empirically investigating how internal and external quality relations, in particular MR, ER, SR, CR, and QT, can increase social, environmental, and economic sustainability performance. In this regard, recent research has acknowledged the role of QM relations in organisational development (e.g. Ambrosini and Altintas, 2019; Glaister et al., 2018). Thus, improving business relations will improve the performance. According to Soliman (2011), achieving and improving performance is addressed through paying direct attention to customer relations management. In this vein, Opara and Opara (2016) identified a significant relationship between customer relations management and market share performance. Likewise, Alawiyah and Humairoh (2017) found that applying customer relations management increases companies' financial, marketing, and operational performance. Moreover, management is responsible for influencing customer, supplier, and employee relations, and ensuring effective communications between employees (Daily and Huang, 2001). Correspondingly, quality training is related to sustainable competitive advantage, which can drive the success of QM

through employee relations. It includes quality principles, problem-solving skills, and teamwork for both managers and employees (Powell, 1995; Tarí et al., 2017). Training itself does not produce an advantage unless it is combined with specific imitable tactics or features such as management and employee relations (Powell, 1995). It also increases employees' responsibilities and involvement in problem solving in their work tasks (Kaynak, 2003).

Moreover, most research considering business relations has not considered QM. QM systems provide an approach that can improve performance. Although QM is an approach that has been prevalent since the 1980s, it still has benefits and can improve firm performance, even within a changing competitive environment (Zhang and Xia, 2013). QM systems aid firms in employing their human relations and physical resources effectively (Hendricks and Singhal, 1997).

The focus of this study is mainly on examining QM relations and sustainability outcomes, an area that has never been analysed from the business relations perspective in empirical research. The QM and sustainability literature streams do not provide a cohesive context or empirical verification distinguishing how internal and external quality relations strengthen social, environmental, and economic sustainability performance. To meet new challenges (such as sustainability requirements and stakeholder pressure), organisations have to consider internal and external quality relations.

The processing of information, and linking and integrating customers (for example through customer relations and supplier relations) requires a source of QM systems (Garvin, 1988), for example combining internal and external quality practices. Moreover, management plays a role in coordinating the relationships, which are dependent on co-specialised quality aspects.

This study proposes a cohesive framework with empirical validation based on internal and external QM relations, and the three dimensions of sustainability performance, not offered in the literature to date. As a contribution to the literature, it tests the effects of internal and external quality relations that enhance social, environmental, and economic sustainability performance. For practitioners, the focus of this research is significant as it identifies the critical factors for implementing internal and external quality relations that can enable service and manufacturing firms to improve their sustainability performance. Business relations theory is appropriate as a framework for this research as it responds to the internal and external business relations within those firms dealing with sustainability aspects internally and externally.

This thesis aims to examine the extent to which QM relations enhance sustainability outcomes. Based on the research questions, this study developed a conceptual model that

assisted in meeting the main objectives of the research. Hypotheses were developed to assess the potential associations among different QM relations and sustainability. The importance of investigating these relationships lies in understanding whether the influence of a specific QM relation on a specific sustainability dimension has a similar, contradictory, or comparable influence on each of the other sustainability dimensions. Providing empirical evidence of potential relationships aims to generate robust and generalisable findings.

6.3 Quality management relations (internal and external quality practices)

This study used extensive quality management literature and TQM practice research to identify internal and external operational quality factors, e.g., Gutierrez-Gutierrez *et al.* (2018). The internal factors are related to management and employee relations, and the external factors are related to supplier and customer relations. The quality management construct consists of six factors related explicitly to the extent managers support long-term quality improvement processes, take responsibility for achieving quality performance, review relevant quality-related issues in top management meetings, evaluate quality performance, understand quality improvement in terms of focusing on long-term profitability, and consider quality improvement as a way to achieve long-term profitability of organisations. The employee relations construct is characterised by six reflective factors related to the extent firms provide a collaborative environment for employees; facilitate team work to solve problems; motivate, support and involve employees in quality aspects; encourage employees to participate in decision making and planning; encourage employees to increase interaction with customers and/or suppliers; and encourage employees to be involved in product and service improvements. As for the quality training construct, it includes four items that measured the extent firms encourage employees to attend training programmes; provide employees with training that includes long-term continuous improvement aspects; provide employees with quality-related training, e.g., quality principles, problem-solving, team working, etc.; and incorporate technological advancements in training programmes. As for the external quality relation, it includes quality customer relations and quality supplier relations. The customer relations construct consists of five indicators: the extent firms use satisfaction surveys to identify their customers' requirements; the extent they use customer feedback to improve their current processes; the extent firms collect customer feedback; how actively firms seek customers input to determine current and future requirements; and, lastly, the extent firms systematically and regularly measure customer satisfaction. The supplier quality relations constructs consists of four

indicators related to the extent suppliers are provided with training and technical assistance; the extent the suppliers are keenly engaged in processes of service or product design; the extent organisations consider a commitment to continuous improvement in supplier selection; and the extent organisations consider quality as more important than price when selecting suppliers.

6.4 Sustainability performance dimensions

For this study, sustainability performance (SP) is defined in line with Elkington (1994; 1998; 2002) and requires firms to expand their emphasis on economic performance to a triple bottom line (TBL). This definition also comprises people, planet and profit (Kleindorfer *et al.*, 2005). The measurement that is related to social performance has resulted in the specification of four manifested indicators. These indicators include measuring the extent of explicit engagement with HR activities that endorse workforce development. They also include items related to the extent firms strive to conserve the traditional values of local communities, and the extent firms conserve the cultural heritage of local communities. The extent firms foster a mutually beneficial relationship with the local communities is also included.

As for environmental performance, it has resulted in five indicators, related to the extent firms attempt to protect the environment; the extent firms have initiatives to reduce energy consumption and reduce water consumption; indicators measuring the extent firms try to minimise waste and emissions from facilities; and the extent firms use more renewable and less harmful materials in their production or service.

The economic sustainability performance has resulted in five indicators that evaluate the change over three years, which are profit growth, market share, market share growth, return on investment, and return on assets.

6.5 Management relations (MR), QT, QR, SR and CR (H1a,b,c,d; H2)

The results of the influences of management relations (MR) on other quality relations (employees, training, suppliers, and customer) are consistent with previous research, strongly supporting H1a, H1b, H1c, and H1d. The effect of MR on ER, QT, SR and CR were strongly significant ($\beta = 0.426$, $p < 0.001$; $\beta = 0.615$, $p < 0.001$; $\beta = 0.600$, $p < 0.001$; $\beta = 0.531$, $p < 0.001$, respectively). These results, along with the mean scores, certainly reflect the role of

management in supporting other quality practices and are strongly in line with previous research findings. For example, Kim *et al.* (2012) argued that quality management is essential in driving further quality relations, including employee, customer or supplier relations. The findings validate the important roles for firms' managers in considering internal and external significance of QM relations. By taking the responsibility of achieving quality performance, supporting and evaluating quality improvement processes, reviewing quality-related issues in top manager meetings and considering quality management to focus on short- and long-term profitability improvements, managers would boost quality employee relations, facilitate more quality training and improve supplier and customers relations.

The relationship between MR and ER is also enriched by the role of quality training as a mediator which is explained by the quality management relation, supporting H2. The mediating role of training was partially supported as all the paths between MR and QT, and between QT and ER, showed significant relationships. Quality training refers to updating and maintaining employee skills and knowledge with cutting-edge skills and capabilities, which can facilitate problem-solving abilities (Flynn, 1994; Zeng *et al.*, 2017; Gutierrez-Gutierrez *et al.*, 2018). Thus, when the rate of quality training is high, firms will also be required to increase the focus on quality employee practices. The results are consistent with prior investigations, e.g., Zhang *et al.* (2012) and Sarkis *et al.* (2010a), who argue that quality training contributes to developing employees' skills which help to improve the efficiency of their work and help firms to implement environmental practices. Previous research pointed out the importance of considering quality training in sustainability performance studies, e.g., Rothenberg (2003); Chaudhuri and Jayaram (2018).

The above empirical findings concerning the effect of management roles and other quality relations of UK firms are essential. Managers use quality management techniques to limit conflicts and problems within their firms and to have their firms performing well in terms of internal and external relations. Therefore, it is beneficial to use quality management mechanism techniques such as supporting long-term quality improvement processes.

6.6 Management relations (MR) and sustainability performance (SP) (H3a,b,c)

Previous literature that examined QM relations and performance has reported conflicting findings and presented a somewhat mixed picture of the relationship. For example, some research reported a negative impact on economic performance (Nair, 2006; Yeung *et al.*, 2006), while other studies have indicated positive results (Rahman and Bullock, 2005). However, the

current study provides enough evidence of the effects of internal quality relations and sustainability performance. Management relations reflect the managers' long-term view of QM efforts in enhancing sustainability performance. The results related to the impact of MR in sustainability dimensions was mixed. The standardised estimated path coefficient of the relationships between MR and social outcomes was not statistically significant (β = 0.125; $p > 0.05$), while there were significant positive results for the MR and environmental outcomes (β = 0.203; $p < 0.05$), and between MR and economic sustainability performance (β = 0.218; $p < 0.05$). Therefore, these findings validate H3a and H3c but do not validate H3b.

The results for the influence of MR on the environmental performance was similar to the findings of previous literature (e.g., Daily and Huang, 2001; Ramus, 2001). It means that environmental sustainability is improved if there is support from management that is based on the quality management setting. Managers are responsible for leading and evaluating environmental initiatives through the improvement process and encouraging employees' involvement in achieving environmental performance. Moreover, top management commitment to quality initiatives improves economic performance, and it is a critical quality practice that boosts economic sustainability performance. The findings are consistent with previous research that suggests when quality is improved, the impact on financial performance is enhanced (Adam *et al.*, 1997; Akdere, 2009). Quality management focused on the quality improvement process as a way to achieve profitable outcomes in the short-term and long-term would enhance the financial outcome. Also, the findings highlight the need for top managers to consider and evaluate the quality improvement process on a long-term basis as a competitive and sustainable advantage.

Although the relationships between MR and social sustainability performance was positively hypothesised, some studies have revealed that QM does not always improve sustainability outcomes (e,g., Boje and Winsor, 1993; Viada-Stenger *et al.*, 2010; Benavides-Velasco *et al.*, 2014). De Menezes (2012) also found that quality and top-involvement management may not trigger organisational performance. He argued that negative results are because some organisations in the UK might not consider effective features of QM. Hence, only some firms benefit from QM. However, quality management support alone may not be adequate to generally impact the sustainability performance dimensions, including social sustainability performance. The mediating role of other quality practices has interesting results. The next sections discuss the findings of the meditating roles of indirect effects of quality management relations.

As business relations views focuses on marketing aspects and it is neglected in QM research. Thus, this study offers a framework with empirical support based on internal quality

relations and the three dimensions of sustainability performance, which the literature does not offer. Besides, the literature is limited as it focuses on environmental performance and neglects the social dimension (Wiengarten and Pagell, 2012). The QM and sustainability movements share common interests, such as the focus on continuous improvement and employee empowerment (Rusinko, 2005). QM is a critical factor in firms' performance. There is an effect of operational decisions in enhancing sustainability performance, for example, prioritising sustainability over durability could affect decisions concerning product design (Taylor and Vachon, 2018). However, firms that simultaneously adopt quality systems, such as lean management, should understand how to support their efforts to gain better performance (Fynes *et al.*, 2015). Business relations theory is appropriate for investigating the relationships between quality relations and sustainability dimensions. This view represents the relationships by involving many independent organisations and managing their relationships. The vertical relations seek to achieve the goals by using the appropriate resources to attain better customer value and create competitive advantage (Hunt *et al.*, 2002)

The management role lies in coordinating business relations which are dependent on co-specialised assets. Management decisions should consider the optimal configuration of assets and be able to select and configure resources, which will produce more value than an isolated part. This confirms the role of management commitment in helping to achieve better sustainability performance. The results revealed that MR is essential in driving other quality relations, such as employee relations and training. The results are similar to the earlier literature (e.g. Kim et al., 2012). The results also illustrated that MR has a positive consequence on environmental and economic sustainability outcomes and no association among QM relations and social outcomes. The findings are also similar to past literature (e.g. Daily and Huang, 2001).

Nevertheless, some research has revealed that QM does not always improve sustainability performance (e.g. Benavides-Velasco et al., 2014; Boje and Winsor, 1993; Viada-Stenger et al., 2010). De Menezes (2012) also found that quality and the involvement of top management may not lead to higher organisational performance.

6.7 The link between employee relations (ER) and sustainability performance (SP) (H4a, b, c)

Employee relations, following QM research, include different aspects ranging from involving firms' employees in quality aspects such as solving problems and facilitating teamwork,

encouraging and rewarding employees, to supporting their participation in decision making, interaction with customers, and improving products and services.

The results for the impact of ER on sustainability outcomes were varied. There was support for social and environmental sustainability performance as the results were positively significant (β = 0.266; $p < 0.05$) for social, and (β = 0.245; $p < 0.05$) for the environmental outcomes (H4a,b), whereas the ER did not show significant results with economic sustainability performance (H4c).

Previous literature has found similar results. The majority of prior research showed that quality employee relations positively affect social initiatives such as SR, e.g., Hutchins and Sutherland (2008); Ahmed and McQuaid (2005); Anderson *et al.* (1995); Akdere (2009) and Molina‑Azorín *et al.* (2009). Firms may pursue social sustainability performance and build a mutual relationship with the community by providing their employees with basic quality necessities, such as providing and involving employees in a collaborative environment, facilitating team working, and encouraging employees to participate and interact with improving the process. While employees are involved with their firms' operations and processes, they become more engaged in acquiring local community values and tend to conserve the traditional values of the local communities, and thus improve social sustainability performance. According to Hutchins and Sutherland (2008), firms seeking to address CSR should meet the primary requirement of their employees and the communities they interact with. Employee relations also emphasises the importance of managing employees' skills and social values (Ahmed and McQuaid, 2005), which shapes social sustainability and makes them socially oriented (Sudin, 2011; Masri and Jaaron, 2017).

As for environmental performance, the results of this research extend prior research that has identified ER as an essential driver of sustainability performance. QM increases the managers' commitment to improvement (Nickols, 1998) by involving employees (Rothenberg, 2003). Firms with involved employees are better than other firms at reducing chemical waste (Theyel, 2000). Jackson *et al.* (2016) found that quality management innovation (including employee issues) had a significant relationship with environmental performance. The employee relations create solutions to deal with environmental aspects and strengthen the employees' capability to recognise ecological issues such as pollution (Boiral and Paillé, 2012), and that reflects positively on improving environmental performance (Massoud *et al.*, 2011; Masri and Jaaron, 2017). Margaretha and Saragih (2012) argue that involving employees in green human resource practices and in developing green culture promotes sustainable business results and help firms to operate in an environmentally sustainable business manner.

As for the effect on economic performance, the result was not as expected; however, it is consistent with some of the prior findings (Jackson *et al.*, 2016). It means that quality employee relations alone are not enough to improve economic performance, This is not really surprising as quality employee relations should be coupled with other firm initiatives, such as improving the green supply chain, which would boost economic performance (Rao and Holt, 2005).

6.8 The link between supplier relations (SR) and sustainability performance (H5a, b, c)

The impact of SR on the three dimensions of sustainability was positive and significant. The study's findings indicate that the relational paths between quality supplier relations and the three dimensions of sustainability performance were significant ($\beta = 0.225$, $p < 0.05$) for economic sustainability performance; ($\beta = 0.187$, $p < 0.001$) environmental sustainability performance; and ($\beta = 0.193$, $p < 0.05$) social sustainability performance. This indicates that UK firms are likely to support their suppliers' quality relations for their sustainability performance. Prior research suggests that acquiring external relationships with suppliers creates trust and mutual benefits which result in improving the efficiency of the firm, and involving collaboration with suppliers result in obtaining sustainable benefits (Kaynak and Hartley, 2008).

Supplier relations as a quality practice enhances and maximises quality performance in several ways. One of the critical contributions is by selecting a few suppliers and building longer relationships which consider quality criteria, not the cost. These relationships also allow for more cooperation and knowledge sharing. Suppliers can take part in product design and offer advice and comments on performance (Flynn *et al.*, 1995; Powell, 1995). Firms must reform those relationships all together at the same time, including relationships between managers, suppliers and employees. According to Barney *et al.* (2001), these resources are beyond the firms' capabilities unless they are subjected to direct management (Powell, 1995).

The findings parallel previous research that proposes the necessity of quality supplier relations for any firms which aim to increase performance. In this regard, scholars argue that the firms are obligated to making an effort to establish long-term supplier relationships. Additionally, they claim that firms are advised to involve their suppliers in design processes and technical training and to have a rating and evaluating system for suppliers that have quality principles criteria (Kaynak and Hartley, 2008; Kim *et al.*, 2012; Hietschold *et al.*, 2014). These activities contribute to fostering and achieving better results (Calvo-Mora *et al.*, 2014).

Moreover, firms which obtain internal and external contact with their business suppliers are able to create trust and mutual benefit in the relationships because they will improve the efficiency of the firm, obtain sustainable benefits and secure sustained success. Furthermore, Kaynak and Hartley (2008) argued that supplier relations are essential in driving performance because they involve communication and collaboration between downstream and upstream members. Other recent studies suggest where firms have good relations with their suppliers, this builds sustainable suppliers and avoids supplier switching, which will result in improving economic performance (Pagell and Gobeli, 2009; Yawar and Seuring, 2017).

6.9 The link between customer relations (CR) and sustainability performance (SP) (H6 a, b, c)

The results of the relationships between CR and three sustainability performance dimensions were positively supported (β = 0.190, $p < 0.05$) for economic sustainability performance; (β = 0.116, $p < 0.001$) environmental sustainability performance; and (β = 0.122, $p < 0.05$) social sustainability performance. Previous literature supported these findings, e.g., Waldersee and Luthans (1994); Bi (2011); Taylor and Vachon (2018). Nevertheless, previous studies found that customer focus increases customer loyalty and sales (Shrivastava, 1995; Longoni *et al.*, 2016); and increases revenues as it improves the business and allows firms to obtain business benefits and improvements (Anderson *et al.*, 1995; Kaynak, 2003). Firms with good customer relations are concerned with identifying current and future customer requirements through surveys and obtaining feedback to improve processes. Firms also involve their customers in product and service design. Customer relations allows firms to maintain relationships with customers by establishing communications and receiving inputs and feedback on the products and services. QM provides tools for determining customers' requirements (Flynn *et al.*, 1995; Powell, 1995). As the necessities of sustainability have become universal, and firms become increasingly globalised, customers' requirements and public values are considered as significant drivers of sustainability (Bi, 2011). Customer focus has an impact on operation management by supporting adoption of new practices and technologies to remain competitive (Taylor and Vachon, 2018). This means that customer focus as a quality practice is concerned with getting positive or negative feedback (corrective actions) on quality and the company's processes (Hietschold *et al.*, 2014). Having feedback on customer service performance leads to improved performance (Waldersee and Luthans, 1994).

This explains the role of customer relations on as quality practice in achieving sustainability performance.

As for the influence of CR on the ecological outcomes, the findings of this study extend prior research that has identified that possessing specialised knowledge about customers and their requirements allow companies to have a better understanding of their product choices and better knowledge of their ecological orientations. The firms become aware of their customers' environmentally friendly products and services. Chardine-Baumann and Botta-Genoulaz (2014) suggest that having good and developed relations with customers allow them to adapt to the firm's products or services.

Previous research has emphasised incorporating the concept of 'customer' to include a much more comprehensive range, which has been stretched to include community (Parast and Adams, 2012). Epstein and Roy (2001) also argued that firms should try to promote sustainability performance, take further steps and consider their customers by reducing CO_2 emissions. This emphasised the importance of considering customers when taking steps towards improving sustainability. This study validates this relationship as there is some research that has dealt with the social dimensions, especially those concerned with employees, workplace safety and health (Jilcha and Kitaw, 2016). Firms achieve a higher level of benefit related to customers by employing quality management initiatives (Parast and Adams, 2012). Also, involving customers in product and service design (Hietschold *et al.*, 2014) would make them socially accountable (Sarkis *et al.*, 2010b). Customer relations as a quality practice is concerned with customer feedback and complaints and encourages companies to deal with social and customer problems (Hietschold *et al.*, 2014).

6.10 Mediating effects

The meditation effects enrich the understanding of the primary relationships by examining the direct and indirect relationships of the QM relations and sustainability dimensions. The findings of this research were partial and full mediations effects. The statistics of direct and indirect effects showed that ER is found to fully mediate the relationship between MR and SS ($p < 0.001$), and partly mediate the relationship between MR and ENS ($p < 0.01$), while there is no mediation effect of ER between MR and ES. The results showed that MR is indirectly related to social sustainability outcomes through quality employee relations.

Moreover, SR has a full mediation result for the main effect of MR and SS ($p < 0.01$), and a partial mediating effect between MR and ENS ($p < 0.01$), and MR and ES ($p < 0.01$). As

for the mediation results of CR for the main effect of MR and the sustainability dimensions, there were mixed results. The results showed that there is a fully mediating effect between MR and SS and a partial mediating effect between MR and ES, while there is no mediation effect between CR and ENS. As for the mediation effect of quality training (QT), as it is in the main effect of MR and ER, it was revealed that there is a partial mediating effect of QT.

In addition, the critical finding is that considering just an individual quality construct is not adequate to achieve more sustainable performance. The findings showed that quality management relations are interconnected and affect sustainability performance directly and indirectly. This indicates that the impact of a single QM relation is attached to other quality relations. QM relations, internally and externally, act together to provide advantages to firms, including sustainability performance. For example, the results showed that QM relations are associated directly to the three dimensions of sustainability performance, except for the direct effect of MR and social sustainability outcomes. MR is indirectly related to the three dimensions of sustainability performance through other QM relations, including employee relations, quality training, supplier relations and customer relations. Similar findings have showed the importance of MR relations and other quality relations in driving firm performance. For example, Kaynak (2003) and Kaynak and Hartley (2008) argued that to achieve more benefits from QM relations, it is imperative to highlight the interrelationships of QM relations. Likewise, Martínez-Costa *et al.* (2008) emphasised that QM relations should be tested as multiple dimension measures rather than one because QM is grounded in a group of relations. This implies that organisations should not consider only a few QM relations and tools, but emphasise and invest more on internal and external quality relations. In this regard, the indirect effect of quality management relations and economic sustainability performance through quality employee relations and quality supplier relations are in line with previous research. For example, a study by Albers Mohrman *et al.* (1995), obtained significant results from QM implementation supported by supplier quality effort, and employee and capital utilisations efficiency.

Moreover, this research supports previous attempts which highlighted the QM relations in predicting sustainability performance. For example, Pagell and Shevchenko (2014) found that taking care of employees' health and safety on the shop floor can eventually affect financial and environmental sustainability performance in a positive way, which is similar findings by Lo *et al.* (2012). They investigated the role of ISO 14001 in improving financial performance and found a significant positive result. Thus, this confirms the causal relationship between QM and economic sustainability performance.

6.11 Sector: service and manufacturing

The main hypotheses of the internal and external QM relations and the three dimensions of sustainability performance were tested across sector types of manufacturing and service firms. It was expected that these relationships would achieve different results. Hence, the research hypothesis was to distinguish the differences between service and manufacturing firms when testing the effects of various internal and external QM relations on sustainability outcomes. Generally, the previous literature showed unconvincing and contradictory results between QM and firm performance (Tarí *et al.*, 2017) without specifying how services and manufacturing may have had different results. In this essence, a study by Lee *et al.* (2003) argues that the QM system enhances business performance and people performance in both sectors.

In comparison, Zhao *et al.* (2004) found that service firms with a developed quality system perform better. Nevertheless, few studies have explored sustainability in service firms (Hasan, 2013). Robson *et al.* (2002) also studied TQM initiatives and sustainability outcomes of 450 UK service firms and found positive results.

However, this research argued that QM systems could be applied in any sector including service and manufacturing firms (Dean Jr and Bowen, 1994) as it creates improvements in products, services, competitiveness and business performance (Kaynak, 2003; Baird *et al.*, 2011). There is also agreement that QM plays a role in different sustainability performance dimensions. Usually, sustainability is seen as an operating context that applies to manufacturing more than services due to manufacturing product types, waste and emissions. However, this research investigates the variances in the relationships between QM relations and sustainability results which could be identified between service and manufacturing firms. By considering the results of the main effects, the paths (MR, ER, SR and CR on SS, ENS and ES) were tested across the service and manufacturing sectors. These results help to identify the effects of different QM relations across different sustainability performance dimensions. Some of the results of the main paths showed no differences when the model was tested for both sectors from when the model was tested for separate sectors. For example, there are no changes between the sector types for the significant positive relationships between MR and SR, MR and CR, MR and QT, QT and ER, MR and SS, ER and ES, SR and SS, SR and ENS, and CR and ES.

However, the relationships between MR and ER, ER and SS, ER and ENS, CR and ENS, and SR and ES are stronger for services, while the relationships between MR and ENS, CR and SS, and MR and ES are stronger for manufacturing.

For the QM relations, it could be concluded that all the quality relations have significant positive effects for both sectors with no difference in strength, except management relations which is stronger for service firms. This finding was supported by previous research. For example, Albers Mohrman *et al.* (1995) found that the outcome of the application of TQM in the service sectors has a more substantial effect. Similarly, the results are supported by Hartline and Ferrell (1996)'s study. By surveying hotel managers, they found empirically that managers with higher QM support tend to empower their employees. Similar results were found by Brah *et al.* (2000). They realised that QM employment enhanced the performance of the service firms due to the higher impact of management commitment and employee relations.

Interestingly, the effect of QM relations and sustainability performance showed mixed results. For example, no variations have been revealed for both sectors for the impact of MR on SS. However, the effect of MR on ENS and ES are stronger for manufacturing. Moreover, the relationship between CR and SS is only significant for manufacturing, while the effect of CR on ENS is only significant for service firms. It seems that manufacturing firms focusing on customer relations perform better in their social sustainability, while it does not repay service firms. In manufacturing firms, health and safety issues are essential such as the use of non-hazardous materials which could damage customer health and safety (Mani *et al.*, 2016b). In contrast, service firms facilitating customer relations perform better in environmental sustainability. Lam and Dai (2015) argued that firms that focus on sustainability would benefit from communicating environmental sustainability effort to customers.

6.12 Moderation effects of stakeholder pressure (SP)

This study argues that stakeholder pressure affects firms' decision making regarding social, environmental, and economic performance. When firms are engaged in quality management practices to increase sustainability performance in their operations, they need to consider the impact of stakeholder pressure. This is important, as stakeholder pressure is imposed on the firm by different stakeholders. The results indicate that firms can manage stakeholder pressure along sustainability performance dimensions. The results are related to the effects of stakeholders' pressure from NGOs, media and government. The moderation effects for MR, ER, SR, and CR on SS, ENS and ES, were tested using the hierarchal regressions technique. The moderations were tested in separate models to show how the stakeholders' pressure moderated each of the QM relations. As for the MR model, the interaction effect of MR and SP showed positive statistical influence only for MR and ENS linkage. The moderation impact

shows that SP negatively moderates the effect of MR and ENS. It means that the SP dampens the positive relationship between MR and ENS. Stakeholder pressure adversely affects environmental sustainability performance. These results are consistent with prior research. For example, Lieb and Lieb (2010) surveyed CEOs about the crucial reasons for starting sustainability programmes, and the results showed that 57 of the total weighted points were related to pressure from stakeholders.

As for the results of the ER model, the interaction of ER and SP showed a positive influence on the linkage of employee relations and social sustainability. It seems that when there is a stakeholder pressure, the significant positive effect of employee relations on social sustainability is increased. Similarly, previous research verified this finding. For example, Taylor and Vachon (2018) argued that NGOs could significantly influence the development of more social sustainability relationship supply chains. In this regard, Fernandez-Feijoo *et al.* (2014) found that when there is an increase of stakeholder pressure, including from employees, it has a positive effect on the level of transparency of sustainability disclosure. Huang and Kung (2010) also argued that the opinions of employees regarding environmental disclosure, specifically in large firms, are more likely to be considered by the top management.

Moreover, for the moderation effect of stakeholder pressure in the SR and CR models, the results of the interaction of SR, CR and SP were negatively significant with environmental sustainability performance. Stakeholder pressure dampens the positive relationships between SR and ENS, and between CR and ENS. Previous literature supports these findings, especially the research in operations management. For example, customer pressure was discussed in the prior research related to concerns and awareness of renewable energy and green investment (Wilkinson *et al.*, 2001). In this instance, Guerci *et al.* (2016) empirically examined Italian firms and how customer pressure affected environmental performance and found a significant relationship. Nowadays, stakeholder awareness about the effects of environmental issues such as pollution has increased (Bask *et al.*, 2013), and customers expect more concern for the environment than a good quality of product or service (Dangelico and Pujari, 2010).

To conclude, stakeholder pressure negatively affects decision making related to environmental sustainability when it is interrelated with quality management relations, quality supplier relations and quality customer relations, while decisions related to social sustainability are affected positively by interaction with quality employee relations.

6.13 Quality certification effects on sustainability performance

As part of assessing the effect of quality certifications on sustainability performance, this study included quality certifications as part of the survey questions. Based on the collected sample, the analysis included the effects of three quality certifications, ISO 9001, ISO 45001 and ISO 14001. Results confirm the benefit of quality certificates in improving sustainability performance dimensions. The current results agree with the prior research that identified the benefits of quality certification in improving the internal and external performance of firms (e.g., Terziovski *et al.*, 2003). Heras-Saizarbitoria and Boiral (2013) also found that ISO 9001 and ISO 14001 have a role in improving operational and business performance, customer satisfaction and image.

ISO 9001

The mean results showed that firms with ISO 9001 are performing better in their environmental and economic sustainability performance. Similarly, the literature supports the findings with a broad discussion. For example, Terziovski *et al.* (2003) found that ISO 9001 contributes to business performance. Hence, the current research is more interested in the effect of ISO 9001 on the three dimensions of sustainability. As expected, the analysis revealed statistically significant results that support that effect of ISO 9001 certification on economic and environmental sustainability, but not on the social outcomes. However, the mean results showed that firms with ISO 9001 certification are performing better than those firms without it. Prior research has similarly agreed with findings showing that ISO 9001 improves organisational performance (Kakouris and Sfakianaki, 2018; Khanai and Bharamanaikar, 2019; Siougle *et al.*, 2019) and also improved the economic performance (Chatzoglou *et al.*, 2015; Martí-Ballester and Simon, 2017; Franceschini *et al.*, 2018; Kusumah and Fabianto, 2018). Accordingly, the results indicate that ISO 9001 is one of the factors to explain the social, environmental, and economic sustainability performance. The findings offer realistic evidence of how ISO 9001 enhances sustainability performance as well as providing an essential contribution to firm managers who are considering the benefit of facilitating the implementation of quality-related certification in order to improve sustainability efforts.

ISO 45001

The results showed that firms with ISO 45001 have better social and environmental sustainability performance. ISO 45001 enhances social sustainability performance and environmental sustainability, but it seems that ISO 45001 does not improve economic

performance. This agrees with the previous literature as regards to social and environmental dimensions and contradicts results related to the economic dimension, Lo *et al.* (2014) found that the standard enhanced the performance on safety, sales growth, and profitability. The ISO 45001 standard is part of the QM system, and it helps organisations to improve their safety and health issues in the workplace (*International Organisation for Standardization-ISO 45001*). This standard is based on an earlier international standard related to occupational health and safety, namely OHSAS 18001.

ISO 14001

The findings revealed that ISO 14001 enhances all the dimensions of sustainability, especially environmental sustainability performance. Nevertheless, it was expected as the standard is mainly focused on the environmental system and was an essential standard for many firms (Arimura *et al.*, 2015; Nunhes and Oliveira, 2018). The current results agree with the previous literature. For example, De Oliveira *et al.* (2010) found that ISO 14001 improved environmental actions and reduced power and water consumption in Brazilian's firms. Singh *et al.* (2015) also explored the efforts of waste reduction in Indian firms and found that ISO 14001 helped the firms to reduce their waste. Moreover, the findings confirm that firms with ISO 14001 have better sustainability performance, which agreed with previous research (e.g., Lo *et al.*, 2012). They found that firms with ISO 14001 have improved their economic performance by increasing their return on assets by 2.9%. Therefore, the current study validates the contribution of ISO 14001 in boosting economic sustainability outcomes.

In conclusion, the effects of the above quality certifications reinforce the arguments in the literature showing the benefits of implementing these standards (e.g., Wang *et al.*, 2016). This study contributes to emphasising the effects of the standards on sustainability performance. This study adds new evidence to the literature on the relationships between three quality standards and the triple bottom line for UK manufacturing and service firms. Additionally, this study has significant implications for industry and academia by showing the importance of having integration through QM systems and sustainability initiatives.

Chapter 7. Implications, conclusion, research limitations and future studies

7.1 Implications

This study has provided interesting significant findings related to the effects of internal and external quality management relations in driving sustainability performance in service and manufacturing firms in the United Kingdom. These findings have enhanced the understanding of the impact of various interrelationships of quality management relations, management, employees, suppliers and customers on sustainability improvements that comprise the social, environmental and economic aspects. The conceptualised model used in this research summarised complex relationships, and it has been tested empirically using robust statistical analysis techniques, including hierarchical regression and structure equation modelling.

In the current complex business environment, where sustainability, globalisation and business competitiveness are essential, firms are required to manage their operations and resources to sustain their competitiveness and performance, not by considering the instrumental track (i.e. economic) only, but by extending it to the external environment and social requirements. Therefore, firms need to direct their efforts to better understand their internal and external quality efforts, which will reflect on their performance and competitiveness. The results in this study uncovered some theoretical and managerial implications and shaped the guidelines that facilitate efforts in implementing quality management relations to improve sustainability performance. Hence, the following sections provide a summary and discussion of the theoretical and practical implication and offer some suggestions for forthcoming studies.

7.1.1 *Theoretical implications*

This research has theoretical implications by contributing to the QM and sustainability domains in various aspects. More precisely, it has primarily emphasised two levels of quality management relations, internal and external, and three dimensions of sustainability performance. Each of the internal and external quality management relations has two constructs: for the internal quality aspects, these are management and employee quality relations; and for the external quality aspects, they are supplier and customer quality relations. As was indicated in chapter two, quality management practices have been used in different

frameworks with no consistent agreement of what constitutes QM practices. However, these quality relations are based on the TQM and QMS approach. Thus, this research is new as it has conceptualised these quality practices into internal and external quality relations as this research argues that QM practices depend on considering firms' relations with internal and external parties. The nature of these quality practices are combined with business relations. Therefore, investing more in these practices presents an opportunity that enhance business relations and affects sustainability performance.

Therefore,

Management relations focuses on improving the level of internal and external quality relations through its commitment to quality management that helps in increasing the level of employees' interactions at the workplace. It is also helpful in bringing positive ambience within a business organisation. Management relations focuses on bringing the change in culture that needs employee involvement at a different level that helps in performing the work with its team. Therefore, it is necessary to take employee relations for maintaining quality within the business organisation. It is necessary for higher authority to provide the opportunity to the employees in order to bring positive ambience at the workplace. Management relations should involve employees of the firm because they help in managing the working environment and increasing firm performance. Also, it is necessary for business organisation to consider customer relations. Thus, it is essential for a business organisation to identify customers' requirements and use feedback to improve operations and processes. It is important to maintain a positive relationship with its supplier for achieving superior quality product as well as services in order to satisfy the need of the customers. It is necessary to overcome from the lack of ability as well as competencies which is needed to deal in an appropriate manner with the high-quality standard that is needed by its buyer (Pipatprapa, Huang and Huang, 2017). Therefore, there must be cooperation from the top-level management within the organisation to improve the quality management system and achieve the goals and objectives of the firm related to quality management.

In addition, ISO 9000 is part of quality management system for the organisation which includes different sets of standards which helped the firm in ensuring in meeting the customer and other stakeholders needs by statutory or regulatory requirements related to the products and services of the firm. This standard is directly related to the basic management system, which includes different quality management principles that help the organisation in managing the quality as well as fulfilling the requirement related to the organisation.

As for sustainability performance, this research embraced the TBL concept that includes social, environmental and economic aspects. TBL suggests that organisations' sustainable

success can be defined not only by financial outcomes but by expanding it to include the three dimensions.

Nevertheless, the social sustainability dimension is almost ignored in the literature due to the emphasis on the ecological dimension. Therefore, the current study contributes to the literature as it provides a holistic analysis of the triple bottom line by providing a robust and generalisable simultaneous examination of the three elements, especially in the social dimension.

Most previous research has generally focused on the direct and indirect linkages of QM relations and economic outcomes, as organisations are mainly profitably focused. Quality management relation studies have been investigated in isolation and have been focused mostly on economic consequences, especially with contradictory results in reporting financial outcomes. Another contribution is related to the importance of investigating the influence of specific quality management relations on the three dimensions of sustainability; thus, identifying to what extent each of the QM relations has a similar or comparable influence on one another validate our understanding of these ambiguous relationships. Quality management relations, especially in the operations management domain, focus on creating consistency everywhere in the organisation, internally by dealing with production systems or staff; and externally, by broadening the scope to consider the relations with suppliers and customers (Boje and Winsor, 1993; Kaynak and Hartley, 2008). Along with this focus, debates on integrating quality harmonise with the focus on sustainability performance (Rao *et al.*, 1999; McWilliams and Siegel, 2001; Tarí, 2011). This gives importance to investigating the impact of internal and external quality relations on firm performance, as those quality relations deal with employee, management, suppliers and customer relations.

Another contribution is that this study extends the previous knowledge related to the relationships of QM relations and sustainability performance to include two different industries, UK service and manufacturing firms. This study has provided comparable results for the relationships by showing which relationships are significant, not significant, stronger or only significant for a specific sector. This research also contributes to quality management systems and sustainability research domains by assessing the role of three ISO standards (ISO 9001, ISO 45001 and ISO 26000) in driving sustainability performance dimensions. Additionally, the research has examined the moderation effects of stakeholder pressure on primary relationships. The external stakeholders, including NGOs, governments and media, are playing a role in UK organisations in terms of sustainability decision making.

Lastly, this research reflects on business relations view to explain the links between quality relations and the three dimensions of sustainability performance. The theory of business

relations provided a logical explanation of how communication and interactions improve the positive relationship factors and mitigate the negative relationship factors (Trada and Goyal, 2020). For example, better relations with suppliers and customers through communications would build trust and confidence, enhance collaboration and resolve conflicts (Trada and Goyal, 2020). While understanding business relational context is one of the highest concerns in marketing exchange (Bagozzi, 1975), others (e.g., Webster Jr (1992) argued that relationship marketing is considered a changing role in marketing research. Also, quality management relations which are related to human resources practices and management roles from business relations perspective have been neglected. Hence, the current research offered an integrated framework with empirical support based on internal and external QM relations, and the three-dimensions of sustainability performance.

7.1.2 *Managerial implications*

Along with profitability, firms need to react to other requirements, such as social responsibility requirements, and concerns from different stakeholders, including the community. Firms also need to consider their internal operations, design and employee issues. However, regardless of all efforts, the concerns related to sustainable development still represent a challenge for successful businesses. Quality management relations were found to enhance processes, operations effectiveness, customer satisfaction and quality improvement, and to provide a competitive advantage. Firms must consider their resources and business relations, internally and externally, to react to sustainability concerns. To provide firms' executives with a deep understanding of the effects of QM relations on sustainability performance, this study has conceptualised the QM relations constructs by using multiple reflective items for the measurement scales of the four quality management constructs (management, employee, customer and supplier relations). Confirmatory factor analysis and reliability tests have validated the scales with higher values.

The research findings revealed several implications for firms' managers. In general, as the results showed, firms need to take into account that quality management relations enhance sustainability performance. This research has supported the results of QM effects on sustainability performance by highlighting the importance of managers' roles in enhancing internal quality aspects such as employee relations and quality training, and external quality aspects related to customers and suppliers.

QM has two dimensions, internal and external relations. The internal relations include management and employee factors, and external quality relations include customer and supplier relations. Firms need to engage more of these four factors to achieve higher sustainability outcomes. If firms involve more in QM relations according to these factors, they will be in a better position to improve sustainability performance.

For internal quality management relations, managers need to maintain long-term improvement processes for the quality initiatives. To do so, managers need to take responsibility for quality performance and incorporate it more in the top management meetings. This highlights the importance of top management responsibility in achieving better quality performance and their role in evaluating the quality approach. Besides, firms need to offer a collaborative environment for employees in order to make them more involved, for example, facilitating team working to solve problems and encourage employees to participate in decision making and planning. This also requires encouragement to interact more with customers and suppliers and to participate in the improvement of products and services.

Additionally, human resource management should be enhanced to support quality training and provide continuous improvement aspects such as quality principles, problem-solving, and teamwork. With regard to social, environmental and economic sustainability performance, it would be valuable for manufacturing and service firm managers to invest more in social and environmental operational practices. This could be achieved by operationalising their sustainability practices, for example, linking social and environmental practices with the local community. Also, it would be useful for operational practices to involve employees and train them in conserving community values and cultural heritage. If manufacturing and service firms aspire to achieve sophisticated levels of sustainability performance through internal quality practices, they should consider QM and employee aspects.

For external quality relations, managers need to consider customer and supplier quality relations. As for customer relation concerns, managers should systematically seek customer feedback and inputs about their firms' process improvements. Managers need to identify their customer requirements in order to improve customer satisfaction. It is also important that managers involve customers in product and service design. Similarly, supplier relations should be established on a long-term basis. Managers need to focus on reasonably few dependable suppliers, which they should involve in service and/or product design. Additionally, managers need to consider continuous improvement when selecting suppliers by considering quality rather than price.

Overall, one of the important managerial implications is that, when considering QM relations for enhancing sustainability performance, service and manufacturing firms should

focus on those quality management relations that have more impact on sustainability performance. This research showed empirically which factors have more impact on each aspect of sustainability performance than others for the service and manufacturing sectors. Additionally, the statistics showed how each of the quality management relations has different effects on social, environmental and economic sustainability. Accordingly, firms should verify quality relations introduced in this study to enhance the three sustainability outcomes. The more quality relations corroborated, the better the overall sustainability performance obtained.

Implications for supply chain managers

The empirical results provide practitioners with evidence which could be extended not just for the organisational side but also the supply chain side. Supply chain managers need to give more attention to the significance of developing business relations when setting up their internal and external quality management relations, such as enhancing social, environmental and economic sustainability performance which represent the three bottom line pillars that sustain competitive advantage.

This research tested a framework that characterises the influence of internal and external quality relations in sustainability performance. The nature of quality relations, especially customer and supplier quality relations, represent supply chain relations.

The findings show that service and manufacturing firms in the UK focus on both internal and external quality relations. This is essential for enhancing the triple bottom line. Thus, UK firms should focus on upstream and downstream quality relations as well as maintain their current focus on quality operational relations. To be more specific, based on the positive regression results, this research drew the conclusion of the importance of emphasising quality customer and supplier relations in driving social, environmental and economic sustainability performance, which indirectly impacts on improvement in firms' quality, and directly supports operational efforts related to quality supplier and customer relations. Managers of the supply chain should extend their quality management efforts to their downstream and upstream relations in their supply chain. For example, managers could share their quality management policies to achieve sustainability goals and supporting long-term improvement processes. Managers should also agree on parallel employee involvement efforts and create a culture of training, teamwork and problem-solving practices, and develop employees within their supply chain. The results showed that quality employee relations positively support sustainability performance. Besides, supply chain managers should support close contact with upstream and downstream supply chain and should extend quality management initiatives such as seeking inputs to determine current and future requirements from their supply chains. The results also emphasised the significance of developing long-term supplier relations and supporting

suppliers by providing them with training and technical assistance. Managers should be more proactive and consider quality management relations and initiatives within their focal firms as these pave the way for more focused supply chain practices within the value chain. According to Acquaye *et al.* (2017), little research has been carried out in supply chain literature related to sustainability performance and measurements related to managing sustainable supply chains.

7.2 Conclusion

The main objective of this research is to assess the impacts of QM relations in enhancing sustainability performance. Internal quality relations include management relations and employee relations; external quality relations include supplier relations and customer relations. The sustainability performance dimensions comprise social, environmental and economic performance sustainability dimensions. This research has also examined the moderation effect of stakeholder pressure. Besides, the effects of quality certifications on sustainability performance were tested. The model in this study includes testing of the mediation effect, firstly, on the quality training influence on the main effect of quality management and quality employee, relations; and secondly, on the influence of quality employee relations on the main effect of quality management relations and the three dimensions of sustainability.

Furthermore, this research examined the differences in the findings between UK service and manufacturing industries. That enhances the generalisation of the findings obtained from the survey. In order to accomplish these aims, a model was established to examine the hypothesised relationships. It was found that internal and external quality relations drive positive sustainability performance which supported expectations outlined in chapter three. The following section concludes the main questions and sub-questions of this study:

1. *What are the critical internal and external quality relations of the quality management system? (answered in the literature review)*
2. *What effects do internal and external quality relations have on social, environmental and economic sustainability performance?*
   2.1 *What influence do management relations have on social, environmental and economic sustainability performance?*
   2.2 *What influence do employee relations have on social, environmental and economic sustainability performance?*

2.3 What influence do supplier relations have on social, environmental and economic sustainability performance?

2.4 What influence do customer relations have on social, environmental and economic sustainability performance?

3. *What effect does management relations have on internal and external quality relations?*

    3.1 What influence does management relations have on quality employee relations?

    3.2 What influence does management relations have on quality supplier relations?

    3.3 What influence does management relations have on quality customer relations?

    3.4 What influence does management relations have on quality training?

4. *Do the linkages between internal and external quality relations differ based on the firms' sectors (service and manufacturing)?*

5. *Do firms with quality certifications perform better in their social, environmental and economic sustainability performance?*

6. *Do firms perform better in their social, environmental and economic sustainability performance when there is stakeholder pressure?*

7. *Does quality training mediate the relationship between quality management relations and quality employee relations?*

8. *Do employee relations mediate the relationship between quality management relations and social, environmental, and economic performance dimensions?*

7.3 Research contributions

The current research contributes to knowledge of quality management and sustainability. This research extends the scholarly inquiry into a model that focuses on the internal and external QM relations that influence the three dimensions of the sustainability performance of 467 UK firms from the service and manufacturing sectors. The contributions in QM and sustainability literature offer some practical implications and future research suggestions. The contributions of the current research as follows.

First, this research is novel as it examined the links between internal and external aspects of TQM practices and the three dimensions of sustainability performance. QM relations are more likely to occur within a QM system and to create a more focused system. This suggests that these practices do not exist in isolation. Although each quality practice forms a part of a system, specifying and refining each quality practice is crucial as they directly impact sustainability performance. The nature of these quality practices is combined with business

relations. Nevertheless, investing more in these practices represents an opportunity that enhance business relations and affects sustainability performance. As the nature of the internal and external quality management practices represent a relationship, quality management practices are conceptualised as quality management relations.

Quality management relations, especially in the operations management domain, focus on creating consistency everywhere in the organisation, internally by dealing with production systems or humans inside the organisation; and externally, by broadening the scope to consider the relations with suppliers and customers (Boje and Winsor, 1993; Kaynak and Hartley, 2008). Along with this focus, debates on integrating quality harmonise with the focus on sustainability performance (Rao *et al.*, 1999; McWilliams and Siegel, 2001; Tarí, 2011). This highlights the importance of investigating internal and external quality relations related to firm performance, as those quality relations deal with employee, management, supplier and customer relations.

Second, the associations between QM relations and sustainability elements (social, economic and environmental) have not been investigated simultaneously. The importance of this research is that it looks at the effect of specific quality management practices on these three dimensions of sustainability. According to Pullman *et al.* (2009), the three aspects of sustainability performance are interconnected. Therefore, identifying to what extent each of the QM practices has a similar or comparable influence on each other validate our understanding of these ambiguous relationships. Besides, this research offers an empirical indication of the relationships between QM relations and their effect on sustainability performance aspects.

Third, the previous research almost ignored the social dimensions and focused on environmental and economic aspects, e.g., Siva *et al.* (2016a) addressed QM and environmental performance. They found that QM is suitable for addressing sustainability concerns; however, they did not provide empirical evidence for this relationship. This study provides robust and generalisable simultaneous examinations of the three elements, especially in the social domain. By considering social sustainability performance, the research adds to the literature and delivers a holistic analysis of the triple bottom line as the social dimension is ignored in sustainability research which focused on environmental and economic dimensions.

Fourth, the previous research focused generally on the direct and indirect relationship between QM relations and economic outcomes, as organisations are mainly profit-focused. Quality relations studies have been carried out in isolation and have focused mostly on economic outcomes, especially with contradictory results in reporting financial outcomes. This study argues that the three sustainability dimensions are all critical for organisations as well as for ecological and community aspects. In this regards, Pullman *et al.* (2009) argued that the

three TBL dimensions are interrelated. Golicic and Smith (2013) found that being socially and environmentally sustainable can yield better performance. However, it is not clear how QM practices influence the three TBL aspects.

Fifth, this study extends the knowledge of the relationships between QM relations and sustainability performance to include two different industries, UK service and manufacturing firms. It is essential to compare service and manufacturing and identify if the relationships are significant, not significant, stronger or only significant for a specific sector.

Sixth, this study examines the role of three ISO standards in driving sustainability performance dimensions. ISO 9001, ISO 45001 and ISO 26000 are the certificates that organisations are most commonly looking to attain as these three ISO standards deal with quality management issues, work-related health and safety, and environmental sustainability. Seventh, the study examines the moderation effects of stakeholder pressure on primary relationships. The external stakeholders, including NGOs, governments and media, are playing a role in UK organisations in terms of sustainability decision making.

Eighth, and finally, this study utilised business relations view as the theoretical lense to illustrate the links between quality relations and the three dimensions of the sustainability performance. Quality relations and the practices related to human resources such as employee quality relations are valuable for firms. Additionally, quality relations which are related to human resources practices from business perspective have been neglected in research related to executives aspects (Vogel and Güttel, 2013). Therefore, this current study proposes an integrated model with empirical verification based on internal and external QM relations, and the three dimensions of sustainability performance, which the literature does not offer. Table 7-1 summaries the research questions, results and the implications.

Table 7-1 The linkage between research questions, research findings and implications

Research questions	Indicators details (independents)	Results	Implications
1. *What are the critical internal and external quality relations of the quality management system?*	Measures were based on previous well-established quality research for both the service and manufacturing sectors.	TQM practices were conceptualised as internal quality relations that include top management relations, workforce relations and external quality relations that include supplier relations and customer relations.	These practices are mostly concerned with the human factors and more appropriate for the service and manufacturing sectors. These practices offer fresh insights for firms' managers in the manufacturing and service sectors as they emphasise the importance of internal and external quality relations for boosting sustainability performance, as well as for advancing employee quality relations and training.
2.1 *What influence do management relations have on social, environmental and economic sustainability performance?*	Management relations was measured by the extent firms' managers accept taking responsibility for the long-term quality improvement process and strategies and creating the environment for quality implementation and motivating employees. Also, the ability to understand quality improvement as a way to achieve short-term and long-term profitability.	Management relations were found to influence environmental and economic sustainability outcomes (SEM model), and influence social, environmental and economic sustainability (hierarchical regression model).	It could be concluded that management relations are critical elements for boosting firms' sustainability performance. The effect of operational management decisions in enhancing sustainability performance is articulated through quality management. The management role lies in coordinating business relations that allow them to consider the optimal configuration of assets and be able to select and configure resources which will help to achieve better sustainability performance. Firms need to improve their sustainability performance; they should implement the optimal operational features of QM supported by top management. Managers should carefully evaluate quality processes and operational decisions to improve their sustainability outcomes as they have significant consequences for performance improvements over time.

Research questions	Indicators details (independents)	Results	Implications
2.2 What influence do employee relations have on social, environmental and economic sustainability performance?	Employee relations comprise different terms of quality employee relations such as employee involvement and empowerment, and the extent employees are involved with and participate in quality efforts, decisions, responsibilities, improvement processes, and teamwork.	Employee relations were found to be a significant predictor of environmental and social performance based on the SEM model, and a significant predictor for all of the sustainability dimensions according to the hierarchical regression analysis.	It could be established that involving the employees in operational decision making within the QM framework helps shape and drive the social and environmental outcomes. The QM creates clarifications to firms' environmental and social aspects which are reflected in better sustainability performance. Also, employee relations create solutions to environmental issues and strengthen employees' ability to identify environmental issues, such as pollution, and that is reflected positively on improving environmental performance. Involving employees in green human resource practices and in developing green culture promotes sustainable business results and helps firms operate in an environmentally sustainable business manner.
2.3 What influence do supplier relations have on social, environmental and economic sustainability performance?	Supplier relations are related to fostering long-term relationships with suppliers that require supplier selecting based on quality rather than cost, and the extent firms develop sophisticated and robust supplier selection and evaluation to help them achieve their performance objectives.	Supplier relations was found to be a significant predictor of social, environmental and economic sustainability performance for both the SEM model and the hierarchical regression model.	Social, environmental and economic performance could be increased if firms implement quality supplier relations, such as by fostering relationships with their suppliers by providing training and technical assistance, involving them in their design of service or products, and considering continuous improvement and quality when selecting them. It is valuable to notice that the high implementation of QM relations in a developed country, like the UK, explains both the higher implementation of QM and how UK firms extend their quality relations to their suppliers.

Research questions	Indicators details (independents)	Results	Implications
2.4 What influence do customer relations have on social, environmental and economic sustainability performance?	Customer relations is about building a closer customer relationship by determining customers' requirements and using these requirements to improve the firms' processes, and the extent firms put emphasis on understanding customers' requirements and their satisfaction.	Customer relations was found to be a significant predictor of the three sustainability aspects for both the SEM model and the hierarchical regression model.	The influence of quality customer relations tends to be statistically significant for the three sustainability performance dimensions. Thus, it can be concluded that it is essential for organisations to consider customer inputs in a systemic way in order to determine customer requirements and improve their satisfaction. According to Huo *et al.* (2013), firms that employ quality customer relations are able to determine conflicts in meeting their customers' requirements within their operations. This also shows that UK firms are more focused on enhancing their operational customer relations which represent competitive environment (nationally and internationally) in order to enhance their sustainability performance, which explained their focus on quality customer relations.
3.1 What influence do management relations have on quality employee, supplier relation and customer relations, and quality training?	These relationships aim to confirm the essential role for firms' managers in taking responsibility for achieving quality performance, supporting and evaluating quality improvement processes, reviewing quality-related issues in top managers' meetings and considering quality management. To focus on short- and long-term profitability improvements, managers would boost quality employee relations, facilitate more quality training and improve supplier and customers relations	Management relations was found to be a strong predictor of the quality employee, supplier and customer relations, and quality training.	It could be concluded that internal and external quality relations are interdependent, supporting previous literature in this regard. Also, it is vital to highlight the role of managers in managing internal and external quality relations, which appear to impact sustainability performance. Management relations (managers role) seems to be essential both for other quality relations and for sustainability performance. Similar studies have identified the significance of managers and leadership in quality performance and customer focus (Kaynak and Hartley, 2008).

Research questions	Indicators details (independents)	Results	Implications
4 Do the connections between internal and external quality relations differ based on the firms' sectors (service and manufacturing)?	Internal quality relations include management and employee relations; while the external quality relations include supplier and customer quality relations. Each construct was operationalised as reported above,	The effect of management relations on environmental and economic sustainability performance is stronger for manufacturing firms; while the influence of employee relations is stronger for service firms. Customer relations influence on social sustainability is only significant for manufacturing firms, while its influence in environmental sustainability performance is only significant for service firms. Supplier relations influence on economic performance is stronger for service firms. Other relationships resulted in no difference between service and manufacturing firms.	These mixed outcomes of the effects of internal and external quality relations on sustainability indicate that QM relations vary across service and manufacturing industries. Generally, it could be concluded that all the quality relations have significant positive effects for both sectors with no difference in strength, except management relations which is stronger for service firms. However, the effect of MR on ENS and ES are stronger for manufacturing. Moreover, the relationship between CR and SS is only significant for manufacturing, while the effect of CR on ENS is only significant for service firms. It seems that manufacturing firms focusing on customer relations perform better in their social sustainability, while it does not repay service firms. The results help to recognize the effects of different QM relations across different sustainability performance dimensions of both sectors.
5. Do firms with quality certifications perform better in their social, environmental and economic sustainability?	The effects of quality certifications ISO standards (9001,45001 and 14001) on sustainability performance are assessed based on two groups: firms with certification or firms without certification.	ISO standards (9001,45001 and 14001) contribute to social, environmental and economic sustainability performance.	The three ISO standards in this research were found to be essential to enhance sustainability performance dimensions. Previous research had similar findings, e.g., Siougle *et al.* (2019) realised that ISO 9001 is related to better economic outcomes. Also, ISO 9001 is found to improve other quality relations and quality performance (Phan *et al.*, 2016). In this regards, Dunmire (2016) argue that ISO 45001 reduces risks related to environmental requirements of firms. Additionally, research on ISO 14001 shows its importance in firms performance, e.g., Hernandez-Vivanco *et al.* (2019) and Boiral *et al.* (2018).

Research questions	Indicators details (independents)	Results	Implications
6. Do firms perform better in their social, environmental and economic sustainability performance when there is stakeholder pressure?	Stakeholder pressure is measured by the extent stakeholders (government, non-government organisations (NGOs) and public media) have influenced firms' decisions on sustainability management.	Stakeholder pressure dampens the confirmed relationship of QM relations and environmental sustainability outcomes; while stakeholder pressure strengthens the positive relationship between quality employee relations and social sustainability. Stakeholder pressure reduces the confirmed relationship between quality supplier relations and environmental sustainability performance. Stakeholder pressure reduces the confirmed relationship between quality customer relations and environmental sustainability performance. No other moderation effects were detected.	It could be concluded that stakeholder pressure controls the statistically confirmed relationships of QM relations and social and environmental outcomes. Previous research discussed that non-government, customers and government pressure could be antecedents to environmental practice (Taylor and Vachon, 2018). The results imply that when firms are engaged in quality management relations to increase sustainability performance in their operations, they need to consider the impact of stakeholder pressure. For MR and ENS, stakeholder pressure adversely affects environmental sustainability performance. For ER and SS, it seems that when there is a stakeholder pressure, the significant positive effect of employee relations on social sustainability is increased. Generally, firms need to be cautious in their decisions making regarding sustainability as these decisions might be affected by stakeholder pressures.
7. Does quality training mediate the relationship between quality management relations and quality employee relations?	Quality training is measured through firms' efforts in developing employees' knowledge, abilities and skills. It includes several aspects related to problem-solving ability, continuous improvement, teamwork and quality principles.	The interaction result (mediation) of quality training on the relationship between quality management relations and quality employee relations showed that there is a partial mediating result of quality training.	The results validated the meditation effect of quality training that indicate that the impact of QM relations on quality employee relations is partially contingent. Thus, this verifies the substance of quality training in the achievement of quality employee relations. This implies that to improve sustainability performance, firms can put more efforts into enhancing their business relations by involving their employees and facilitating training. Also, investing more in ER and QT allows the employees of firms to help their companies to be more sustainable. Moreover, employee training as an aspect of QM helps employees to understand the firm's philosophy and strategies. QT allows firms to identify sustainability issues through team-working and problem-solving procedures and allocating suitable training programmes.

Research questions	Indicators details (independents)	Results	Implications
8. *Do employee relations mediate the relationship between quality management relations and social, environmental, and economic performance dimensions?*	Employee relations comprise different aspects of quality employee relations such as employee involvement and empowerment; and the extent employees are involved with and participated in quality efforts, decisions, responsibilities, improvement processes, and teamwork	There were full mediation effects of the quality employee, supplier and customer relations on the relationships between QM relations and social sustainability outcomes, while there were partial meditations on the relationships between QM relations and environmental and social performance.	These results imply the internal (ER) and external (CR and SR) quality relations enhance the effect of management relations (MR) and enhance the suitability performance results. For social sustainability results, organisations need to focus on their employee quality relations, supplier relations and customer relations. For environmental sustainability performance, organisations need to pay more attention to employee relations, such as involving them in quality efforts, decisions, responsibilities, improvement processes, and teamwork.

To revise the discussion of the theoretical contribution and managerial implications, the following table includes more details about the contributions of the thesis against each research objective.

Table 7-2 Research contributions and implications

Research Objectives	Empirical Results	Theoretical Contributions	Managerial Implications
What influence do management relations have on employee relations, supplier relations and customer relations, and quality training?	The effect of management relations on employee relations, supplier relations, customer relations, and quality training were significant and positive. Management relations was found to be a strong predictor of the employee, supplier, and customer relations, and quality training.	By investigating these relationships, this research extends the scholarly inquiry of a model focused on the internal and external QM relations. This research is novel as it examines the links between internal and external aspects of TQM practices. QM relations are more likely to occur within a QM system and to create a more focused system. This suggests that these practices do not exist in isolation. QM relations focus on creating consistency everywhere in the organisation, internally by dealing with production systems or humans inside the organisation, and externally by broadening the scope to consider relations with suppliers and customers (Boje and Winsor, 1993; Kaynak and Hartley, 2008).	Firms need to consider their internal operations, and design and employee issues. Also, they need to consider external aspects. QM relations were found to enhance processes, operational effectiveness, customer satisfaction, and quality improvement, and to provide a competitive advantage. These relationships aim to confirm the essential role of firm managers in taking responsibility for achieving quality performance, supporting and evaluating quality improvement processes, reviewing quality-related issues in top managers' meetings and considering QM. When focusing on improving short- and long-term profitability, managers need to boost quality employee relations, facilitate more quality training, and improve supplier and customer relations. Also, HRM should be enhanced to support quality training and provide continuous improvement in aspects such as quality principles, problem solving, and teamwork.

Research Objectives	Empirical Results	Theoretical Contributions	Managerial Implications
What influence do management relations have on social, environmental, and economic sustainability performance?	The standardised estimated path coefficient of the relationships between MR and social sustainability performance showed insignificant results (β = 0.125; $p > 0.05$), while there were significant positive relationships between MR and environmental sustainability outcomes ($\beta = 0.203$; $p < 0.05$), and between MR and economic sustainability performance ($\beta = 0.218$; $p < 0.05$).	This research is novel in examining the links between internal and external aspects of TQM practices and the three dimensions of sustainability performance. Along with this focus, debates on integrating quality harmonise with the focus on sustainability performance (Rao *et al.*, 1999; McWilliams and Siegel, 2001; Tarí, 2011). This highlights the importance of investigating internal and external quality relations related to firm performance, as these quality relations deal with employee, management, supplier, and customer relations. The associations between QM relations and sustainability elements (social, economic, and environmental) have not been investigated simultaneously. The importance of this research is that it looks at the effect of specific QM practices on these three dimensions of sustainability. According to Acquaye *et al.* (2017), little research has been carried out in the supply chain literature related to sustainability performance and measurements concerning the management of sustainable supply chains. Also, in considering social sustainability performance, this research adds to the literature by delivering a holistic analysis of the	Firms need to take into account that QM relations enhance sustainability performance. This research supported the results of prior research concerning the effects of QM on sustainability performance by highlighting the importance of managers' roles in enhancing internal quality aspects, such as employee relations and quality training, and external quality aspects related to customers and suppliers. Managers need to maintain long-term improvement processes related to quality initiatives. To do so, they need to take responsibility for quality performance and incorporate it more in top management meetings. This highlights the importance of top management responsibility for achieving better quality performance and the managerial role in evaluating the firm's quality approach. Supply chain managers need to pay more attention to the significance of developing business relations when setting up their internal and external QM relations, for example enhancing social, environmental, and economic sustainability performance, which represent the three bottom line pillars that sustain competitive advantage.
What influence do employee relations have on social, environmental, and economic sustainability performance?	The results related to the impact of ER on social and environmental sustainability outcomes were positive (β = 0.266; $p < 0.05$; β = 0.245; $p < 0.05$, respectively for H4a, b), while ER did not show significant results regarding economic sustainability performance (H4c).		Firms need to offer a collaborative environment for employees so they are more involved, for example facilitating team working to solve problems and encouraging employees to participate in decision making and planning. Managers should also agree on parallel employee involvement efforts and create a culture of training, teamwork, and problem-solving practices, developing employees within their supply chain.

Research Objectives	Empirical Results	Theoretical Contributions	Managerial Implications
What influence do supplier relations have on social, environmental, and economic sustainability performance?	The study findings indicate that the relational paths between supplier relations and the three dimensions of sustainability performance (H5 a, b, c) were significant: (β = .225, p < .05) for economic sustainability performance; (β =.187, p < .001) for environmental sustainability performance; (β =.193, p < .05) for social sustainability performance.	TBL as it includes the social dimension. This has been neglected in sustainability research, which has focused on environmental and economic dimensions. In addition, prior research has focused generally on the direct and indirect relationships between QM relations and economic outcomes, as organisations focus mainly on profit. Quality relations studies have been carried out in isolation and have focused mostly on economic outcomes, presenting contradictory results in reporting financial outcomes. This study argues that the three sustainability dimensions are all critical for organisations, as well as for ecological and community aspects. In addition, training is a primary aspect of the human resource literature and is linked positively with employee performance. The extant literature supports the notion of significance of enhancing employees' skills and retention. Socially focused training, for example on recycling, pollution, and sustainability policy (Rothenberg, 2003) is important. Training programmes can include different aspects, such as health, safety, and sustainability issues, providing employees with information on green procedures, strategies, sustainability benefits, and how to prevent and reduce waste (Mandip, 2012). Thus, the results enhance knowledge of	Supplier relations should be established on a long-term basis. Managers need to focus on reasonably few dependable suppliers, involving them in service and/or product design. In addition, managers need to address continuous improvement when selecting suppliers, considering quality rather than price. Supply chain managers should extend their QM efforts to their downstream and upstream relations in their supply chain. For example, managers could share their QM policies to achieve sustainability goals and support long-term improvement processes. Supply chain managers should support close contact with upstream and downstream supply chain partners and should extend QM initiatives, such as seeking inputs to determine current and future requirements from their supply chains. The results also emphasise the significance of developing long-term supplier relations and supporting suppliers by providing them with training and technical assistance. Managers should be proactive and consider QM relations and initiatives within their focal firms as these pave the way for more focused supply chain practices within the value chain.
What influence do customer relations have on social, environmental, and economic sustainability performance?	The results of the analysis show positive relationships between CR and the three sustainability performance dimensions (H6a, b, c): (β =.190, p < .05) for economic sustainability performance; (β =.116, p < .001) for environmental sustainability performance; (β =.122, p < .05) for social sustainability performance.		Firms require to encourage and interact more with customers and suppliers and to participate in the improvement of products and services. Managers should systematically seek customer feedback and inputs about their firms' process improvements. Managers need to identify their customer requirements in order to improve customer satisfaction. It is also important that managers involve customers in product and service design.

Research Objectives	Empirical Results	Theoretical Contributions	Managerial Implications
What influence does quality training have on social, environmental, and economic sustainability performance?	The relationships between quality training and sustainability performance variables were all positive and significant. Quality training has positive effects on environmental, social, and economic sustainability performance dimensions ($p < 0.001$, F = 66.530; 54.763; 198.314; 19.766, respectively).	how QM systems might be implemented to include training practices that increase the success of sustainability efforts.	HRM should be enhanced to support quality training and assure continuous improvement aspects, such as quality principles, problem solving, and teamwork. With regard to social, environmental, and economic sustainability performance, it would be valuable for manufacturing and service firm managers to invest more in social and environmental operational practices. This could be achieved by operationalising their sustainability practices, for example linking social and environmental practices with the local community. Also, it would be useful for operational practices to involve employees and train them in conserving community values and cultural heritage. If manufacturing and service firms aspire to achieve sophisticated levels of sustainability performance through internal quality practices, they should consider QM and employee aspects.

7.4 Research limitation and future research

Notwithstanding the discussion in this chapter on the practical and theoretical implications, this study has some limitations. First, the scales of measuring social, environmental and economic results (TBL) are still being improved. They may not conceptualise the full complex nature of the TBL dimensions, especially the social outcomes. However, this research drew on recent research that used TBL indicators. Future studies may conduct more research on the TBL measurements with more emphasis on the social element.

In this regard, as the three dimensions of the TBL concept are interrelated, focusing on a single dimension, such as the economic dimension, can achieve short-ranging success, which is against the meaning of sustainability. The present study does not explicitly consider the long-term perspective of economic outcomes. Using accounting-based assessments such as return on assists (ROA) is suitable to assess short-term financial results. It implies internal assessment, not outside measurements (Endrikat *et al.*, 2014). Future studies could use long-term economic performance as they capture the market-based data, such as Tobin's Q, which assesses firms' viability. The use of Tobin's Q is appropriate for using secondary data, while this research has used primary data collection by using a questionnaire survey.

Moreover, another limitation is related to the use of a survey as it was sent to firms' managers, so it relies on subjective measures as self-reported items were used to measure the research constructs. In order to decrease this form of individual bias, future research may use subjective and objective indicators and scales, especially sustainability measurements. For example, economic sustainability could be collected by finance managers and quality constructs could be collected by quality managers. However, this could be costly and difficult to access within one firm. Another limitation is related to a single country, the UK only. This was selected as the researcher had access to UK firms only. By using a single country, this research avoids potential influences due to particular country characteristics, such as country regulations. Future investigations could test the hypotheses of this research to confirm whether the results for the UK firms are applicable in other countries. Another limitation is linked to the cross-sectional design of this study as the data was collected at a specific point of time. Future studies may consider a longitudinal data collection method to provide deeper inferences and to extend the scope of the results beyond causality inferences. Moreover, future studies could consider using case studies to provide an in-depth understanding of how quality relations drive different sustainability performance dimensions.

Appendices

Appendix 1 The questionnaire

Dear participant,

Thank you for taking the time to contribute to this survey. This survey is issued by researchers from Newcastle University Business School. The goal is to understand more about the quality management system and its impact on sustainability. We would appreciate your help. It will take about 10 minutes of your time.

The survey will collect answers in an anonymised and strictly confidential process. Your answers will not be linked to your name, your company, or your department. Your participation is voluntary, and if you come to any question you prefer not to answer, you are welcome to skip it and move on to the next.

To answer this questionnaire, simply click on this link:
https://newcastlebusiness.eu.qualtrics.com/jfe/form/SV_5gsGufHtNHvrGvz

Should you have any questions or comments, please contact me directly: a.alsawafi2@newcastle.ac.uk, or +44(0)1912081500.

I personally very much appreciate your help with this important study.
Many thanks and have a nice day,

Ahmed Al Sawafi
PhD researcher
Newcastle University Business School

Section 1: General Information

1. Which of the following industries most closely matches the one in which your company operates in?

□ Manufacturing
□ Services

2. How many employees work in your organisation?

☐ 1-4 ☐ 5-9 ☐ 10-19
☐ 20- 49 ☐ 50-249 ☐ 250-499
☐ 500-999 ☐ 1000 or more

3. What is your job position?

☐ CEO/Managing Director ☐ General Manager ☐ Buyer/Sales manager
☐ Supply Chain Manager ☐ Quality Manager ☐ Project Manager
☐ Operations Manager ☐ Finance Manager ☐ Assistant Manager
☐ Other, please specify....................

4. How many years have you been in your current position (including your previous work with other companies)?

☐ 0-5 ☐ 6-10 ☐ 11-15
☐ 16-20 ☐ 21-30 ☐ 30+

5. What quality certifications does your company currently have? Choose more than one, if applicable

Certificate type
☐ ISO 9001 (Quality Management Standard)
☐ SA8000 (Social Accountability Accreditation)
☐ ISO 14001 (Environmental Management)
☐ ISO 26000 (Social Responsibility)
☐ ISO 20121 (Sustainable Events)
☐ ISO 45001 (Occupational Health and Safety)
☐ ISO 29001 (Oil and Gas Quality Management)
☐ Other, please specify ………………………….
☐ None

6. When has your firm been established?

☐ Please indicate the year ………………
☐ I don't Know

Section 2

Please evaluate your company in the following quality management practices. Please indicate whether you "strongly agree" or "strongly disagree" with the statements on a scale of 1-5.

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
	1	2	3	4	5
1. Our top management supports long-term quality improvement processes					
2. Our top management encourages employee involvement in quality management and improvement processes					
3. Our top management takes responsibility for achieving quality performance					
4. Our top management reviews relevant quality-related issues in top management meetings					
5. Our top management evaluates quality performance					
6. Our top management understands quality improvement as a way to focus on long-term profitability					
7. Our top management considers quality improvement as a way to achieve long-term profitability of our organisations					
8. Our top management considers quality improvement as a way to achieve short-term profitability of our organisations					

Section 3

Please indicate whether you "strongly agree" or "strongly disagree" with the statements on a scale of 1-5.

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
	1	2	3	4	5
9. Customer satisfaction surveys are used for identifying customers' requirements					
10. Our company uses customers feedback as a method to improve the company's current processes					
11. Our company collects extensive customers feedback					
12. Our company is actively seeking customer input to determine their current and future requirements					
13. Our company systematically and regularly measures customer satisfaction					
14. Our customers are involved in product or service design					

Section 4

Please indicate whether you "strongly agree" or "strongly disagree" with the statements on a scale of 1-5.

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
	1	2	3	4	5
1. Our company prefers to establish long-term relationships with our suppliers					
2. Our company relies on reasonably few dependable suppliers					
3. Our company provides training/ technical assistance to the suppliers					
4. Our suppliers are actively involved in service/product design/redesign processes					
5. Our compnay cosdiers commitment to continous imporment in supplier selection					
6. When selecting suppliers, our company considers quality more important than price					

Section 5

Please indicate whether you "strongly agree" or "strongly disagree" with the statements on a scale of 1-5.

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
	1	2	3	4	5
15. Our company provides a collaborative environment' for employees					
16. Our company facilitates teamworking to solve problems					
17. Our company motivates, supports and involves employees in quality aspects					
18. Our company encourages employees to participate in decisions making and planning					
19. Our company encourages employees to increase interaction with customers and/or suppliers					
20. Our company encourage employees to participate in improving products, services, and processes					
21. Our company encourages employees to attend training programmes					
22. Our company provides employees with training that includes long-term continuous improvement aspects					
23. Our company provides employees with quality-related training, e.g., quality principles, problem-solving, team working, etc.					
24. Our company incorporates technological advancements in training programmes					

Section 6

Please indicate whether you "strongly agree" or "strongly disagree" with the statements on a scale of 1-5.

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
	1	2	3	4	5
25. Our company provides a healthy and safe work environment					
26. Our company reduces the number of occupational-related accidents/accidents at our facilities					
27. Our company engages in human resource management activities that promote employee development.					
28. Our company strives to conserve the traditional values of local communities					
29. Our company strives to conserve the cultural heritage of local communities					
30. Our company builds and fosters a mutually beneficial relationship between the company and community					

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
	1	2	3	4	5
1. Our company strives to protect and restore the environment					
2. Our company has initiatives to reduce energy consumption					
3. Our company has initiatives to reduce water consumption/recycling and reuse of water					
4. Our company has initiatives to reduce waste and emissions from our facilities					
5. Our company has initiatives to reduce purchases of non-renewable materials, harmful, chemicals, components, etc.					
6. Our company has initiatives to use locally produced supplies					

Section 7

Over the past three years, please note the change in each of the following financial indicators:

	Significant Decrease	Decrease	No Change	Increase	Significant increase	I Do not Know/ Not applicable
	1	2	3	4	5	6
1. Profit growth						
2. Market share						
3. Market share growth						
4. Return on investment						
5. Return on assets (ROA)						

Section 8

At last, please indicate to what extent the following stakeholders have influenced your decisions on sustainability management (1=Not at all… 5=Very large extent):

	Not at all				Very large extent
	1	2	3	4	5
1. Customers / Clients					
2. Government					
3. Shareholders					
4. Employees					
5. Non-governmental organisations (NGOs) / Society					
6. Public media					
7. Competitors					

Please provide any comments in the box below:

Thank you for your time!

Quality Management system and Sustainability impact

ADDRESSING THE ROLES OF QUALITY MANAGEMENT PRACTICES IN DRIVING SUSTAINABILITY PERFORMANCE.

Challenges of the contemporary business environment require organisations to find better operations management systems to boost organisational performance and to satisfy the needs of different stakeholders. Also, Corporate social responsibility and sustainability issues became popular concepts of global environmental problems.

These challenges are of great significance for people, planet and profit. The quality management system is a universally applicable philosophy that resulted in positives organisational outcomes. Based on this study results, it will provide managerial applications as it proposes specific quality management tools to deal with sustainability issues.

" *An approach to achieving and sustaining high quality output.* "

Looking for

CEOs, General managers, Operation managers, Senior managers, Quality managers (Manufacturing & service)

Your benefits

A comprehensive and exclusive report summarising the research findings

Means

Online questionnaire format, about 10 minutes

Timing

Jan-Feb 2019

Research goals

Professor Fred Lemke, Dr Ying Yang, and Ahmed Al Sawafi are conducting an academic study by Newcastle University Business School and Vlerick Business School aiming to deliver a better understanding of how to utilise quality management system to obtain sustainable performance.

► ► ►

Professor Fred Lemke is a Professor of Marketing and Sustainability. Recently, he joined Vlerick Business School coming from Newcastle University Business School, where he was a full professor, the School Director of Research, and Joint Department Head of the Marketing, Operations and Systems Group.

Fred leads management workshop in the areas of sustainability, marketing, innovation, and value creation. Fred's research and teaching interests include consumer behaviour and customer relationship management, sales management and customer interaction skills, supply chain management, reputation risk management and sustainability. It's a wide and diverse area of expertise, but everything is somehow related, as he explains when commenting on some of the current hot topics and projects he is working on. Fred acts as a management consultant for international companies such as Sony, BASF, and Bosch. His business experience was in the financial services sector, in marketing and business analysis. The results of his research have been applied to a number of leading companies. He ran projects for, e.g., the automotive industry (Germany), the pharmaceutical industry (UK), designers (Italy) and the European Commission (Brussels).

He has published in practitioner magazines as well as in high impact academic journals. His management book on understanding customer needs, modern market research techniques, and the links to innovation (ISBN: 978-0230219762) was nominated as one of the 'Top 25 Management Books in the UK', by CMI.

As an expert in supply chain management, marketing and innovation, Fred speaks frequently on international conferences on topics such as supply chain reputation, customer experience, innovation, business resilience, and value creation.

Prof. Fred Lemke, Ph.D., MBA, BCom (Hons.)
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Dr Ying is an expert in operations strategy, supply chain management and business service. Practitioners have well recognised her work, and she frequently publishes in leading international journals. Among others, Ying is a reviewer for International Journal of Operations and Production Management, Supply Chain Management: An International Journal and International Journal of Production Research. Her work has been regularly presented at international academic conferences.

Before joining Newcastle University, Dr Yang researched and lectured at the University of Ulster and Aberystwyth University. She is also an adjunct Professor for Management Development Institute, India since 2013.

Ying holds a PhD in Operations Management, an MSc International Management, and a Master in Industry Economic Management.

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Ahmed Al Sawafi is a PhD researcher at Newcastle University Business School. His primary research interest is in quality management and sustainability. He is working as a quality management specialist at Ministry of Education in Oman. Ahmed has an experience of about 19 years in the educational sector and working as a quality control auditor. He holds a bachelor degree from Sultan Qaboos University in Oman, and an executive MBA from the University of Hull, UK.

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Appendix 3 Outliers (Mahalanobis distance)

Observation number	Mahalanobis d-squared	p1	p2
447	102.597	.000	.001
458	102.173	.000	.000
183	99.862	.000	.000
304	98.220	.000	.000
443	93.765	.000	.000
473	91.458	.000	.000
398	90.304	.000	.000
52	88.634	.000	.000
3	86.620	.000	.000
159	85.255	.000	.000
495	84.396	.000	.000
180	84.374	.000	.000
116	83.057	.000	.000
94	82.591	.001	.000
286	82.139	.001	.000
368	81.930	.001	.000
15	81.884	.001	.000
303	80.679	.001	.000
439	80.511	.001	.000
381	80.483	.001	.000
452	79.162	.001	.000
36	77.812	.002	.000
74	77.797	.002	.000
333	77.762	.002	.000
97	77.674	.002	.000
448	77.646	.002	.000
125	75.865	.003	.000
222	73.062	.005	.000
223	72.839	.005	.000
450	72.580	.006	.000
307	71.563	.007	.000
51	70.936	.008	.000
499	70.558	.009	.000
297	70.301	.009	.000
466	70.139	.010	.000
200	70.056	.010	.000
234	69.954	.010	.000
137	69.635	.011	.000
424	69.466	.011	.000
483	69.435	.011	.000
92	69.354	.011	.000
209	69.289	.011	.000
349	69.037	.012	.000
275	68.603	.013	.000
161	68.307	.014	.000
19	68.087	.015	.000
32	67.444	.017	.000
477	67.370	.017	.000
251	67.165	.018	.000
165	66.970	.018	.000
169	66.814	.019	.000

Observation number	Mahalanobis d-squared	p1	p2
345	66.299	.021	.000
390	66.041	.022	.000
256	65.969	.022	.000
186	65.943	.023	.000
376	65.521	.024	.000
468	64.968	.027	.000
497	64.896	.028	.000
277	64.778	.028	.000
34	64.319	.031	.000
445	64.122	.032	.000
167	63.588	.035	.000
22	63.383	.037	.000
84	63.364	.037	.000
331	62.934	.040	.000
27	62.387	.044	.000
377	62.294	.045	.000
442	62.101	.046	.000
494	62.005	.047	.000
489	61.981	.047	.000
374	61.766	.049	.000
501	61.623	.050	.000
317	61.454	.052	.000
122	61.424	.052	.000
475	61.192	.054	.000
194	60.739	.059	.000
29	60.408	.062	.000
264	60.396	.062	.000
420	60.367	.063	.000
351	60.358	.063	.000
201	59.928	.067	.000
503	59.636	.071	.000
421	59.385	.074	.000
204	59.288	.075	.000
144	59.231	.076	.000
332	59.176	.076	.000
467	59.079	.078	.000
53	59.009	.079	.000
276	58.833	.081	.000
498	58.778	.082	.000
224	58.762	.082	.000
324	58.667	.083	.000
314	58.651	.083	.000
306	58.424	.086	.000
271	58.208	.089	.000
358	58.107	.091	.000
490	58.079	.091	.000
334	57.871	.094	.000
379	57.681	.097	.000
233	57.616	.098	.000

Appendix 4

<p align="center">**Pilot interview questions**</p>

- Introduction about the study and its aims; and to ensure the anonymity and confidentiality of the interviews

I am Ahmed Al Sawafi, a PhD researcher at Newcastle University Business School. I would thank you for accepting to participate in my data collection as part of my research project. The research investigates 'The role of quality management relations in sustainability performance.' This research aims to explore the quality management insights for driving sustainable business performance.

The interview time would be approximately 30-45 minutes. There are no right or wrong answers.

This data collection would be conducted in **an ethical manner**. Your information would be kept **confidential** and answers derived from the interview will be used wholly for academic research purpose.

Participation is also voluntary and you are free to withdraw anytime.

- The following questions will be asked:

  - *Could you please give a brief summary about your company? (Characteristics of the company)*
    ➢ *Quality Management Practices:*
  - *Please describe what quality management practices are used across the company? Could you please give some examples?*

    ➢ *Sustainability dimensions:*
  - *Please describe the company's focus on sustainability performance?*
  - *Do you think that quality practices influence sustainability? Yes? No?*
  - *By looking at sustainability dimensions (social, economic and environmental), which quality practices have greater sustainability performance?*
  - *You mentioned that some quality practices influence sustainability performance. Are there any other factors that affect these relationships?*

  1. *Could you please give some examples of the relationships such as the company's focus to the communities both internal (i.e., human resources) and external to an organisation (community)?*
  2. *Do companies' initiatives on Quality & sustainability have improved competitive advantage and business performance?*
  3. *Do companies' initiatives on Quality & sustainability have improved reputation and image?*

- **Additional**
  ➢ The interviewee will be asked if there is anything he or she wants to add.

Would you like to have a copy of an exclusive report on the key findings?

- **Characteristics of Companies and Respondents/Managers**

General questions.

1. What is your gender?
a) Male ☐
b) Female ☐

2. What quality systems/certification does the company implement?
   a. ISO 9001 ☐   c. SA8000 ☐
   b. ISO 14001 ☐   d. Other. ☐ Please indicate ……………………….

3. What is the number of employees at your firm?
a) 10-50 ☐   d) 501-1000 ☐
b) 51-100 ☐   e) More than 1000 ☐
c) 101-500 ☐

4. When has your firm been established? ……………………………..

5. Turnover and sales revenue in a year? (in million)
a) Less than 10 ☐   c) 51-200 ☐
b) 10-50 ☐   d) Unreported ☐

6. What is the type of your firm ownership?
a) Sate-owned enterprises ☐   d) Private companies ☐
b) Joint ventures ☐   e) Collective enterprises ☐
c) Limited companies ☐   f) Other ☐

7. What is your major product or service type? ……………………………………

8. What industry does your company operate in?

9. What is your job position?
a) CEO/Managing director ☐   d) Buyer/Sales manager ☐
b) General Manager ☐   e) Purchasing/Procurement/Supply manager ☐
c) Other ☐

10. How many years have you been in your current position (including your previous work with other companies)?
a) 0-5 ☐   d) 16-20 ☐
b) 6-10 ☐   e) 21-30 ☐
c) 11-15 ☐   f) 31 and above ☐

Thank you for your time.

Appendix 5

Quality practices	Important Quotes
Management commitment	"We have that commitment from the directors…"[2] "There is a good management commitment to quality."[4]
Customer focus	"To work with our clients, our clients expect a certain level of service." [1] "We have customer reviews and feedback, so we meet quarterly with our top ten clients. We have a survey that we can conduct."[2] " so you're actually producing what the clients has asked for, and all the way out the door, where you are actually then providing to the clients what they've ordered"[2] "We are in a customer facing business. People pay money to come here, and they expect to receive a quality experience. So we're very very hot on customer excellence, and customer relations, and how we treat people when they come here."[3] "we have to go the extra mile for customers."[3] "There is a department that is responsible of quality of service and follows the progress called Supportive department management. Customers can follow up their requests."[5]
Training	"We do every six months training days."[1] "They have the opportunity to learn additional skills. In the industry that we're in, there's quite a lot of technological advances. It might be that the machinery we have this year, it may be obsolete in the next five years. The systems may change."[2] So we do a lot of training, and the training is on-going. We do most of our training internally, because we know what we're doing in that sphere."[3]
Quality Data/ Information	"Call recording, sample analysis of these calls." [1]
Process management	"The most important quality practice is review of service… because it is easy and instance."[1] So did we do the right thing at the right time…"[1] "As part of the ISO 9001 standard you have to do management review anyway. So we monitor all internal and external non-conformances. We

	investigate them, we close them off, we review them on an annual basis for tends to see which areas are causing us the most issues."[2] '*We've just got in a new booking system, which gives us a greater degree of flexibility. It enables us to find out much more information about who is coming."[3]* '*The process are run by automated programmes that calculate everything. There are two automated systems, one for billing (Orion System) and the other one is for customer services (CSM, Customer Relations Management. These systems allow the manager to follow up process, delays, problems, and challenges, time to finish etc. Also, this makes it easier for reporting and for top management to get updated reports."[5]*
Supplier relations	*"So we go out and visit them and make sure that they are trading in the same manner that we trade."[2]* *"We constantly go to them enough and we go: Do you have any new products coming through? Can you work with us on something? Can you recommend a new type of material or anything like that?"[2]* *"Suppliers are controlled by a department called 'Assets management' department and Distribution Control and Review Board (DCRB). One of its responsibilities is to evaluate the quality and performance of suppliers. Any supplier has to get an approval from this board."[5]*
Product/Service design	*"To make sure our product is robust, is attractive..."[3]*
Employees management	'*Involving employees depends on the leader or head of department. The company follows the regulations by the (ERA) as regards to employees. For example, the company involves employees in projects decision making. Employees participate in choosing the best projects."[5]*

Questions	Important Quotes
To describe companies' focus on sustainability	**Social sustainability:** *"Our job is to make sure to maintain our clients' relationship."* [1] *"The social workplace accountability we have invested in people, so working with internal staff to make sure that they're continuously developed"* [2] *"We work with local school as well. So we are available for schools to come out and talk. We take work placements on…"* [2] *"And what we're embarking upon at the moment, is quite a major exercise in looking at our culture and our operations ... To seek indeed we are well due to serve communities, who do not currently have anything to do with us"* [3] *"So we're looking at that, and looking at ourselves, and looking at equality and diversity, right through the organisation, from the very top, right through to that, starting with our Board."* [3] **Economical sustainability:** *"And economically, that is really important to us... this year we are hoping we can be bigger than last year."* [1] *"financial sustainability is as important to us as all of the other types"* [3] **Environmental sustainability:** *"For our packaging waste returns as well, so we report back on an annual basis how much packaging we've sent out to our clients."* [2] *"It wasn't so long ago, maybe 10-15 years that a lot of the inks were solvent based so you can image the potential damage to the environment there. Now they've all moved across so the industry constantly recognises what impact it can have on the environment, and looks to try and mitigate and reduce any detrimental effect it can have."* [2] *"We try to buy with an eye to where the products are coming from. How they actually got to us… we try to source locally produced ingredients."* [3] *"We do have an environmental policy and environmental plan, and that covers everything… we're acutely aware of our carbon footprint, and how we reduce it… We have a dedicated green team. Everyone in the organisation is acutely aware of what we're all doing to harm the environment. We have a duty … to try and persuade people when they come in to behave responsibly, when it comes to disposing of litter, and reducing plastics... and telling people about the sorts of things that can happen, including climate change."* [3]

Questions	Important Quotes
To confirm the effect of quality management practices on sustainability dimensions from the practical perspective	- Quality, in general, is important in achieving better sustainability Performance: *'With having 14001, we are looking to see: Are we using the most of environmentally-friendly products we can? We are taking materials from sustainably managed forests. And, is there an alternative to the plastic? Can we use cardboard instead? Is it recyclable, is it already recycled?"[2]* *"We've just got in a new booking system, which gives us a greater degree of flexibility. It enables us to find out much more information about who is coming."[3]* *"The Company has improved as it started to implement quality ideas mentioned before. From its financial system performance, it's showing good performance. Generally, there are more than 10 systems, e.g., HR system, safety system, financial system, billing systems, IT, customer services, Transportations, etc. These systems are controlled and managed by top management."[5]* - The company support people who are less trained and put more effect on training (social issues): *'I mean all training supports this business. We tend to employ less experienced people ... people who may come as apprentices… we put effort into training them and investing in them." [1]* *'Obviously as a management team, we are constantly look at succession practices. So we need to make sure that the business continues, that we're always looking to see who we're bringing through training and promotion."[2]* *'Well if we are training everybody correctly, and we are giving them the correct tools to do their jobs, then there will be a reduction in the amount of errors that could potentially go through, which then of safeguards their jobs. Because we are not losing customers to poor practice or bad quality."[2]* *'We have a training plan, a minimum of 5-10 training programmes are provided annually for each employee. These programmes affect positively their job satisfaction and performance."[4]*

'New employees (even from the contractors), must be trained for health and safety systems. They also be tested and followed up their performance after joining the work. The safety and health department assess new employees as regards to following the health and safety procedures.''[5]

"There is a good training and development system called PDP (Personnel Development Plan), e.g., coaching, training while at work. Coaching is to identify what are training needs. This process followed by putting a plan for the training needs for every employee. This is 70 % of training programs (in housing training). There are also 30% of international training programs (outside the country). The training programs include, for example, assigning projects for a year time that includes attending a workshop internationally. These projects are monitored by the managers who write reports about the employee progress. The results of this system shows better performance from the company's performance, employees feel satisfied about it as it involves them and encourage them. Also, international workshops that employees attend internationally increase their satisfaction and performance. Employees also sit with the manger to discuss the training plan. It allows employees to learn new skills. The training plan is flexible, for example, when a yearly plan is evaluated after 6 months and found that the employee is progressing, so this plan is upgraded to more complex or challenging activity.''[5]

- It is important to revise all the process (process management), for example training and quality of support given to employees. Also, to review the service and procedures:

'Whenever somebody fails you, it is the failure of the business that we either ... didn't support them correctly, we didn't do enough training." [1]

- To achieve better sustainability performance, it is important to consider (suppliers relations):

'So we go out and visit them and make sure that they are trading in the same manner that we trade. We are checking to make sure that

standards, as well as environmental social work, plays responsibility… are ethical?"[2]

- Customer focus:

'We've got a new customer relationship management system, a CRM system. Which enables us to do much more sophisticated segmentation of our market. So we know who's coming, we know why they are coming, we know the sorts of things they like when they come here."[3]

"Understanding our various communities and customers, is at the heart of what we do... and they are very different… you have a sort of fundamental responsibility… to try to make what you do accessible to everybody. And so we have to think very carefully about if we are trying to fulfil our remit of making what we do accessible, relevant, and interesting to everybody...That means you have to really understand yo ur customers.[3]

"To make sure our product is robust, is attractive..."[3]

"We've got a new customer relationship management system, a CRM system. Which enables us to do much more sophisticated segmentation of our market. So we know who's coming, we know why they are coming, we know the sorts of things they like when they come here."[3]

"The main customer is citizens. The system is required to resolve any blocking in the network in two hours. This assures of not having an effect on the environment and customer satisfaction."[4]

- Product/ service design:

"So we have to think about, how do we make what we have conducive to people who may not fall into the spectrum of average or normal, whatever normal might be. So we're looking at Special days for people with a range of physical disabilities and mental disabilities. So we have to look at the barriers to participation, which vary from community to community, depending on their specific need… to try and raise aspiration, and get communities there to understand a little bit better about what we do, and how we could possibly help them."[3]

- Quality Data/Information:

	"The company uses quality information, e.g., parameters, ratio, CED, POD, Lead, Zinc, Ammonia, etc. in water processing ...which gives us information about its influence to the environment. The company has online information about processed water (lab manager). This reflects on quality performance and sustainability performance."[4] - Supplier relations: *'We have a system to register specific suppliers. We select suppliers by using specific criteria and specifications. Employees are involved in choosing the best suppliers. Suppliers are selected according to their product effect on the environment, safety and health.*[4] - Employees involvement: *"Employees are involved and trained when, e.g., building new stations, choosing a specific pump, risk assessment, value engineer. This allows to better economic, environment and social sustainability."*[4]

1-5 refer to the interview number (total of 5 interviews)

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