The Impact of Quality Management Practices on Innovation and Organizational Performance in Campania Region Universities

by
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Abstract

Today, the higher education sector is facing challenges from a dynamic environment characterized by rapid technological change and increased demand from the various stakeholders. To cope with these challenges, quality management and innovation are required as they help in improving the overall performance and competitiveness of the organization. However, most of the studies carried out to date on quality management and innovation focus more on the manufacturing sector compared to the service sector in general and higher education in particular. Moreover, prior literature has reported mixed results on the relationship between quality management (QM) practices, innovation, and organizational performance because of the different approaches used in studying QM (Multidimensional or Integrated approach) as well as the opposing arguments about whether the organizations could excel in QM and innovation simultaneously or they should focus on improving one of them at the expense of the other. Following the suggestions of recent studies to extend the research scope to the service sector, this study developed a model to examine the direct and indirect relationships between QM, understood as multidimensional construct (soft QM and hard QM), innovation (administrative innovation and technical innovation) and organizational performance. Innovation as an intended consequence of QM implementation is also examined as a potential mediator between QM practices and organizational performance. The proposed model consists of nine main hypothesized relationships reflecting the direct and indirect relationships between the latent variables. A quantitative approach through questionnaire development has been used for collecting data from faculty members located at different public universities in the city of Naples in Italy. Data collected from 356 staff and faculty members from different departments. A partial least squares structural equation modelling was used to investigate the direct and indirect relationships between the latent variables. The results showed that soft QM affects organizational performance directly and indirectly through hard QM. Soft and hard QM directly impact innovation. Hard QM and innovation show a partial sequential mediating effect on the relationship between soft QM and organizational performance. Based on the results, it can be argued that quality and innovation are not a matter of tradeoff, but they can coexist in a cumulative improvement model with soft QM practices as the foundation. For the proper implementation of QM, directors are advised to emphasize the different roles that soft and hard quality can have on innovation and organizational performance. They should consider QM as a systematic, interdependent, and holistic approach instead of focusing on only one or few QM practices.

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List of Abbreviations

AI	Administrative Innovation
AP	Administrative Process
AVE	Average Variance Extracted
BSC	Balanced Scorecard
CB-SEM	Covariance-Based Structural Equation Modeling
CI	Continuous Improvement
CMB	Common Method Bias
CR	Composite Reliability
EFQM	European Foundation for Quality Management
EP	Educational Process
HEIs	Higher Education Institutions
IA	Information and Analysis
IEUs	Internal Evaluation Units
IR	Institute Results
LV	Latent Variable
MBNQA	Malcolm Baldridge National Quality Award
MI	Management Innovation
NPM	New Public Management Paradigm
OI	Organizational Innovation
PD	Program Design
PEM	People Management
PER	People Results
PLS-SEM	Partial-Least Squares Structural Equation Modeling
PRCI	Process Innovation
PRDI	Product Innovation
QA	Quality Assurance
QM	Quality Management
RBV	Resource-Based View
RP	Research Process
SEM	Structural Equation Modeling
SF	Student Focus
SM	Supplier Management
SOR	Society Results
SP	Strategic Planning
SQC	Statistical Quality Control
STR	Student Results
STS	Socio-Technical System Theory
TMS	Top Management Support
TQM	Total Quality Management
VIF	Variance Inflation Factor

Chapter 1 Introduction

1.1 Background of the Study

Recognized as a critical issue in human capital and innovation development (Dill and Van Vught, 2010), Higher Education Institutions (HEIs) are facing, in the last decades, a revolution marked by significant changes both in scope and diversity (Altbach et al., 2019). Higher education environment is nowadays characterized by high expansion of systems, greater internationalization and competition, rapid education technological changes, as well as increasing pressure on cost control and financing (Laurett and Mendes, 2019). Furthermore, increasing competition on HEIs imposed by economic forces has resulted in the development of global education markets and reduction of government funds which forced those institutions to seek other financial sources (Abdullah, 2006). Job markets also put another pressure on HEIs as they have become highly competitive, with employers having the opportunity to choose from a wider pool of potential candidates. The prospective students also thoroughly evaluate universities before seeking admission. The students' decision to enroll in a university is strongly influenced by the university's ability to differentiate its graduates from competitors. One of the ways that HEIs could use to cope with these challenges is to focus on quality and innovation as implementing quality could enable them to adapt to the environmental changes, while innovation leads to provide better services to the students and society (Aminbeidokhti et al., 2016).

Since quality management (QM) practices were initially adopted and practiced in the manufacturing industry, there is a widespread literature available on QM and its role on fostering innovation and organizational performance in the manufacturing sector (e.g O'Neill et al., 2016; Prajogo and Sohal, 2008 ; Zeng et al., 2015; Feng et al. 2006; Singh and Smith, 2004). Segarra-Ciprés et al. (2017) used content-analysis to carry on a systematic literature review on QM-innovation relationship and they found that there was a prevalence of studies in the manufacturing sector compared to the service sector (57% of the articles focus on manufacturing while 4.26% of the articles focuses on services). On the same page, Mehta et al., (2014), found that numerous studies have been written about TQM in manufacturing, however, the same attention has not been paid to the service sector in general and the education sector in particular. Tari and Dick (2016) also stated that, in

contrast to the industrial sector, only a few studies evaluated performance and its measures in higher education. It follows that there is still an ongoing need to understand how these topics are influencing the HEIs.

Moreover, the importance of innovation has motivated many researchers to identify its antecedents, and one of the issues that have been considered is whether the practices of quality management may emerge as one of the requirements to the definition of innovation strategies (Antunes et al., 2017; Kim et al., 2012; Zeng et al., 2017).

According to Odoh (2015), TQM is considered to be both a philosophy and a methodology for managing organizations, it provides the overall concept that fosters continuous improvement in all aspects of the organization. Thus, it is more than a philosophy as it entails a methodological approach, which draws on the strength of technical tools and analysis as well as recognizing the crucial role of employees at all levels in order to meet or exceed customer expectations (Besterfield et al., 2012). The existing literature on QM has provided different dimensions of QM. Several authors distinguished these as soft and hard QM (e.g., Rahman and Bullock, 2005; Zu, 2009; Zeng et al., 2017; Khan and Naem, 2018; Ershadi et al., 2019). Soft QM includes elements related to the social or people-related aspects such as management commitment, workforce training, and shared vision, whereas hard QM elements are related to the technical aspects including the tools and techniques -such as process management- required to control and improve processes and products (Khan and Naem, 2018).

On the other hand, the evaluation of the organization's performance has also become an element of great importance in the development of the organization's strategies (Khan and Naem, 2018). Thus, quality and innovation can have a positive impact on organizational performance (Antunes et al., 2017), however, an organization can't benefit from the advantages of innovation if there isn't an organizational structure defined to follow those strategies (Zeng et al., 2017). Innovation can reflect significant impact on the organization's performance by enabling a better position in the market, which in turn, will promote competitive advantage and superior performance (Escrig-Tena et al., 2018).

It is widely acknowledged that higher education is one of the most important fields as it plays a key role in the transfer of knowledge. Education can be based on national need and in line with the improvement of culture and knowledge of modern management only

when client-centered and quality-wise management has been set. In this regard, the structure and system of the educational management come to the attention of total quality management (TQM) system. HEIs as a bridge between knowledge producers and knowledge researchers need continuous changes in order to respond to the rapid social changes, political, economic and cultural changes (Qaltash and Salehi, 2008). Quality management is a method that can bring this change to education. As a management philosophy of continuous improvement, quality management can provide a set of tools and techniques to fulfill the current and future needs and expectations of any educational institution (Aminbeidokhti et al., 2016).

Innovation is also essential to public and private organizations, particularly learning institutions such as universities. Hence, it is important to enhance the level of experience relating to taught courses, improve the institutions' problem-solving abilities and the quality of applied research (Al-husseini and Elbeltagi, 2016).

Therefore, this study seeks to examine the relationship between quality management practices, innovation types, and organizational performance.

1.2 Research Problem

Several scholars concluded that both quality management practices and innovation play a crucial role in achieving the organization's success and survival in the current turbulent environment (Zeng et al., 2017; Khan and Naem, 2018). Nowadays, HEIs put more focus also on quality and innovation in order to cope with the current challenges in their context, as implementing quality will enable them to adapt to the environmental changes, while innovation could lead to providing better services to the students and society (Al-husseini and Elbeltagi, 2016; Aminbeidokhti et al., 2016).

The previous studies have provided several insights into the role of QM in enhancing innovation and performance as the adoption of quality management in innovative activities helps the organization to upgrade itself with respect to customer needs, to minimize the activities that don't create value, and to reduce time and costs in the development of new products and services (Antunes et al., 2017). While previous studies have provided interesting insight into the role of QM practices in innovation and organizational performance, some shortcomings emerge from the literature.

Firstly, since quality management practices were initially adopted and implemented in the manufacturing industry, there is a well-developed literature on the relationship between QM and innovation as well as organizational performance in that sector compared to other sectors in the service industry (Joiner, 2007; Prajogo and Sohal, 2003; Khan and Naem, 2018). Studies examining these relationships in higher education field are also few as most of the studies conducted in that field focus more on examining the applicability of QM framework in HEIs (e.g., Venkatraman, 2007; Kanji et al., 1999; Owlia and Aspinwall, 1997) or on identifying the factors of QM in HEIs (e.g., Bayraktar et al., 2008; Calvo - Mora et al., 2005; Sahney et al., 2008).

Secondly, previous literature has got mixed results on the relationship between QM and innovation (Prajogo and Sohal,2003; Santos-Vijandea and Alvarez-Gonzalez,2007; Hoang et al.,2006; Zeng et al., 2015). One probable reason can be that most of the studies adopted an integrated approach, considering QM as a single factor without focusing on investigating the different effects each QM dimension may have on innovation (Martinez-Costa and Martinez-Lorente,2008; Abrunhosa and Sa, 2008). Accordingly, recent studies adopted the multidimensional approach of QM in order to distinguish between soft and hard QM practices to explain this controversy (Zeng et al., 2017; Khan and Naem, 2018; Escrig-Tena et al., 2018). However, there is a lack of these studies in the services sector (Segarra-Ciprés et al., 2017) and in higher education (Tari and Dick, 2016), as most of the studies that adopted this classification focused more on the manufacturing firms (e.g., Kim et al.,2012; Zeng et al., 2015;2017) and High-Tech companies (e.g., Hung et al., 2010; Escrig -Tena et al., 2018). Therefore, several studies recommend the need to extend this multidimensional approach to the service sector in order to extend the generalizability of the results (Zeng et al., 2017; Ershadi et al., 2019).

Thirdly, most of the empirical studies that examine the relationship between quality management and innovation have usually focused on studying one type of innovation (mainly technical innovation), with paying attention only to product innovation (e.g., Zeng et al.,2015; Prajogo and Hoang, 2008), or process innovation (e.g., Abrunhosa and Moura, 2008; Camison and Puig-Denia, 2016), or, in some cases to both of them (e.g., Hung et al., 2010; Martinez-Costa and Martinez-Lornte, 2008; Song and Su, 2015), with a little consideration to the administrative innovation type (Kim et al., 2012). It can be argued that

such a narrow view of innovation is a barrier that causes a misunderstanding of the impacts of QM on innovation (Kim et al., 2012). It was also argued that administrative innovation can be considered as the prerequisite for, and as a facilitator of, the efficient use of technical innovation as the changes in the operating (technical) and social (administrative) systems, should happen simultaneously (Damanpour and Aravind 2012; Azar and Ciabuschi, 2017).

Finally, there is a lack of agreement in the literature regarding the impact of QM on organizational performance (Rahman and Bullock, 2005; Khan and Naem, 2018). There are mixed results regarding whether soft QM has a direct or indirect impact on organizational performance (Calvo-Mora et al., 2013), and which dimension is more important in order to yield superior organizational performance (Khan and Naem, 2018). The opposing arguments also extend to the relationship between quality and innovation in improving performance. A fundamental question remains about whether organizations can excel in both types of performance simultaneously or have to achieve one at the expense of the other as they compete for the same resources (Zeng et al., 2015). The empirical studies that examined the mediating impact of innovation on QM-organizational performance relationship are also few (Khan & Naeem, 2018; Antunes et al., 2017).

Therefore, and from the above discussion, this study has identified a lack of empirical studies on the relationship between quality management practices, innovation, and organizational performance in the higher education field. To contribute to filling this gap in the literature, this study has been conducted in order to achieve the following main purposes:

- *To investigate the relationships between social QM practices and technical QM practices in higher education.*
- *To examine how social and technical QM practices impact innovation types and organizational performance in higher education.*

1.3 Research Methodology and Process

According to Saunders et al. (2016), the research process should start with making choices about the research philosophy, approach, and design as these choices will determine how the data will be collected in order to address the research problem or the research questions identified. Accordingly, this section discusses these aspects with explaining the rationale behind the choices made.

1.3.1 Research Philosophy

The research philosophy is a belief that leads to the nature and development of knowledge in the research process (Johnson et al.,2007; Creswell and Clark,2011). The choice of a research philosophy is central to identifying and evaluating the choice of research methodology and it assists researchers to shape the way they undertake their research and influences the overall research process, including the selection of the research strategy, methods, data collection and analysis (Saunders et al., 2016). According to Tashakkori and Teddlie (2010), the selection of a research philosophy is heavily influenced by the practical purpose of the research.

Saunders et al. (2016) state that there are five research philosophies: positivism, critical realism, interpretivism, postmodernism, and pragmatism. *Positivism* relates to the philosophical stance of the natural scientist. It entails working with an observable social reality and the end product can be law-like generalizations similar to those in the physical and natural sciences. *Critical realism* focuses on explaining what we see and experience in terms of the underlying structures of reality that shape the observable events. They tend to undertake historical analyses of changing or enduring societal and organizational structures, using a variety of methods. *Interpretivism* is a subjectivist philosophy, which emphasizes that human beings are different from physical phenomena because they create meanings. Interpretivists study meanings to create new, richer understandings of organizational realities. Empirically, interpretivists focus on individuals' lived experiences and cultural artefacts, and seek to include their participants' as well as their own interpretations into their research. *Postmodernism* emphasizes the world-making role of language and power relations. Postmodernists seek to question the accepted ways of thinking and give voice to alternative worldviews that have been marginalized and silenced

by dominant perspectives. *Pragmatism* asserts that concepts are only relevant where they support action. For a pragmatist, research starts with a problem and aims to contribute practical solutions that inform future practice. The characteristics of these research philosophies are shown in table 1.1

Table 1. 1 Characteristics of the different research philosophies

Category	Characteristics
Positivism	• Value-free research • Researcher is neutral and independent of what is researched • Typically, deductive, highly structured, large samples, measurement, typically quantitative methods of analysis, but a range of data can be analyzed
Critical Realism	• Value-laden research • Researcher tries to minimize bias and errors • Retroductive, in-depth historically situated analysis of pre-existing structures and emerging agency. • Range of methods and data types to fit subject matter
Interpretivism	• Value-bound research • Researchers are part of what is researched, subjective • Typically, inductive. • Small samples, in-depth investigations, qualitative methods of analysis, but a range of data can be interpreted
Postmodernism	• Value-constituted research • Researcher and research embedded in power relations • Typically, deconstructive – reading texts and realities against themselves • In-depth investigations of anomalies, silences, and absences • Range of data types, typically qualitative methods of analysis
Pragmatism	• Value-driven research • Research initiated and sustained by researcher's doubts and beliefs • Following research problem and research question • Range of methods: mixed, multiple, qualitative, quantitative, action research • Emphasis on practical solutions and outcomes

Source: Saunders et al. (2016)

In order to achieve the objective of the research, the current study will adopt positivism philosophy. Following that philosophy, the research will review the literature and the relevant theories that are related to the current study which will be the basis for developing the hypotheses and the research model. Moreover, the data obtained will be quantitative in nature and the researcher is external of the data collection process and these arguments are in line with the positivism philosophy.

1.3.2 Research Approach

There are three main approaches that can be undertaken to research: deduction, induction, and abduction. *Deductive research* tends to explain the causal relationships between variables by using quantitative data.The concepts of this approach need to be operationalized in order for the facts to be measured quantitatively, and large samples are used so that the results can be generalized statistically. In this sense, the approach involves testing theory, hence it falls under the positivism paradigm (Bryman, 2008).

On the other hand, the *inductive approach* allows the research findings to emerge from significant themes inherent in qualitative raw data and uses several methods to collect these data. Researchers deal with a small sample of subjects and theory is developed as a result of the data analysis. Hence, this approach is exploratory, unlike the explanatory nature of deductive research. It works well under the interpretivist paradigm (Creswell, 2009). The *abductive approach* is used when the researcher collects data to explore phenomenon, identify themes and explain patterns, to generate a new or modify an existing theory that could be subsequently tested through additional data collection (Suanders et al., 2016).

The decision over whether to use the deductive, inductive or abductive approach is not an easy one, but it is important to attach these approaches to the philosophies of the research as this will help the researcher to determine the types of strategies and methods to be used in the data collection (Saunders et al., 2016). In line with the positivism paradigm, the deductive approach will be adopted as this study aims to investigate the causal relationships between quality management practices, innovation, and organizational performance in higher education. The deductive research starts with a theory, often developed from the academic literature, and then designing a research strategy to test the theory. In line with the deductive and positivist approach, the hypotheses of the study will be developed according to the literature review and the identified gaps in the literature and then these hypotheses will be tested empirically through collecting quantitative data.

1.3.3 Research Purpose

The purpose of the research needs to be understood, since it will aid clarifying which research strategy is the most appropriate for the nature of the research.

According to Robson (2011), the purpose of a research can be exploratory, descriptive, and explanatory. Exploratory research structures and identifies new problems. This type of research is particularly used in little-understood situations. Descriptive research portrays systematically an accurate profile of persons, events or situations. Finally, explanatory research seeks an explanation of a situation or problem, clarifying how and why there is a relationship between two aspects of a phenomenon or situation. According to Robson (2011), the characteristics of each category are shown in Table 1.2

Table 1. 2 Categories of research purpose

Category	Characteristics
Exploratory	• To find out what is happening, particularly in little understood situations • To seek new insights • To ask questions • To assess phenomena in a new light • To generate ideas and hypotheses for future research • Almost exclusively of flexible design (qualitative)
Descriptive	• To portray an accurate profile of persons, events or situations • Requires extensive previous knowledge of situations etc. • To be researched or described, so that the author knows the appropriate aspects on which to gather information • May be flexible and/or fixed design (qualitative or quantitative)
Explanatory	• Seeks an explanation of a situation or problem, traditionally, but not necessarily in the form of causal relationships • To explain patterns relating to the phenomenon being researched • To identify relationships between aspects of the phenomenon • May be of flexible and/or fixed design (qualitative or quantitative)

Source: Robson (2011)

Taking into account the aim, objectives and the context of this research, its overall purpose can be characterized by explanatory as it seeks to examine the causal relationships (both direct and indirect) between quality management practices, innovation, and organizational performance.

1.3.4 Research Design

Research literature broadly identifies three classifications of research designs: *quantitative*, *qualitative* or *mixed methods*. These research methods are usually based on *cross-sectional* or *longitudinal* time horizon (Trochim and Donnelly, 2007). According to Saunders et al. (2016), quantitative methods used as a synonym for any data collection technique (such as questionnaire) or data analysis procedure (such as graphs or statistics) that generates or used numerical data while qualitative methods involve any data collection technique (such as interview) or data analysis procedure (such as categorizing data) that generates or used non-numerical data. A cross-sectional research approach is an approach in which the researcher investigates a phenomenon in a given population at a certain point in time, while a longitudinal study extends over a long period of time (Bethlehem, 1999).

This study adopts a quantitative approach based on cross-sectional time horizon. The quantitative approach has been chosen as it aligns with the research philosophy, approach, and designs discussed earlier. Quantitative research is generally associated with the positivism philosophy and deductive approach where the focus is on using data to test theory. It also examines the relationships between variables that could be measured numerically and analyzed using a range of statistical techniques. For these reasons, the quantitative approach has been selected for this study. According to Trochim and Donnelly (2007), cross-sectional approach will be used to be more efficient, and more effective in considering numerous variables at once

1.3.5 The Research Process

Following the positivism approach and in order to achieve the research aims and objectives, the research process comprises four main stages (Figure 1.1):

- Stage 1: This stage includes identifying the related theories of the study and the literature review that will help in identifying the different practices of quality management practices and how they are related to innovation and organizational performance.
- Stage 2: This stage extends the review of the literature to the study context (higher education) in order to understand quality management in that sector and to identify the different practices of QM that are specifically adopted in higher education.

These two stages will help in developing the research hypotheses and the initial framework of the study.

- Stage 3: This stage involves conducting a field study and collecting the data via the questionnaire survey.
- Stage 4: This stage consists of updating and validating the conceptual framework through quantitative data analysis and discussion.

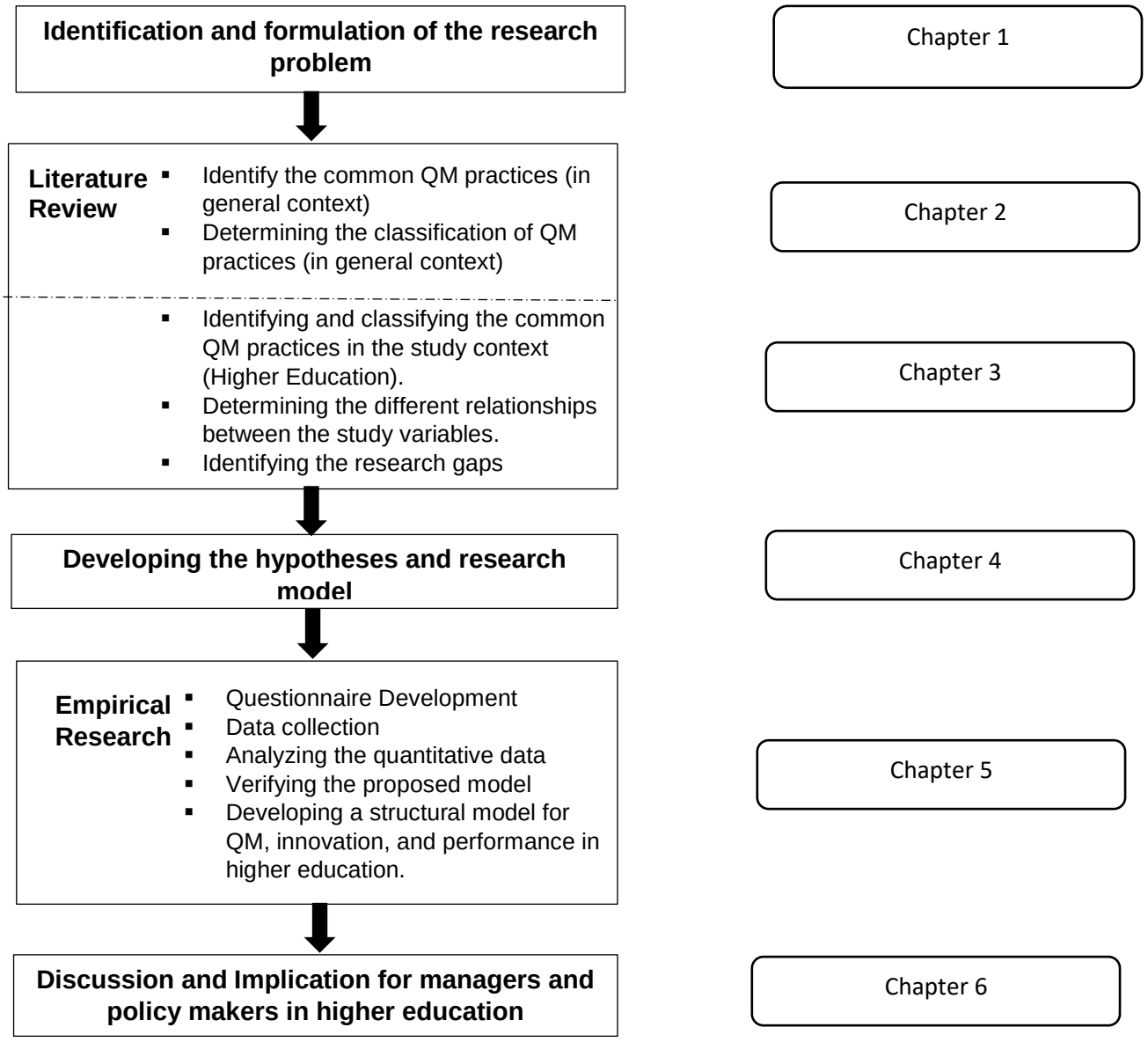

Figure 1. 1 The research process and thesis structure

1.4 The Theoretical Perspective of the Study

In quality management field, studies that consider the multidimensionality of QM have based their model and classification on ***the socio-technical system (STS) theory***.

The socio-technical system theory was originally developed from open systems theory which considers organizations as an open system consisting of two independent but linked systems: a technical system (composed of processes and tools), and social systems (consisting of people and relationships). Regarding QM, the socio-technical system theory suggests that TQM practices and their potential impact depend on the capability of organizations to adopt and apply both soft and hard QM elements simultaneously. This approach sees TQM from a systematic point of view suggesting that organizations should effectively implement both the hard and soft QM practices in order to achieve maximum benefit from QM implementation (Zu, 2009; Zeng et al., 2015; Khan and Naem, 2018). In addition to QM, the socio-technical system theory is relevant to the innovation studies that classify innovation into technological and non-technological or what is also called administrative and technical innovation. According to this theory, administrative innovation represents the social aspect while technical innovation represents the technical part and organizations should reinforce both of them in order to benefit from implementing and harmonizing a complex set of innovation practices which will ultimately lead to optimizing the results for their innovation processes (Anzola-Roman et al., 2018).

Another related theory, that could be used to explain the relationship between the research variables, is the ***resource-based view (RBV) theory***. RBV was developed to understand how organizations achieve sustainable competitive advantage and it is defined as "a managerial framework used for determining resource availability within a firm with the underlying principle that such resources serve as the basic organizational competitive advantage" (Barney, 1991; Wernerfelt, 1984).

According to RBV, organizations perform well and create value when they implement strategies that exploit their internal resources and capabilities (Barney, 1991; Conner and Prahalad, 1996). Consistent with this view, TQM and innovation become resources that are valuable, rare, inimitable, and non-sustainable (VRIN) for maintaining competitive advantage and better performance.

Several authors (Escrig-Tena et al., 2001; Powell, 1995; Savolainen, 2000) hold that the RBV perspective provides a useful theoretical basis for explaining the effects of soft and hard QM on innovation and organizational performance. This argument is built on the idea that QM can contribute to the improvement of innovation and performance by encouraging the development of elements that are specific, produce socially complex relationships, are steeped in the history and culture of the organization and generate tactic knowledge. All these features correspond to the conditions, which, according to RBV, allow a sustained competitive advantage (Escrig-Tena et al., 2001; Barney, 1991).

In the same vein, Winter (1994) holds that TQM can further the development of a series of routines and a form of behavior in the organization, which results from a process of learning and experience within the company itself. Powell (1995) considers that other companies cannot precisely replicate TQM as it allows for the creation of certain isolating mechanisms that inhibit their reproduction. Savolainen (2000) also holds that a commitment to TQM can trigger an inimitable competitive advantage due to its ability to encourage routines and guidelines within the company, which makes it difficult for potential imitators to gather resources for the successful reproduction of the same strategy. Therefore, in line with the RBV, TQM becomes an important competitive factor.

Following the socio-technical systems theory, the current study will adopt the multidimensional approach in studying both quality management practices and innovation. Regarding quality management and in line with the related studies that adopted the STS theory in QM field (e.g., Zeng et al., 2017; Khan and Naem; Escrig-Tena et al., 2018), QM practices will be classified into soft and hard QM practices. Regarding innovation, it will be classified into administrative and technical innovation which is in line with the relevant innovation literature and on the idea that organizations will benefit from implementing and harmonizing the two innovation aspects as they complement each other (Anzola-Roman et al., 2018; Haned et al., 2014; Azar and Ciabuschi, 2017). Following the RBV approach, the current study could suggest and examine the causal relationship between quality management practices, innovation, and organizational practices. Accordingly, the initial model is proposed (see figure 1.2) which depicts the direct and indirect relationships between QM practices (soft QM, hard QM), innovation types (Administrative innovation and technical innovation) and organizational performance.

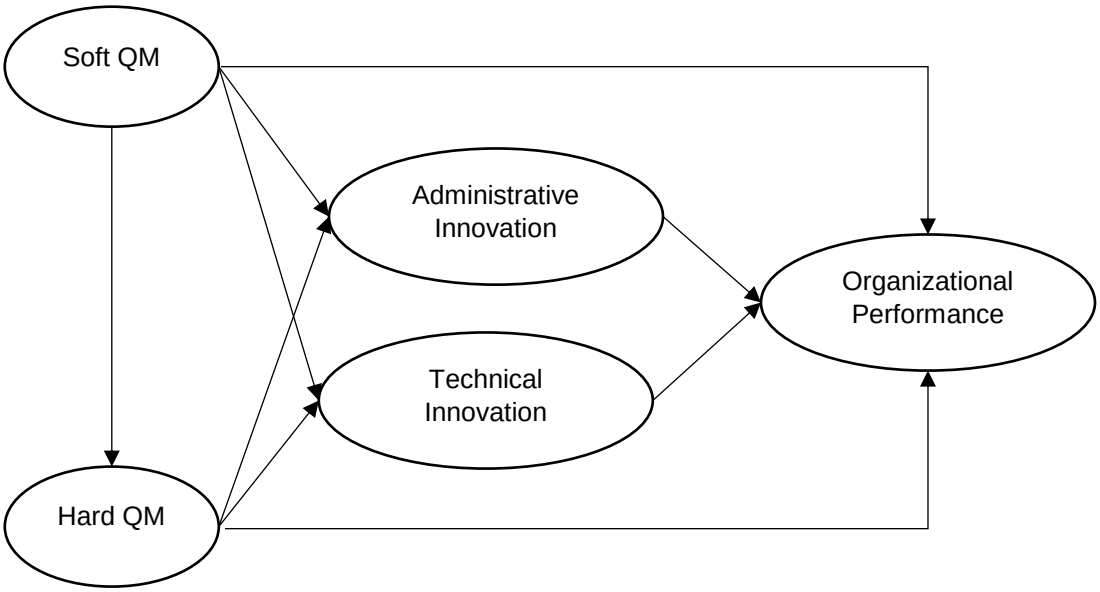

Figure 1. 2 The initial model of the study

1.5 Structure of the Thesis

This section provides an outline of the contents of the thesis. This thesis is divided into six chapters. The contents of every chapter are given below.

Chapter 1 introduces the background of the study, the study problem, the research methodology explaining the philosophy, approach, and design adopted in the study as well as the related theories to the study which lead to the adoption of the initial model. The chapter also presents the structure of the whole thesis.

Chapter 2 introduces a literature review on quality management, innovation, and organizational performance. It reviews the evolution of quality management and describes the different definitions and practices of quality management. It also discusses innovation and the innovation types that are looked in this study, as well as organizational performance concepts and measures.

Chapter 3 provides a detailed literature review on quality management, innovation, and organizational performance specifically in higher education. It discusses the meaning of quality management in HEIs, the barriers of QM, and the related QM practices in HEIs. It also discusses the concept of innovation, innovation types, and the challenges and barriers of innovation in HE. Then, the chapter discusses the organizational performance concept in higher education.

Chapter 4 provides the research framework and methodology. The first part of the chapter provides a discussion on the research hypotheses and model. Then, the chapter discusses the methodological part with putting a focus on discussing sampling design and data collection, questionnaire design and measures, pretest, as well as explanations of statistical tools for analysis of main data and hypotheses testing.

Chapter 5 presents the quantitative findings. This includes data screening, the characteristics of the sample, the testing of the reliability and validity of the model using the partial least squares structural equation modelling with Smart PLS Version 3. Then the chapter presents the outcomes testing the direct and indirect hypothesized relationships.

Chapter 6 contains the discussion of the findings and linking the results with the relevant literature. Then, the chapter presents the implications of theory and practice, limitations, and suggestions for future research.

Chapter 2 Quality Management, Innovation and Organizational Performance

Chapter Outline

2.1 Quality Management; **2.1.1** Evolution of Quality Management; **2.1.2** Defining Quality Management; **2.1.3** Practices of Quality Management; **2.1.4** Soft and Hard Quality Management; **2.1.4** Quality Management and Organizational Performance Relationships; **2.2** Innovation; **2.2.1** Defining Innovation; **2.2.2** Innovation Typologies, **2.3** Innovation and Organizational Performance Relationships; **2.4** Quality Management and Innovation Relationships

Introduction

This chapter aims at presenting a critical review of the literature related to quality management and innovation, the main topics of this thesis. This literature review looks at the origin and evolution of TQM, the different perspectives in defining QM, the main dimensions and classifications of the different QM practices, and how these practices are linked to organizational performance. The following section discusses innovation with a focus on the definition, its classifications and how they are linked to organizational performance. The chapter ends with a review of the relationship between quality management and innovation in theoretical and empirical studies.

2.1 Quality Management

2.1.1 The Evolution of Quality Management

As a concept, quality management has a long history. In its original form, quality was reactive and inspection-oriented but today, quality-related activities in organizations have come to be seen as being more strategic in outlook (Feigenbaum, 1983; Powell, 1995; Zeng et al., 2015). The management of quality now is being embraced by functions as diverse as purchasing, human resources and marketing, and is said to command the attention of top management and chief executives (Garvin, 1988; Yong and Wilknison, 2002; Esrig-Tena et al., 2018).

To understand quality management origins, several scholars (Yong and Wilkinson, 2002; Hafeez et al., 2006; Martinez-Lorente et al., 1998; Dahlgaard-Park et al., 2018) have identified four stages from its traditional inspection role, through quality control, quality assurance, to TQM. The main characteristics of each of these stages are shown in figure 2.1

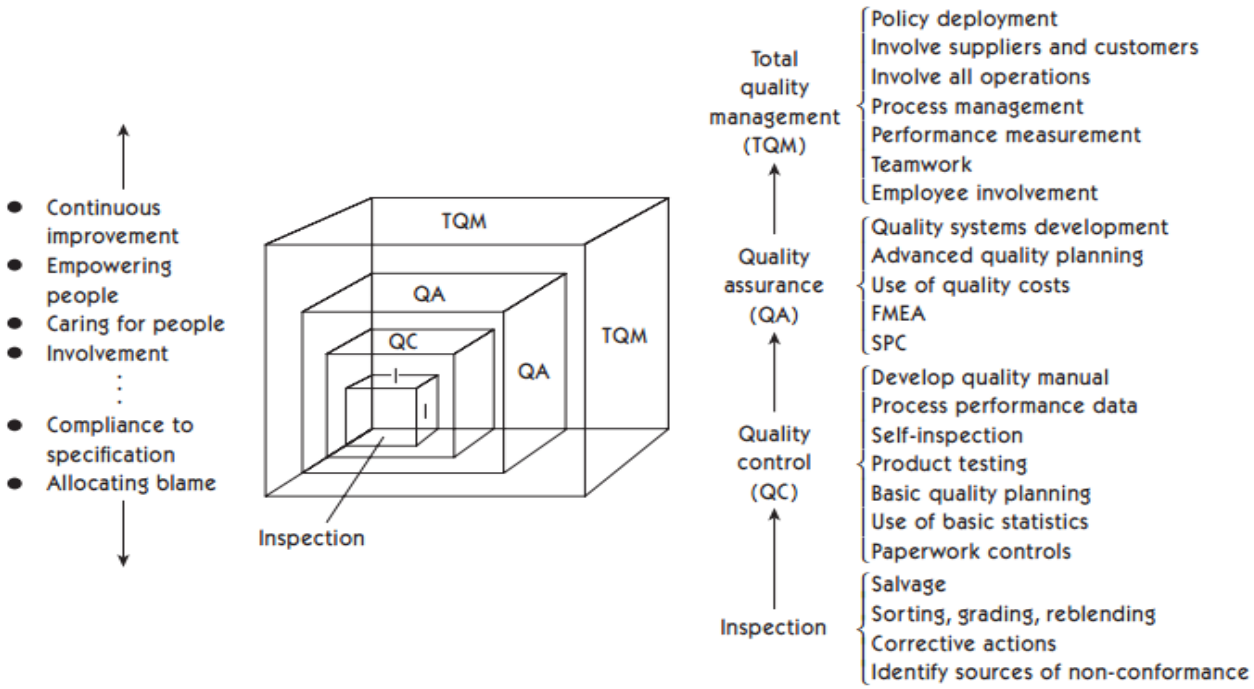

Figure 2. 1 The four stages of TQM evolution (Dale et al., 2013)

QM practices can be found in the 1910s, but it was mostly limited to simple inspection-oriented systems to implement production processes quality control in a scientific and rigorous way. According to several authors (Flynn et al., 1994; Mehra et al., 2001; Yong and Wilkinson, 2002), this first stage of quality-related activities and it relied mainly on results-oriented, narrow and mechanistic approaches called "after the fact" control techniques.

In 1924, W.A. Shewart, a Bell Laboratories physicist at Western Electric Company's Hawthorne Plant in Chicago, developed a statistical chart for the control of variables. Shewart's work marked the beginning of statistical quality control (SQC) and was published in 1931 in his book, Economic Control of Quality of Manufactured Product (Yong and Wilkinson, 2002). According to several authors (Hafeez et al., 2006; Dahlgaard-Park et al., 2008; Martinez-Lorente et al., 1998), the development of statistical quality control constitutes the second stage of quality management.

Hafeez et al. (2006) hold that QM practices changed in the 1950s as the increased competitiveness of the markets drove practitioners to focus their efforts more on enhancing customer satisfaction and, as a consequence, in implementing managerial principles taking into account the behavioral side of quality which requires a change in management style and thinking and also requires teamwork across various functions to help in finding and eliminating the root causes of problems. In this period, organizations changed their perspective on QM from an internal, narrowly focused (mostly inspection-oriented) to a broader perspective taking into account the relationship with the external environment (getting a more market-oriented approach to QM) that was mostly focused on paying more attention on satisfying customers' needs as well as identifying and improving the real causes behind quality problems as a way to solve them before delivering the final products to the customers (Hafeez et al., 2006; Martinez-Lorente et al., 1998; Yong and Wilkinson, 1998). This constitutes the third stage of QM which is known by quality assurance and it includes the previous two stages with incorporating other quality issues such as quality manuals, auditing, process control, appraisal and prevention activities (Dahlgaard-Park et al., 2018). The quality system, thus, set in place, is documented and audited to ensure that it is adequate against predefined standards (Hafeez et al. 2006).

In the early 1980s, QM technical methods and behavioral concepts were integrated and developed into a comprehensive management philosophy resulting in the appearance of the term total quality management (TQM). This stage involves the principles and values that can be applied in each business area of a company (Dahlgaard-Park et al., 2018). Along this line, since that late 1980s, researchers put more attention on developing the measurement constructs of QM and examining the various impacts and benefits of implementing QM (Park et al., 2001; Ahire and Ravichandaran, 2001).

According to the study of Dahlgaard-Park et al. (2018), which mainly aimed to compare the historical evolution of TQM to eight well-known management theories to see whether there is convergence between them, they found that TQM covers many of the perspectives offered by the earlier management theories; it concerns scientific processes and human behavior and posits a systematic mind-set where everything and everyone is connected (see Figure 2.2).

According to Figure 2.2, it can be concluded that the classical management theories, quality inspection, and parts of quality control stages have complementary elements such as work-standardization, task design, process work design, and control processes, designed to provide a rationale and scientific basis for management and enable efficient planning, organization, and control of work activities. These relationships reflect the main objective of total quality management which is making the institution more effective and economically efficient, cutting costs, and improving productivity.

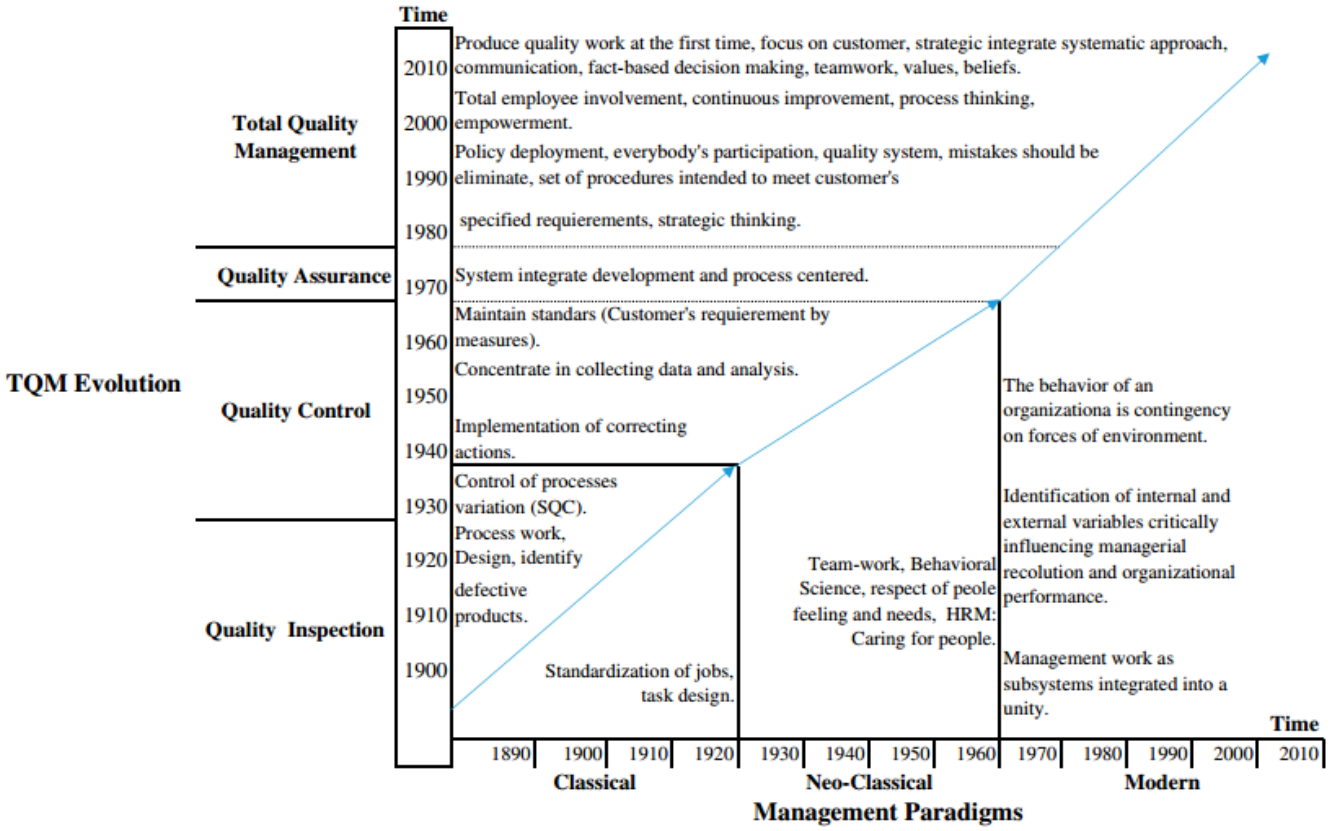

Figure 2. 2 Timeline comparison of the evolution of TQM and management paradigms.
Source: Dahlgaard-Parket al. (2018)

In summary, QM requires to motivate all the actors in the organization (managers, and employees as well) in order to satisfy customer requirements on a continual basis. TQM is, therefore, a philosophy of management that strives to make the best use of all available resources and opportunities through continuous improvement. TQM has been a key business improvement strategy since the 1980s, as it has been deemed essential for improving efficiency and competitiveness (Hafeez et al., 2006).

2.1.2 Defining Quality Management

In the last few decades, several books and articles have been written about TQM, but a universal definition of what is quality still can't be found. Andersson et al. (2006) state that defining quality is similar to the famous John Godfrey Saxe story 'The Blind Men and the Elephant' meaning that scholars have developed several definitions that suit their different views and persepctives (Boaden, 1997). Spencer (1994, p.448) describes a similar situation, considering that TQM is not a cut-and-dried reality but an amorphous reality that is continuously enacted by managers, consultants, and researchers who make choices based not only on their understanding of principles of TQM but also on their own conceptual frameworks concerning the nature of organizations.

Therefore, researchers have abundant definitions of TQM concept due to their differences on the perspectives, interests, and awareness of TQM. Therefore, based on the literature review, TQM has been defined from several perspectives.

TQM is regarded by several authors as a management process for attaining continuous improvement of each facet of the organizations (e.g., Senthil et al., 2001; Selladurai, 2002; Parzinger and Nath, 2000; Kanji and Asher, 1993). Other writers consider it as an integrated approach that can lead to the success and sustainability of effective results of the organization (e.g., Oakland, 2003; Hashmi, 2007). It is also regarded as a business organizational culture by other scholars (Kanji and Wallance, 2000; Gherbal et al., 2012). Moreover, with reference to the systematic nature of the organization, TQM is defined by various authors as a systems approach (Hellsten and Klefsjo, 2000; Kartha, 2004), while other writers regard it as a strategy for the advancement of the activities that concern the organization (Jones, 1994; Hiestchold et al., 2014). Furthermore, TQM is considered by other authors as a management philosophy that strives for the involvement of the organization's stakeholders to attain its set goals (Bayazit, 2003; Pun, 2002; Demirbag et al., 2006; Dean and Brown, 1994). Table 2.1 summarizes these various perspectives with the definitions related to each of them.

Table 2. 1 The different perspectives and definitions of TQM

Perspective / Author	Definition
TQM as a management process	
Kanji and Asher (1993)	TQM is a continuous performance improvement process of individuals, groups, and organizations
Parzinger and Nath (2000)	TQM is a management process that aimed to implant continuous improvement culture in the whole organization to make sure that the organization constantly and reliably met and surpassed customer needs and expectations
Senthil et al. (2001); Selladurai (2002)	TQM is a constant process of management, which aims to improve the quality of all processes and activities of the organization. It seeks to develop an effective and constant management system and organizational culture for improving the organization's activities including customer satisfaction
TQM as an intergrated approach	
Oakland (2003)	TQM is an integrated approach applied to advance competitiveness and flexibility using planning, as well as understanding every activity in the organization
Hashmi (2007)	TQM viewed an organization as an integrated process that should be constantly improved by combining worker experiences and knowledge in order to attain organizational objectives and that it must be accomplished management and employees in all organization's activities.
TQM as an organizational culture	
Kanji and Wallance (2000)	TQM is an organizational culture dedicated to fulfilling customers desires using continuous development
Gherbal et al. (2012)	TQM is an open and co-operative culture that should have to be established by the management in which all employees, regardless of their managerial levels or positions, had to cooperate together in order to achieve the organization's objectives.
TQM as a strategy	
Jones (1994)	TQM is an organizational strategy for improving and enhancing the organizational performance using employees' commitment in order to satisfy customers' needs at the lowest cost through constant development of products and services, business practices, and involvement of the stakeholders
Hietschold et al. (2014)	TQM is an organizational strategy that requires long-range management commitment to lead organizations to become efficient.
TQM as a management system	
Hellsten and Klefsjo (2000)	TQM is a constantly developing management system consisting of core values, scientific practices and tools, with the aim of increasing and enhancing the satisfaction of different stakeholders with the reduction of resources
Kartha (2004)	TQM is a management system approach that aims to improve customers' values by designing and enhancing organizational processes and systems on a continual basis.
TQM as a management philosophy	
Dean and Brown (1994)	TQM is a management approach characterized by principles (mainly customer focus, continuous improvement, and customer focus), practices and techniques. Each principle is implemented through a set of practices and, in turn, these practices are supported by a wide range of techniques.

Perspective / Author	Definition
Pun (2002)	TQM is a management philosophy consisting of a set of practices that highlight continuous improvement, fulfilling the needs of customers, decreasing reworking, long-term thinking, improved employee participation and teamwork, processes restructuring, continuous measurement of outcomes and effective relations with suppliers.
Bayazit (2003)	QM is a management philosophy that aims to continuously improve the performance of processes, products, and services so as to attain and exceed customer's needs and expectations.

Source: The researcher based on a review of the Literature

In reference to the above different definitions, it becomes evident that TQM has a wide perspective which may be interpreted differently according to the perceptions of the scholars and practitioners referring to the TQM concept. However, there are major common components between these definitions that include TQM producing different kinds of benefits for the organization and stakeholders.

These commonalities have led several authors to conclude that QM can be considered as a holistic and multidimensional management approach that should be implemented through core values and concepts that had to be built into every level of a company and become part of everything the organization does if its aim is long-term success (Dahlgarrd-Park et al., 2018; Fredriksson and Isaksson, 2018; Hellsten and Klefsjo, 2000;2010). Table 2.2 presents the core values and components of QM.

According to several scholars (Vouzas and Psychogios,2007; Spencer, 1994; Abrunhosa and Moura E Sa, 2008), in almost all the definitions of quality management, two substantial aspects can be identified: the "hard" side and the "soft" side. The hard (or technical) side refers to management tools, techniques and practices, while the soft (or philosophical) is associated with management concepts and principles. While the "hard" aspects of TQM include clear and well-documented methods to achieve quality results, the "soft" aspects synthesize its whole theory, composing its background and philosophical elements.

Table 2. 2 TQM's theoretical foundation

Core values and concepts	Components	Focal Points/Thoughts
• Top management responsibility • Employees have a strategic approach for continuous improvement • Customer-need orientation • Produce quality work from the first time • Encourage mutual respect, communication & teamwork • Behaviour of leaders and employees needs to change at the beginning of the implementation of TQM core values. • Cooperation with supplier • Concern for social and environmental context	• Quality goals, policy and planning • Process control management • Management based on facts • Performance is continuously measured. • Involvement of human resources • Prevention of errors instead of correction by training. • Quality tools and techniques, methods, and frameworks • Management leadership • Communication between departments	• Recognizes the importance of processes and SQC as key for continuous improvement. • Management processes should be considered as an integral system where external and internal stakeholders are interrelated around the quality customer's needs. • Implemented via holistic frameworks like Business Excellence, Excellence Model, and ISO • In a TQM environment, employees and leaders have important roles and responsibilities different from those in a traditional organization (everyone, as a part of a system, matters). • TQM environment is created via training. • Continuous management commitment is necessary

Source: Dahlgaard-Park et al. (2018)

2.1.3 Practices of Quality Management

To exploit the benefits provided by TQM, organizations must manage the complex implementation process successfully. Thus, organizations need to identify and evaluate the key practices when introducing TQM (Hietschold et al., 2014). Researchers recognized that examining QM practices is essential and primary prerequisite to provide effective management and competitive survival (Nair, 2006; Zeng et al., 2015). Along this line, since the late 1980s, much attention has been devoted to developing and identifying the measurement constructs of QM and examining the net impact of QM practices (Park et al., 2001; Ahire and Ravichandran, 2001; Perdomo-Ortiz, 2006).

Several researchers attempted to identify the different practices of quality management (Saraph et al., 1989; Flynn et al., 1994; Powell, 1995; Black and Porter, 1996;

Ahire et al., 1996, Grandzol and Gershon, 1998; Dow et al., 1999; Rahman, 2001). The key practices identified in the literature are summarized in table 2.3.

Table 2. 3 The practices of TQM in different frameworks.

TQM Dimension	***S1***	***S2***	***S3***	***S4***	***S5***	***S6***	***S7***	***S8***	***S9***	***S10***	***S11***	***S12***
Management Support	X	X	X	X	X	X	X		X	X	X	X
Product Design	X	X		X				X	X	X		X
Supplier quality Management	X	X	X	X	X	X	X	X	X	X		X
Management of Quality data and reporting	X	X		X	X	X			X	X	X	X
People management	X	X	X	X	X	X	X	X	X	X	X	X
Process Management	X	X	X				X		X	X	X	X
Customer Relations		X	X		X	X	X	X		X	X	X
Continuous improvement				X			X					
Benchmarking			X	X	X			X				
Flexible manufacturing			X									
Availability and use of technology						X			X			
Zero-defects			X									
Role of quality department	X											
Open Organization			X									
Communication of quality information			X			X			X	X		X
Use of JIT								X				

Sources: **S1**: Saraph et al. (1989) and Badri et al. (1995); **S2**: Flynn et al. (1994); **S3**: Powell (1995); **S4**: Anderson et al. (1995); Rungtusanatham et al. (1998) **S5**: Ahire et al. (1996); **S6**: Black and Porter (1996); **S7**: Grandzol and Gershon, 1998 **S8**: Dow et al. (1999); **S9**: Joseph et al. (1999); **S10**: Zhang et al. (2000); **S11**: Rahman (2001); **S12**: Antony et al. (2002).

According to Perdomo-Ortiz et al. (2006), the first attempt to explore the measurement of QM practices was made by Saraph et al. (1989). Their motivation fuelled due to a lack of a systematic attempt to organize a set of QM practices and develop measures of the overall QM efforts in the QM literature. Using a survey of 162 general and quality managers, they proposed eight critical factors of QM: the role of management leadership, the role of the quality department, training, employee relations, quality data and reporting, supplier management, product/service design, and process management. Similarly, Flynn et al. (1994) argued that QM studies on theory development and measurement failed to yield conclusive evidence related to validity and reliability. Therefore, they developed an empirical study on different plants in US to determine the different QM elements and they suggested seven key dimesnions of QM: top management

support, quality information systems, process management, product design, workforce management, supplier involvement, and customer involvement. Ahire et al. (1996) responded to the lack of studies that scientifically examine the practices to measure the role of QM efforts. By developing an empirical study of 371 companies in the automotive components manufacturing industry, they identified 12 QM practices: top management support, customer focus, supplier quality management, design quality management, benchmarking, statistical process control usage, internal quality information usage, employee empowerment, employee involvement, employee training, product quality, and supplier performance.

As can be shown from the literature, there is no clear agreement on a specific list of QM practices. According to Rahman (2004), one of the main difficulties in the identification of critical QM elements is the basis of defining these elements. For instance, Saraph et al. (1989) have based their classification to the QM factors on the quality management prciniples developed by quality gurus such as Deming, Juran, and Crosby. Black and Porter (1996) developed their factors using the Malcolm Baldridge National Quality Award (MBNQA) framework and Powell (1995) based his analysis on the principles prescribed by the quality gurus as well as the MBNQA framework. The domains of these studies were also different. For instance, Dow et al. (1999), Ahire et al. (1996) and Flynn et al. (1994) surveyed manufacturing companies and Grandzol and Gershon (1998) surveyed the suppliers to the US Navy's Aviation Supply office, while others investigated those elements in small and medium-sized enterprises (e.g., Rahman, 2004).

Despite these differences, several researchers show that there is a great deal of overlap and similarities of these frameworks (Rahman, 2004; Ho et al., 2001; Powell, 1995; Rahman and Bullock, 2005). For instance, elements such as top management support, customer focus, supplier relationships, process management, and employee training are common to most of the frameworks. These commonalities led several authors to categorize those QM elements into two distinct groups: Soft QM and hard QM (Rahman, 2004; Rahman and Bullock, 2005; Flynn et al., 1995; Zeng et al., 2015; Esrig-Tena et al., 2018). Sometimes these groups are termed institutional and technical TQM (Zbaracki, 1998). The elements of soft are the behavioral aspects of quality management, such as leadership, human resource management, employee empowerment etc., and the elements of hard TQM

include process management tools and methods, information and analysis, benchmarking, and JIT practices (Rahman, 2004).

2.1.4 Soft and Hard QM Practices

According to several authors (e.g., Asif, 2017; Zu, 2009; Zeng et al., 2015; Escrig-tena et al., 2018; Rahman and Bullock, 2005; Flynn et al., 1994), quality management practices can be classified into two types of practices: the first type of practices is related to people and encompasses the social and cultural sides of the organization. These practices are also called soft QM practices or infrastructure QM practices (Zu, 2009; Fotopoulos and Psomas, 2009; Zeng et al., 2017; Asif, 2017). Zeng et al. (2017) defined soft QM as those practices that are directed toward involvement and commitment of management and employees, training, learning, and internal cooperation or teamwork which promote the human aspects of the system. The other type of QM practices are tools, techniques, and methodology oriented practices that improve process performance through the use of scientific methods and statistical tools (Zu, 2009; Fotopoulos and Psomas, 2009; Asif, 2017; Zeng et al., 2017). Examples of those practices include statistical process control (SPC), data and information analysis, and process management (Asif, 2017). These practices are also called core, or hard, QM practices (Rahman, 2004; Escrig-tena et al., 2018). Zeng et al. (2017) defined hard QM practices as those practices that are related to the technical aspects which focus on controlling processes and outputs through techniques and tools to conform and satisfy established requirements.

It is evident from the previous definitions that the hard and soft QM practices possess different purposes and functions in continuous improvement. The hard QM practices entail the use of scientific methods and statistical tools, while the soft QM practices create a learning and cooperative environment for QM implementation (Flynn et al., 1995; Ho et al., 2001; Sousa and Voss, 2002).

The classification of QM practices into hard and soft practices finds support from socio-technical systems (STS) theory (Appelbaum,1997; Pasmore, 1988; Manz and Stewart,1997). As a model of organization design, the socio-technical systems theory was originally developed from open systems theory (von Bertalanffy, 1950). The STS theory views an organization as an open system consisting of two interacting subsystems: a

technical subsystem and a social subsystem (Manz and Stewart, 1997). The technical subsystem is composed of the tools, techniques, devices, methods, procedures and knowledge used by organizational members to acquire inputs, transform inputs into outputs and provide outputs or services to clients or customers, while the social subsystem consists of the people who work in the organization and their social interactions with one another (Pasmore, 1988). The outputs of the organization are viewed as the result of interactions between the technical and social systems (Grover et al.1995), and thus joint optimization of the two systems is considered more desirable than simple optimization of either system at the expense of the other (Manz and Stewart, 1997).

The STS theory is useful to explain QM implementation because both systems advocate technical proficiency and employee involvement as part of an organizational change effort (Manz and Stewart, 1997). This led several authors in QM field to suggest that hard QM practices may be categorized as the technical subsystem and the soft QM practices may be described as the social one (e.g., Ho et al., 2001; Rahman, 2004; Zu, 2009; Zeng et al., 2017; Asif, 2017; Esrig-Tena et al., 2018).

As the technical subsystem deals with the processes, tasks, and technology needed to transform inputs to outputs that satisfy the external environment (Bostrom and Heinen, 1977), the hard QM practices involve extensive use of procedures, tools and techniques in solving quality problems and improving product and service quality to satisfy customers' needs and expectations (Zu, 2009; Zeng et al., 2017). On the other hand, the soft QM practices are intended to establish a learning and cooperative environment through organizational change and development efforts in ensuring top management support, employee involvement, and customer and supplier involvement, which correspond to the social subsystem that encompasses people and their attitudes, values and behaviors (Zu, 2009; Zeng et al., 2017).

STS theory highlights the interaction between the social and technical subsystems and the importance of jointly optimizing both subsystems to maximize the overall system or organizational effectiveness (Hendrick, 1997). The social and technical subsystems need to be developed together, rather than independent of each other (Power and Singh, 2007). There is a strong interdependence relationship between QM practices (Flynn et al., 1995; Kaynak, 2003; Yeung et al., 2005), which implies that the effectiveness of an

organization's QM system is determined by all the practices, not a subset of them. According to Kaynak (2003), ineffectual implementation of some QM practices may deteriorate other practices and thus undermine the ability of the organization to achieve maximum benefits from its overall QM implementation. From the perspective of the STS theory, the soft QM practices and the hard QM practices interact and both have to be established for successful quality improvement (Zu, 2009).

In addition to the above arguments, the STS theory had been empirically supported by several studies related to QM. According to Sousa and Voss (2002) and Zu (2009, the techniques and tools promoted by hard QM through practices, such as process management and use of quality information, are important to yield quality improvement but they are not enough to increase the competitive advantage over time as these practices are easy to be imitated and adopted by competitors. Therefore, strong human resource utilization is required to identify and eliminate sources of quality problems effectively, as continuous quality improvement is highly contingent upon the problem-solving abilities of employees (Ahire and Ravichandran, 2001). Accodingly, Bowen and Lawler (1992) hold that organizations have to be customer-focused, maintain competency, and promote employee participation in decision-making processes through training and empowerment.

Based on the above arguments, it can be concluded that soft and hard QM cannot be managed in isolation because both dimensions are needed for successful QM implementation and improvement. Joint optimization of the two subsystems is more beneficial than the optimization of only one subsystem at the expense of the other (Manz & Stewart,1997).

Regarding the practices that constitute the hard and soft aspects of QM, there are a wide range of scholars that adopted this classification (e.g., Rahman and Bullock, 2005; Clavo-Mora et al., 2014; Zeng et al., 2017; Esrig-Tena et al., 2018). However, there is still a lack of consensus in the literature as to what are exactly the soft and what are the hard QM practices. For instance, Flynn et al. (1995) consider supplier management as one of the hard QM practices, whereas Rahman and Bullock (2005) consider it as a soft QM practice. This is also reflected in table 2.4., which summarizes the soft and hard QM practices through a review of different articles.

Table 2. 4 Soft and hard practices of QM in literature

Study	Soft QM elements	Hard QM elements
Flynn, 1995	Top Management Commitment, Customer relationship, Supplier relationship management, Workflow Management, Work attitudes	Process Management, Statistical Control & Feedback, Product Design Process
Ho et al., 2001	Employee relations; Training	Quality data & reporting; Supplier Management
Rahman, 2004	Top management leadership; Employee involvement; Employee empowerment; Employee training; Teamwork and communication; Strategic quality management; Customer focus	Use of advanced manufacturing systems; Process management; Quality data and reporting; Design quality management; Benchmarking
Rahman and Bullock, 2005	Shared vision; Workforce commitment; Customer focus; Use of teams; Personal training; Cooperative supplier relations	Computer-based technologies; JIT principles; Technology utilization; Continuous improvement enablers
Calvo-Mora et al., 2013	Management leadership; HR Management; Continuous improvement	Implementation of strategies; Management of resources; Partnerships; Management of processes
Bakotić and Rogošić, 2015	Customer focus; Leadership; Employee involvement; Supplier relationship	Process approach; System approach to management; Continual improvement; Factual approach to decision-making
Zeng et al., 2015	Small group problem-solving Employee suggestion Task-related training for employees	Process management; Quality information
Patyal and Koilakuntla , 2017	Top Management Commitment, Customer Relationships, Supplier Relationship, Workforce Management.	Quality Information & Analysis, Product/ Service design, Process management
Khan and Naeem, 2018	Workforce commitment; Shared vision; Customer focus; Personnel training; Personnel training	Quality policy and target objectives; Information and Analysis; Quality system processes; Continuous improvement

Source: The researcher according to the literature review

2.1.5 The Relationship between Quality Management and Organizational Performance

Quality gurus, such as Deming, Crosby, and Juran, support the positive impact of QM on organizational performance. For instance, Deming (1986) argues that "improving quality leads to productivity increases, while low levels of quality will increase costs and consequently weaken the organization's competitive position". Similarly, Crosby (1980) states that 'organizations that mainly focus on developing and improving quality could probably increase their profits by an amount equal to five to ten percent of their sales'. They also report many success stories of companies that implemented quality improvement initiatives. For example, Crosby (1984) describes a textile manufacturer saving $700,000 from the cost of quality in the first six months. He also describes similar success stories from other manufacturing companies. He argued that these companies have saved millions of dollars by reducing error rates, minimizing the cost of quality, eliminating customer complaints, and decreasing material handling costs.

Moreover, there are several empirical studies in the literature that focus on examining the relationships between quality management and organizational performance in different countries and industries. By reviewing the literature, it was found that studies that focus on TQM-Performance relationships can be grouped into two streams. The first stream pertains to studies that generally consider QM as an integrated variable without explicitly classifying TQM elements into soft and hard practices.

According to that stream, several empirical studies conducted in various countries support the positive associations between the implementation of TQM and organizational performance (e.g., Shafiq, 2017; Al-Dhaafri and Al-Swidi, 2016). For instance, García-Bernal and Ramírez-Alesón (2015) provided empirical evidence from manufacturing and service organizations in Spain. They found that the implementation of TQM improves the operational performance of organizations, which ultimately affects the other dimensions of performance such as financial performance, customer satisfaction, and other stakeholders' performance. The study developed by O'neill et al. (2016) in the Small Australian Manufacturing Firms (SAMFs) indicated that the financial performance of the firms that implemented quality management practices was much better than those that don't engage in quality management. Bou-Llusar et al. (2009) and Tari et al. (2007) provide empirical evidence from Spanish manufacturing and service organizations indicating that QM

practices positively impact organizational performance. Similarly, Douglas and Judge (2001) provide empirical evidence from American hospitals confirming that QM practices are positively and significantly associated with financial performance.

Although most of the researches have shown a strong positive relationship between TQM and organizational performance, there are some studies suggesting weak, irrelevant and even negative relationship among these two variables (Powell,1995; Yeung and Chan, 1998). Rahman (2001), for instance, established that the implementation of TQM in terms of ISO 9001 has no significant impact on organizational performance. Macinati (2008) provides empirical evidence from Italian healthcare providers, indicating that quality management practices are not significantly related to financial results.

The second stream pertains to studies that consider the multidimensionality of QM trying to examine the different relationships between soft QM, hard QM, and organizational performance (e.g., Ho et al., 2001; Kaynak, 2003; Rahman and Bullock,2005; Zu, 2009; Patyal and Koilakuntla, 2017). The findings on the relationship between those variables are also not consistent and this perhaps could be attributable to the different types of soft and hard quality management (QM) factors considered and the different measures of organizational performance employed (Gadenne and Sharma, 2009). For example, Flynn et al. (1995) found that both hard and soft QM factors were related to organizational performance, as measured by "quality market outcomes", which represented several dimensions of quality performance. The hard factors included statistical control/feedback and the product design process, while the main soft factors positively associated with performance were top management support, workforce management, supplier relationships, and work attitudes. On the other hand, Powell (1995) found that mainly soft QM factors were conclusively associated with organizational performance (as measured by two summative measures–"TQM performance" representing five subjective items and "total performance" representing eight subjective items) including executive commitment, open organization, and employee empowerment. Similarly, Samson and Terziovski (1999) found that the soft QM factors of leadership, people management and customer focus were positively associated with organizational performance, as measured by a summative variable of customer satisfaction, employee morale, productivity, quality of output and delivery performance. Dow et al. (1999) found that the soft QM factors of

employee commitment, shared vision, and customer focus had a positive correlation with organizational performance (as measured by "product quality", encompassing: the percentage of defects at final assembly; the cost of warranty claims; the total cost of quality; and an assessment of the defect rate relative to competitors), whilst, other hard quality practices, such as benchmarking, cellular work teams, advanced manufacturing technologies, and close supplier relations were found to not contribute to superior performance. Terziovski et al. (2003) found that the soft QM factor of customer focus was the one contributing the most to organizational performance (as measured by a "quality factor" consisting of four items). Rahman and Bullock (2005) found that the soft QM factors of people management, supplier relations, customer focus and shared vision affect organizational performance (as measured by a factor including customer satisfaction, employee morale, productivity, quality of output and delivery performance); and that certain hard QM factors such as use of JIT principles, technology utilization, and continuous improvement enablers also affect organizational performance. Abdullah et al. (2008) found that the soft QM factors of management commitment, customer focus, and employee involvement had a significant influence on organizational performance (as measured by a composite variable consisting of added value per employee, total output per employee, added value content, process efficiency, fixed asset per employee, added value per fixed assets, added value per labor cost, unit labor cost, and labor cost per employee).

Therefore, it is evident that there are inconsistent results in the literature regarding the relationship between soft QM, hard QM, and organizational performance and further research is needed.

2.2 Innovation

2.2.1 Definitions of Innovation

There are several different definitions of innovation, each one emphasizing some different aspects, and perspectives, making it difficult to give a simple and general definition to innovation. The first definition of innovation was developed by Schumpeter in the late 1920s (De Jong, 2006), who stressed the novelty aspect. According to Schumpeter, innovation is the creation of new products/services, brands and processes, and their impact on economic development that is able to unbalance the market and help the firm to get a temporary competitive advantage on the other firms in the same industry/area/market. Nystrom (1990) found innovation to be new products/services, and processes that aim to improve the competitive advantage of the organization and meet the customers' changing demands. According to White and Clickman (2007), innovation means the introduction of new ideas, methods, and devices.

Innovation in organizations has been conceived both as a discrete outcome and as a process. Studies that consider innovation as an outcome mainly explore external and internal organizational conditions under which an organization innovates (Damanpour and Schneider, 2006; Hitt et al., 1996). On the other hand, studies that consider innovation as a process focus on exploring how the innovation is originated, developed, commercialized, diffused, adopted, or implemented (Angle and Va de Ven, 2000).

Innovation as a process is defined to encompass multiple patterns, stages, and phases (Roberts, 1988; Schroeder, et al. 2000), which are broadly grouped into generation and adoption which have some different characteristics. The generation process covers activities related to creating new ideas, getting them to work, and supplying them for transfer to, and use by, other organizations. It also includes the phases of recognizing the opportunity, research, design, commercial development, marketing and distribution (Roberts, 1988; Tornatzky and Fleischer, 1990). On the other side, the adoption process covers how an organization becomes aware of new ideas, acquires, adapts, and uses them. It includes three main phases namely, initiation, decision adoption, and implementation (Damanpour and Schneider, 2006).

Further, some scholars conceived innovation as a means of changing an organization, either as a response to changes in the external environment or as a preemptive action to

influence the environment. Hence, innovation in this regard is broadly defined to encompass a wide range of typologies, including new products or services, new process technologies, new organizational structures or administrative systems or new plans or programs pertaining to organizational members (Damanpour and Evan, 1984; Damanpour et al. 2009).

Innovation in the current study is generally defined as the introduction of new product, service, or process to the external market or the introduction of a new device, system, program, or practice in one or more internal units (Walker et al., 2011). This definition was adopted because it reflects a broader view by encompassing both technical innovation (such as new products, services, and process technologies) and administrative innovation (such as new administrative systems or new plans or programs of organizational members) which are the main innovation typologies in the innovation literature.

2.2.2 Innovation Typologies

Several authors indicated that it is important to understand the types of innovation because each type requires unique and sophisticated responses from organizations (Damanpour et al., 2009; Hurmelinna-Laukkanen et al., 2008). Different types of innovation are reported in the literature as shown in table 2.5. In the innovation literature, there is either a similar name used for different innovations or the same innovation categorized into different typologies (Garcia and Calantone, 2002; Rowley et al., 2011). Although previous innovation studies suggest several typologies of innovation, the most prominent types of innovation comprise the following: Product versus process innovation, incremental versus radical innovation, and administrative versus technical innovation (Cooper 1998; Zhao, 2005; Kim et al., 2012).

Table 2. 5 The different types of innovation in the literature

Study/Type	Product innovation	Process innovation	Administrative innovation	Technical innovation	Radical innovation	Incremental innovation	Service innovation	Ancillary innovation	Position innovation	Paradigm innovation
Evan (1966)			X	X						
Knight (1967)	X		X				X			
Deward and Dutton (1986)					X	X				
Damanpour (1987)			X	X				X		
Cooper (1998)	X	X	X	X	X	X				
Garcia and Calantone (2002)					X	X				
OECD (2005)	X	X								
Francis and Bessant (2005)	X	X							X	X
Schmidt and Rammer (2007)			X	X						
Oke et al., (2007)	X	X			X	X	X			
Rowley et al. (2011)	X	X							X	X
Purchase et al., (2016)				X						
Geldes et al., (2017)	X	X	X							
Anzola-Roman et al. (2018)	X	X	X	X						

Source: The Researcher based on the review of the literature

Product versus Process Innovation

According to Damanpour and Gopalakrishan (1996), the distinction between product and process innovations is important as their adoption requires different skills within the organization. They asserted that product innovation requires organizations to assimilate customer need pattern, design, and manufacture the product, while process innovation requires firms to apply technology to improve the efficiency of product development and commercialization. Product innovation refers to changes to the end of providing product or service, while process innovation is defined as changes in the way of producing products or services (De Propris, 2002; Utterback, 1994).

The objective of ***product innovation*** is to meet the needs of customers or market demand (Salavou and Lioukas, 2003). Product innovation is based on two dimensions: the technological capability dimension and the product capability dimension. The technological capability dimension represents the degree to which the product includes expanding technological capabilities beyond existing capabilities, while the product capability dimension is related to the benefits of products that customers perceive (Veryzer and Robert, 1998). Depending on the level of organizational capability at each dimension, product innovation could provide organizations with opportunities to create a new market or change the balance of power in a competitive market (Herrmann et al., 2007). In terms of the degree of innovation, product innovation can be classified as radical product innovation and incremental product innovation (Reichstein and Salter, 2006; Huiban and Bouhsina, 1998). Radical product innovation refers to innovation associated with the introduction of products or services that involves substantially different technology from the current products, whereas incremental innovation is defined as innovation related to the introduction of products or services that provide new features, improvements of benefits to the existing technology in the existing market (Herrmann et al., 2007; Valle and Vazquez-Bustelo, 2009; Kim et al., 2012).

On the other side***, process innovation*** has been often described as changes in the way that an organization produces products or services (Koberg et al., 2003; Utterback, 1994). Process innovation is associated with the sequences and nature of the production process (De Propris, 2002). The main purpose of process innovation is to introduce a new element in production processes, equipments, task specifications, and workflow mechanisms (Damanpour, 1991; Knight, 1967). According to Cooper (1998), process innovation tends to occur more often in large and

bureaucratic firms compared to small firms because large firms deal with many input materials and complicated processes with high economic and social costs. Compared to product innovation, process innovation focus on improving the productivity and efficiency of production activities (Garcia and Calantone, 2002). Process innovation enables organizations to produce large amounts of products or services with limited resources or with higher performance levels (Abrunhosa and Moura E Sa, 2008). Moreover, process innovation can be achieved by quality-based management approach, namely TQM, because one of the main goals of TQM is to increase efficiency and quality through continual process improvement (Martinez-Cost and Martinez-Lorente, 2008). Like product innovation, process innovation can be classified according to the degree of innovation into incremental process innovation and radical process innovation (Reichstein and Salter, 2006; Kim et al., 2012). Radical process innovation refers to innovation associated with the application of new or significantly improved elements into an organization's production or service operations aimed at lowering costs and/or improving product or service quality. In contrast, incremental process innovation is associated with the application of minor or incrementally improved elements into an organization's production or service operations in order to lower cost and/or improve product quality (Reichstein and Salter, 2006; Kim et al., 2012).

Incremental versus Radical Innovation

According to several authors, innovation can be split into incremental innovation and radical innovation (Hurmelinna-Laukkanen et al., 2008; Grover et al., 2007; Salavou and Lioukas, 2003; Koberg et al., 2003). Both innovations are mutually exclusive, so the less chance for radical innovation, the more chance for incremental innovation (Salavou and Lioukas, 2003). Incremental and radical innovation can be distinguished according to three key features: a target customer or market (existing vs. new), the level of change (minor vs. major), and the level of risk (low vs. high) (Kim et al., 2010).

Incremental innovation is defined as minor changes in existing technologies in terms of design, function, price, quantity, and features (Garcia and Calantone, 2002; De Propris, 2002). It aims to meet the needs of existing customers by refining, broadening, and exploiting the current knowledge and skills (Broring and Herzog, 2008; Li et al., 2008; Jansen et al., 2006).

According to Garcia and Calantone (2002), managing incremental innovation is important in a technologically mature market because the continuous improvement of existing technologies helps in identifying threats and opportunities related to the shift to a new technology paradigm. Lower-level technicians and R&D workers achieve incremental innovation at all stages of a product life cycle (Daft, 1978; Garcia and Calantone, 2002; Ibarra, 1993). Incremental innovation entails a low level of risk because an organization focuses on modifying or improving existing technologies, not on creating new technology (Yonghong et al., 2005; Hurmelinna-Laukkanen et al., 2008; Kim et al., 2012).

On the other hand***, radical innovation*** refers to the adoption of new technologies to create a demand unrecognized by customers and markets (Jansen et al., 2006; Yonghong et al., 2005; Garcia and Calantone, 2002)**.** Radical innovation is likely to be triggered by market pull or technology push strategies (Li et al., 2008; Moguilnaia et al., 2005). For example, radical innovation provides an unprecedented feature of a familiar feature that significantly disrupts a trajectory of existing technologies (Leifer et al., 2001). Radical innovation is regarded as competence-destroying because this kind of innovation primarily changes the characteristics of existing technologies (Teece et al., 1997; Broring and Herzog, 2008). Using a bottom-up approach, lower-level workers accomplish radical innovation (Daft, 1978). Radical innovation entails greater uncertainty and higher level of risk than incremental innovation because there are many technical/market uncertainties, a high degree of complexity and major changes in the existing technologies (Moguilnaia et al., 2005; Valle and Vazquez-Bustelo, 2009). In this respect, Rothwell and Gardiner (1988) found that radical innovation covers only 10 percent of all new innovations, whereas the proportion of incremental innovation is about 90 percent.

Administrative Versus Technical Innovation

Another widely recognized classification is the administrative-technical typology (Bantel and Jackson, 1989; Evan, 1966; Kimberly and Evanisko, 1981; Walker, 2008). This typology relates to a more general distinction between technology and social structure (Evan, 1966). At the firm level, technical and administrative innovations are, respectively, associated with the organizations' technical and social systems (Boonstra and Vink, 1996; Damanpour & Evan, 1984) or technological and administrative cores (Daft, 1978).

The term ***administrative innovation*** appeared in the literature under different names such as 'managerial innovation' (Hwang, 2004), 'organizational innovation' (Armbruster et al., 2008) and 'management innovation' (Birkinshaw et al., 2008). They have been usually conceptualized in contrast to product/service and technical process innovation (Damanpour and Aravind, 2012). Of these terminologies, organizational innovation was the first term that has evolved from Shumpeter's (1983) early work and it includes changes in internal organizational structure and procedures that facilitate organizational change and growth (Damanpour and Aravind,2012; Fagerberg, 2005). This previous term has been evolved in order to distinguish the administrative types of innovation (i.e oriented toward the efficiency and effectiveness of management processes and administrative systems) from the product/service innovation (i.e oriented to address customer/client needs) and technical innovation types (i.e oriented to produce changes in products and production systems) (Damanpour and Evan, 1984; Kimberly and Evanisko, 1981; Damanpour and Aravind, 2012). Similarly, Bantel and Jakson (1989) viewed administrative innovation as those that improve managerial activities and decision making, and Kimberly (1981) viewed them as a means of changing the decision-making processes. In addition to the previous terminologies, other researchers used the term management innovation (e.g., Hamel, 2006; Vaccaro et al., 2010; Walker et al., 2011; Damanpour and Aravind, 2012). For instance, Hamel (2006) defined management innovation as a departure from traditional management principles and practices that alters the way the work of management is performed. It changes how managers do what they do (Birkinshaw et al., 2008). Similarly, Vaccaro et al. (2010) defined management innovation as new practices, processes, and structures that change the nature of managerial work at the firm level. Walker et al. (2011) defined management innovation as new approaches to devise strategy and

structure in the organization, modify the organization's management process, and motivate and reward its employees.

While different terms such as organizational, administrative, and management innovation have been used, it is evident from the definitions that these terms overlap as this innovation type is conceptualized to be distinct from product, service, and technical innovation (Damanpour and Aravind, 2012). Table 2.6 illustrate these conceptualizations and examples of administrative innovation in multiple fields.

On the other hand, administrative innovation has several characteristics and features that differentiated it from technical innovation and other innovation types. Administrative innovation is driven by internal needs for coordination and structuring (Daft, 1978; Kim, 2010), and includes practices such as authority patterns and decision-making processes (Sabet and Klingner, 1993), external relations with suppliers (Uhlaner et al., 2007), improvements and continuous search for new ideas (Abrunhosa and Moura E Sa, 2008), coordination, information sharing, learning and collaboration (Gunday et al., 2011). The primary purpose of administrative innovation is to improve the efficiency of internal operational and administrative processes. Administrative innovation requires considerable set-up costs and entails organizational disruption due to the fact that this kind of innovation tends to call for major assignment of responsibilities and tasks (Kim et al., 2010). Using a top-down approach, upper-level managers or administrators commit to relevant activities of administrative innovation (Daft, 1978; Ibarra, 1993; Kim et al., 2012).

The literature review, however, indicates that existing innovation literature are biased toward technical innovation (Prajogo and Sohal, 2006; Weerawardena, 2003; Kim et al., 2012). There is a lack of research on administrative innovation. According to several authors (e.g., Kim et al., 2012; Battisti and Stoneman, 2010; Evangelista and Vezzani, 2010), it can be argued that technical innovation is not always sufficient to meet consumer needs and maintain organizational competitiveness in a new global market. It is necessary to explore ways that technical and administrative innovations lead to a competitive advantage (Abrunhosa and Moura E Sa, 2008; Weerawardena, 2003; Kim et al., 2012).

Table 2. 6 Definitions and terms of administrative innovation in literature

Study	Term	Definition	Examples
Daft (1978)	AI	Pertains to the policies of recruitment, allocation of resources, and the structuring of tasks, authority, and reward and is related to the administrative core of the organization	Scheduling of students, structure of high school organizations, location of classes, and program budgeting
Damanpour and Evan (1984)	AI	Innovations that occur in the social system of an organization including rules, roles, procedures, and structures related to the communication and exchange among people and between the environment and people.	Implementation of a new structure, way to recruit personnel, allocate resources, and structure tasks, authority, and rewards
Ravichandran (2000)	AI	Embody the adoption of administrative programs, processes, or techniques new to the adopting organization	Total Quality Management (TQM)
Edquist et al. (2001)	OI	New ways to organize business activities such as production or R&D, and innovations that have to do with the organization of human resources	Just-in-time production, lean production, and TQM
Birkinshaw et al. (2008)	MI	The generation and implementation of management practice, process, structure, or technique that is new to the state of the art and is intended to further organizational goals	Toyota production system, spaghetti organization, cellular manufacturing, modern assembly line, balanced scorecard, quality of work life.
Tanninen et al., (2008)	AI	Innovations that are related to management activities and connected with the organization's social system	TQM
Vaccaro et al. (2010)	MI	Implementation of management practice, process, or structure that is new to the adopting organization.	Management systems, remuneration policy, objective setting, organization of work, project management.
Battisti and Stoneman (2010)	OI	new management practices, new organization, new marketing and new corporate strategies	Advanced Management Techniques such as knowledge management systems, investors in people, etc.
Jaskyte (2011)	AI	implementation of a structure, procedure, system, or process in the administrative core of an organization that is new to the prevailing organizational practices	creation of strategy teams composed of staff and board members that are responsible for addressing a variety of different issue areas identified during a strategic planning meeting
Hecker and Ganter (2013)	MI	the introduction of management practices that are new to the firm and which are intended to enhance firm performance	introducing a new or significantly improved organizational method in knowledge management, workplace organization, or external relation.

AI, Administrative Innovation; **MI**, Management Innovation; **OI**, Organizational Innovation

In contrast to administrative innovation, ***technical innovation*** is defined as the adoption of new technologies that are integrated into products, services or processes (Yonghong et al., 2005). Another definition is proposed by Nieto (2004): 'the process through which technological investigating the effects of managerial and technological innovations advances are produced'. Technical innovations occur as a result of the use of a new technique, tool, equipment, or system by which the organization enhances its capabilities (Damanpour, 1987), and leads to developing new products or processes, or continue old ones at much lower cost (Norma and Danny, 2002).

Technical innovation responds to environmental factors such as technical knowledge or uncertain market conditions (Kim, 2010), and helps organizations to deal with rapid changes, turbulence of external environment, and complexity (Jiménez-Jiménez and Sanz-Valle, 2011). It also provides organizations with an opportunity to offer unique products by establishing entry barriers (Montes et al., 2005). Technical innovations have significant strategic implications for organizations and can greatly affect industries as a whole (Porter, 1990). Technical innovation requires the involvement of lower-level works, therefore it applies a bottom-up approach (Daft, 1978), and is usually protected by intellectual property law (Hoffman and Hegarty, 1993).

According to Kim et al. (2012), technical innovation can be classified into incremental/radical innovations, and/or, product/process innovations, depending on the degree and level of innovation. They argued that technical innovation is not only adapted to solve technological problems, but also linked to the implementation of technologies to provide new products, features or to enter new markets. Rosenberg (1963) indicated that the capital goods sector, sometimes referred to as physical capital, played an important role in the technological innovation process. The capital goods sector is the tangible human-related items used to produce products (Haines, 2004). This includes physical technology, plant, machines and equipment (Barney, 1991). All levels of technological innovation, whether they involve improving existing products or introducing new products, require the capital goods sector to support them (Haines, 2004).

Technical innovation is characterized by four distinctive elements which include a physical tools component, a codified knowledge component, a human skills component, and a systemized methods component (Haines and Sharif, 2006). Previous research has indicated that productivity gains were substantially affected by new technologies (Greenwood et al., 1997). Pannirselvan et

al. (1999) further insisted that technical innovation was becoming a new competitive priority for organizations. However, Nieto (2004) indicated that several studies did not distinguish among the terms 'innovation', 'innovation management', 'technology' and 'technological innovation' and have used these terminologies interchangeably meaning the same idea.

In sum, innovation is categorized into technical versus administrative, radical versus incremental, and product versus process innovation. It is vital to understand the different objectives and features of each king of innovation because a different type of innovation requires different activities and resources from an organization. Table 2.7 summarizes the key dimensions of the different types of innovation.

Table 2. 7 Comparison of technical and administrative innovation

Dimension	**Technical Innovation**	**Administrative Innovation**
Objective	Meeting the needs of customers by offering new products/services through the implementation of new technologies.	Improving organizational structures, systems, and administrative processes by adopting new programs or techniques.
Level of changes and innovation subjects	Major or minor changes in products, services, processes, and programs.	Major or minor changes in organizational structures, processes, systems, and routines.
Organizational structure	A bottom-up approach conducted by lower-level staff.	A top-down approach initiated by upper-level managers or administrators.
Level of risk	Achieved in high risk (major changes of technological directions) or low risk (minor changes of technological components).	Introduced in both high and low risks, but administrative innovation is rarely amendable to partial adoption or to testing.
Outputs	Achieving competitive advantage by helping organizations to deal with rapid changes and environmental turbulences. Offering significant improvements of products/services or/and processes. Significant strategic implications for the organization and the industry.	Enhanced organizational structures and administrative processes related to basic work activities. Changed the way of recruiting employees, allocating resources, and structuring tasks. Added value either directly for a firm or indirectly to customers.
Protection of outputs	Protected by intellectual property law, such as patents.	Not protected by intellectual property law; diffused by specialized agents (e.g consulting firms).
Activities of subtypes of innovation	New products or significantly improved New services or significantly improved New or significantly improved support activity for processes such as maintenance.	New business practices for the organization's processes. New methods of organization and decision-making responsibilities. New methods of organizing external relations with other firms or public institutions.

Source: Kim et al. (2010)

2.3 Innovation and Organizational Performance Relationships

Innovation is critical to a firm obtaining a dominant position and achieving higher profits (Cheng et al., 2010). It has a considerable impact on organizational performance by producing an improved market position that conveys competitive advantage and superior performance (Walker, 2004). Organizations also adopt innovations to gain first or early mover advantages that result in superior performance (Damanpour et al. 2009) or to eliminate a performance gap caused by uncertainties in the external environment (Damanpour and Evan, 1984).

A review of empirical studies that focus on innovation-performance relationship has shown that innovation is positively related to organizational performance as summarized in table 2.8 (e.g., Gunday et al., 2011; Calantone et al., 2002). For instance, Arvanitis and Hollerstein (2002) conclude that the degree of innovativeness significantly increases the productivity of knowledge capital. Favre et al. (2002) found that innovation has a positive impact on firm profit.

Empirical evidence supports the view that technical innovation (i.e., product/process innovation) has a positive impact on organizational performance. For instance, Mabrouk and Mamoghli (2010) have investigated innovation-performance relationships in the banking sector and they found that product and process innovation improve the profitability and efficiency of the firm. Implementation of product and process innovation makes the company more flexible in its operations which could drive the company to improve the quality of products and services (Githakwa, 2011).

On the other hand, a considerable amount of research has indicated that administrative innovation is positively related to organizational performance (Chiang and Hung, 2010; Reed et al., 2012) and helps to better understanding of which type of capabilities would affect for gaining competitive advantage in the market (Camison and Lopez, 2014). For instance, Yavarzadeh et al. (2015) have investigated the relationship between administrative innovation and performance in tax affairs general administration in Iran. They found that administrative innovation has a significant positive impact on organizational performance in terms of financial, growth, customer, and internal process. Similarly, Aboelmaged (2014) conducted a study using a sample of 400 manufacturing and service industries and he found that high levels of administrative innovation contribute to increasing the quality level and the overall performance of the studied organizations.

Although previous studies have looked at innovation-performance relationships, most of them focus only on a single type of innovation rather than considering different innovation types simultaneously in exploring their impact on performance. Technical innovation is the most common innovation type examined with some studies paying attention only to product innovation (e.g., Zeng et al.,2015; Prajogo and Hoang, 2008), or process innovation (e.g., Abrunhosa and Moura, 2008; Camison and Puig-Denia, 2016), or, in some cases to both of them (e.g., Hung et al., 2010; Martinez-Costa and Martinez-Lornte, 2008; Song and Su, 2015).

Generally, most of the studies neglect administrative innovation, which is equally essential to the growth and development of the organizations (e.g., Damanpour and Evan, 2012). A balanced portfolio of both technical and administrative innovation is needed to cope with changes and uncertainties in the environment and to fully realize the benefits of innovation on performance (Azar et al., 2017).

Table 2. 8 Summary of research studies of innovation-performance relationships

Authors	**Industry/Country**	**Innovation Types**	**Results**
Guan and Ma (2003)	Export/China	Administrative innovation	A positive relation of innovation on the export ratio.
Veugelers (2008)	Manufacturing/Brazil	Administrative and technological	Technological innovation directly impacts performance but there is no evidence for the impact of administrative innovation.
Gunday et al. (2011)	Manufacturing/Turkey	Administrative, Marketing, Product, Process	Positive impact of innovation types on performance
Dadfar et al. (2013)	Pharmacy/Iran	Innovation capability	Positive relationship between innovation and organizational performance
Rosli and Sidek (2013)	Manufacturing/Malaysia	Product, process, market innovation	Product and process innovation positively influence performance.
Alam et al. (2013)	Manufacturing/Malaysia	Innovation capability	Firm's innovation capability has greater impact on overall performance
Aboelmagd (2014)	Manufacturing/Service UAE	Administrative & Technical	High levels of administrative innovation increase the level of overall performance
Augusto et al. (2014)	Manufacturing/Portugal	Organizational, product, process	Process and product innovation directly impact performance.

Authors	Industry/Country	Innovation Types	Results
Huhtala et al. (2014)	Manufacturing/service Finland	Innovation capability	Innovation mediates performance effect on market orientation, while innovation mediates customer orientation-business performance relationship.
Ngumi (2014)	Banking/Kenya	Product and Process innovation	Positive impact of both process and product innovation on firms growth and performance.
Lilly and Juma (2014)	Banking/Kenya	Product, Process, market, and organizational innovation.	All innovation types positively impact the performance of commercial banks.
Kafetzopoulos and Psomas (2015)	Manufacturing/Greece	Product, Process, Marketing, Organizational	Innovation types directly contributes to product quality and operational performance.
Karabulut (2015)	Manufacturing/Turkey	Product, process, marketing, administrative	The product, process and organizational innovation have positive impacts on financial, customer , internal business processes and learning and growth performance
Karlsson and Tavassoli (2015)	Service/Sweden	Product, process, market, administrative innovation	The firm that have a complex innovation strategy perform better in terms of productivity compared to firms that choose simple innovative strategy.
Antunes et al. (2018)	HEIs/Portugal	Innovation strategies	Innovation positively impact performance by enabling HEIs to have better market position.
Rajapathirana and Hui (2018)	Insurance/Sri Lanka	Organizational, process, product, and market	Effective management of innovation capability leads to better performance of insurance companies.
Iqbal et al. (2018)	HEIs / Pakistan	Innovation speed Innovation quality	Universities should promote innovation to enhance their performance.

Source: The researcher based on the review of literature

2.4 Quality Management Practices and Innovation Relationships

A review of the literature discussing QM-innovation relationship suggests that there are conflicting arguments concerning the overall relationship between TQM and innovation as shown in table 2.9 (Prajogo and Sohal, 2001; Singh and Smith,2004).

Table 2. 9 Summary of conflicting arguments between QM and innovation

TQM element	**Positive arguments**	**Negative arguments**
Customer Focus (CF)	CF will help organizations innovate more aggressively when developing new products and services to meet changing needs and ensure that innovation creates customer value.	- CF could lead institutions to be reactive instead of exploring new opportunities. - CF may inhibit innovation, since the process is constrained by what customers want. - CF doesn't prepare the organization to deal with the turbulent and changing environment.
People Involvement and teamwork	-Empowerment, involvement, and teamwork make employees feel that they have a certain degree of autonomy, participation and flexibility in the decision-making process -Team cooperation, communication and conflict resolution are critical dimensions in teams with an innovation expectation. -Cross-functional teamwork is one of the most effective channels of communication, which is recognized as the primary determinant in organizational innovation	-Generally, there is no time for employees to take part in nonproduction activities, and that also reduces their chances to participate in the process of innovation. -TQM's cultural tendency toward group working will constrain individual creativity, resulting in a detrimental effect on innovation. -In practice, workers commit themselves to the lower scales of improvement
Continuous Improvement	Continuous improvement encourages change and creative thinking in how work is organized and conducted	-TQM could lead people to work on unambitious goals and standardization may hinder innovation. -TQM with too much formalization is referred to as rigidity or stickiness in existing methods, which will hinder creativity. -Stable and repetitive systems are promoted.

Source : Liao et al. (2010)

Some scholars have found a positive relationship (e.g., Hung et al., 2010; Martinez-Costa and Martinez-Lorente,2008; Prajogo and Hong,2008). They contend that QM could foster innovation because it nurtures a fertile environment and culture that supports innovation by enabling the efficient detection of customer needs, promoting knowledge sharing, training, commitment and participation, and the continuous improvement of work systems (Martinez-Costa and Martinez-Lorente,2008). Proponents of this argument suggest that the principle of customer focus will lead organizations to search continuously for the new customer needs and expectations and therefore leads organizations to be innovative by developing new products and services (Prajogo and Sohal, 2001). Likewise, the principle of continuous improvement encourages change and creative thinking in organizing and conducting the various functions and activities inside the organization (Liao et al., 2010). Finally, the principles of empowerment, involvement, and teamwork are also substantial in determining the success of organizational innovation (Prajogo and Sohal, 2001; Hung et al., 2010; Liao et al., 2010).

In contrast to the above arguments, other scholars (e.g, Prajogo and Sohal,2001; Prajogo and Sohal, 2004; Hoang et al., 2006; Abrunhosa and Sa,2008) claim that QM could hinder innovation as it possesses principles and practices that are not compatible with innovation. They argued that when the company is just customer-led (Slater and Narver, 1999), its management will focus only on incremental improvements rather than trying to create novel solutions which could, in turn, lead to developing and introducing products similar to those that exist in the market instead of developing a real innovation. According to Imai (1986), continuous improvement principle requires standardization and activities that are sufficiently routine to be well understood and this could inhibit innovation because standardization reduces the ambiguity of any task that is necessary to enforce innovation.

These conflicting arguments and results lead several authors (e.g., Martinez-Costa and Martinez-Lorente, 2008; Song and Su, 2015; Zeng et al., 2015) to suggest that the discrepancies in the relationship between QM and innovation may be due to different interpretation of QM, which includes varied kinds of practices. It is therefore important to define QM in terms of soft and hard elements in order to resolve the controversies in the literature, since it would shed some light on which dimension bears most responsibility for innovation. Following their suggestions,

several studies have focused on analyzing the different impacts of both soft and hard practices on innovation.

As for the impact of soft QM practices on innovation, Prajogo and Sohal (2004) explain that soft QM is associated with an organismic model (Spencer, 1994), which has been identified as instrumental in supporting innovation. Martinez-Costa and Martinez-Lorente (2008) and Zeng et al. (2015) note that QM practices are in accordance with what Pfeifer et al. (1998) identify as fundamental aspects for innovation: customer orientation, promotion of flexible organizational structures, and employee autonomy. In the same vein, Song and Su (2015) highlight that enablers of innovation are essentially the same elements as the characteristic features of QM, such as teamwork, employee involvement, and supplier participation.

Regarding customer focus, although some argued that it may limit the organizations' focus on the current needs of the customers (Slater and Narver, 1998), it can stimulate organizations to search for new customer needs and feedback which in turn could trigger innovation so as to continuously meet the changing market needs (Santos and Alvarez, 2007; Sadikoglu and Zehir, 2010; Manders et al., 2016). This customer focus derives in the concept of internal customer, which according to Terziovski and Guerrero (2014) may foster process innovation by facilitating cooperation among functions and resolving work procedures inconsistencies.

Regarding supplier management, which is considered by several studies as related to soft QM, it could foster innovation through knowledge sharing and information, which could help in identifying areas from improvement and innovation in processes (Silva et al. 2014). Authors such as Prajogo and Cooper (2010) argue that people management associated with soft QM (training, empowerment, promotion of open organization) promotes innovation. They can encourage an organizational context of autonomy and trust that trigger behavior towards knowledge sharing and new-idea generation for innovative products and services (Escrig-Tena et al., 2018). This claim is justified by the results of previous research such as Jimenez and Sanz (2008), who concluded that training, participation, communication, or teamwork significantly explain product and process innovation. Santos and Alvarez (2007) and Ooi et al. (2012) recognize that training and developing employees' knowledge and skills prepare them to better perform their jobs, be more open to new systems, and even to propose new operating procedures. Regarding product innovation, teamwork or the development of shared vision promote absorptive capacity, which can be considered an

enabler of product innovation (Silva et al., 2014). Moreover, empowered employees are able to use new techniques to identify opportunities for developing products and handling problems as well.

In addition, several scholars found that management support for quality and communication of QM philosophy could foster innovation by establishing shared vision and challenging targets that inspire employees to improve their performance, encourage training, and generation of new suggestions and creative ideas (Jackson et al., 2016; Manders et al., 2016). These elements enable managers to create an environment that supports innovation, nourishes employee contributions and cultivates new initiatives and innovation projects, which in turn, lead to process and product innovation. For instance, managers can provide resources for training or allocate time during working hours for employees to participate in improvement groups (Jackson et al., 2016).

To sum up, it can be concluded from the previous discussion that soft QM could nurture a fertile environment and supportive culture for innovation by enabling the efficient detection of customer needs, promoting knowledge sharing among employees with suppliers, enhancing employees' capabilities, commitment, and participation. All this will lead to the continuous improvement of work activities and functions and effective translation of ideas into new services and products that customers value (Prajogo and Sohal, 2001; Martinez-Costa and Martinez-Lorente, 2008; Perdomo et al., 2009; Sadikoglu and Zehir, 2010; Kim et al., 2012).

On the other hand, several studies have shown that ***hard practices of QM can have a positive impact on innovation*** (e.g., Flynn,1994; Kim et al., 2010; Perdomo-Ortiz et al., 2006). Effective management of processes encourages organizations to develop routines that are formed by a set of best practices, which can be used to establish a learning base and support innovative activities (Kim et al., 2012).

As Ooi et al. (2012) contend, process management involves applying new technologies, which could lead to new design features for products. Moreover, having a process perspective may lead to new product development being considered as a process (Song and Su, 2015), and create routines that increase efficiency in developing new products, and respond more rapidly to the changing markets. According to Sadikoglu and Zehir (2010) and Ooi et al. (2012), hard practices can also contribute indirectly to innovation by identifying non-value-added activities, signaling needs to renovate processes or replace them with other more effective ways of working. Moreover,

benchmarking helps to identify new technologies and production processes in other firms that could be applied in the organization. Likewise, managing quality information and having immediate feedback from customers helps to speed up new offerings to the market (Flynn, 1994).

In brief, it can be generally concluded that hard QM practices could improve innovation as quality tools and techniques help to introduce order and create routine based organizations, and the established routines encourage employees to pay attention to and understand vital processes and to search for new and innovative ideas (Zeng et al., 2015). Hard QM could also promote creativity and reduce fear, which may lead to an improvement in product and process innovation (Silva et al., 2014).

The empirical studies that analyze the QM-Innovation link also support the positive relationship between soft QM, hard QM, and innovation (See table 2.10). Some studies (e.g., Hoang et al., 2006; Ooi et al., 2012) report that both hard and soft QM practices have a significant impact on innovation. Other studies emphasize the role of either hard or soft QM dimensions. One stream of literature highlights the soft elements as being critical to realize full innovation advantages from QM practices (e.g.Prajogo and Sohal, 2004; Feng et al., 2006; Song and Su, 2015). In contrast, authors such as Kim et al. (2012) conclude that process management plays a predominant role in improving innovation performance when supported by a set of interrelated soft and hard QM practices. Similarly, Silva et al. (2014) and Zeng et al. (2015) find that technical practices are critical for product innovation, while a QM culture, teamwork, empowerment, and training are necessary supporting practices.

Table 2. 10 Summary of the empirical evidence for soft and hard QM-Innovation link

Authors	QM practices considered	QM practices driving innovation
Prajogo and Sohal (2004)	Three subgroups: *QM1* (Leadership and people management); *QM2* (Customer focus and process management); *QM3* (Strategic planning and information and analysis).	Soft QM elements: Leadership and people management are related to product innovation.
Hoang et al. (2006)	Management support, employee involvement, employee empowerment, education and training, teamwork, customer focus, process management, information and analysis, strategic planning, open organizations, service culture.	Both hard and soft : when considered as separate practices, not all QM practices enhance innovation. Only leadership and people management, education and training, process and strategic management, and open organisation showed a positive impact on innovation.
Kim et al. (2012)	management leadership, training, employee relations, supplier quality management, customer relations, product/service design, quality data and reporting and process management	Direct effect of hard QM: overall process management is a significant and direct predictor of five types of innovation. Other QM practices are indirectly associated with innovation.
Ooi et al. (2012)	Leadership, customer focus, strategic planning, people management, information analysis and process management.	Both hard and soft : process management, strategic planning, people management and customer focus positively influence innovation.
Silva et al. (2014)	Three groups: QM culture (management commitment, human resource management, customer focus); process improvement capability (statistical process control, quality information, benchmarking); product design capability (supplier involvement, FMEA, design quality management	Direct effect of hard QM: only the group of QM practices concerning product design capability has a direct effect on product innovation.
Song and Su (2015)	Soft QM practices (leadership, strategic planning, customer focus, people management) Hard QM practices (process management, information and analysis, supplier management, product design)	Soft QM practices promote new product development.
Zeng et al. (2015, 2017)	Hard QM (process management and quality information) soft QM (group problem solving, employee suggestion, task-related training)	Direct effect of hard QM on innovation performance
Khan and Naem (2018)	Soft (Workforce commitment, Shared vision, Customer focus, Trainig, Supplier relations) Hard (Quality policy and objectives, information and analysis, Continuous improvement, Quality system process).	Soft and Hard directly impact service innovation directly; soft QM impact innovation indirectly through hard .
Escrig-Tena et al. (2018)	Soft (Management commitment, Adopting the philosophy, close to customers, close to suppliers, training, empowerment), Hard (Benchmarking, Zero defects, process improvement, measurement).	Direct effect of hard QM on product/process innovation. Soft QM impacts innovation indirectly through proactive behaviour.

Source: The researcher based on literature review.

Chapter 3 Quality Management, Innovation, and Organizational Performance in Higher Education

Chapter Outline

3.1 Quality Management in Higher Education; **3.1.1** Defining QM in higher education; **3.1.2** Barriers to QM in higher education; **3.1.3** QM practices in higher education; **3.1.4** Soft QM practices; **3.1.5** Hard QM practices; **3.2** Innovation in Higher Education; **3.2.1** The relevance of innovation in Higher Education; **3.2.2** Defining innovation in higher education; **3.2.3** Innovation types in higher education; **3.2.4** Challenges and barriers to innovation in higher education; **3.3** Organizational performance in higher education; **3.4** The relationship between quality management practices, innovation and organizational performance in higher education; **3.5** Higher education in Italy: Context and trends.

Introduction

After presenting a general review in the previous chapter for quality management, innovation, and organizational performance, this chapter is devoted to discussing these topics with putting a specific focus on higher education context. This literature review looks at the different perspectives in defining QM in higher education, the main barriers of QM, and the classifications of soft and hard QM in higher education. The following section discusses innovation, innovation types, and the main barriers to innovation in higher education. Then, the chapter will discuss organizational performance with a focus on its different models and dimensions in higher education. The chapter ends with a review of the higher education context and trends in the Italian context.

3.1 Quality Management in Higher Education

Since 1980, the idea of quality management has slowly been extended to be used by other organizations (Sahney et al., 2004). Among the organizations that started using the QM theories, and practices as well, there are higher education institutions (HEIs) (Sahney et al., 2008; Owlia and Aspinwal, 1997; Kanji et al., 1999). According to Pham and Starkey (2016), the growing interest of HEIs on QM has been driven by an increase in the number of students, asking not only to have more education services, but even to have better, and more updated courses. On the other side, the increase in demand was coupled with growing attention by the public, as the education sector was asking for more and more public resources.

Moreover, these institutions have needed to become more and more transparent, driving them to develop, and implement, new systems for quality assurance, in order to verify that the courses' topics are still up-to-date, if they are effective, taking into account the expenditure decisions, the quality of graduates, and the transnational mobility of students (Pham and Starkey 2016; Laurett and Mendes, 2019). As the results of TQM on performance are still mixed (Brigham, 1993), it is important for higher education to learn from the positive, and negative, experiences of the other organizations and focus their core business processes, namely teaching and learning (O'Neill and Palmer, 2004; Temponi, 2005).

While TQM as a successful managerial strategy is generally accepted in commercial and manufacturing industries, its role in the service sector, especially in higher education is still controversial. These controversies may be due to some features that make higher education different from other sectors. This led several scholars to examine the possibility of applying QM principles to the education sector (e.g., Venkatraman,2007; Owlia and Aspinwall,1997; Stensaasen,1995; Lundquist,1998). From a theoretical point of view, customer focus is a more problematic principle when applied to universities. Students are non-standard human beings who have a wide range of experiences, emotions, and characteristics and hence treating them as products misses the complexities of the learning process as a unique learner (Venkatraman, 2007). In higher education, the dynamic interaction between the teachers and the students (which is intangible in nature) have a greater impact on the educational process (teaching and learning) and, in turn, on the educational quality, making quality implementation in this sector more complex. Another major difference between the industrial sector and education is the difficulty in defining

customer requirements as there are a variety of stakeholders (e.g., students, parents, employers, faculty members, government, and society) having different interests in education (Owlia and Aspinwall, 1997).

However, many researchers who have compared industry with education pointed out that although industry and education differ from business process perspectives, some of their outcomes, such as, focusing on building flexibility and improving customer base in a dynamic environment are very much similar (Stensaasen,1995; Lunquist, 1998; Srikanthan and Dalrymple, 2003). Stensaasen (1995) states that educational institutions may be considered as industries that provide education as the service with raw materials as incoming students on whom the processes of teaching are applied and turned out as the finished products of graduates. Similarly, Srikanthan and Dalrymple (2003) consider courses offered as products, current and future students as users of these products, and the graduates as output for the community and outside organizations. Lundquist (1998) states that there are some similarities between industry and high education regarding the principles of customer focus, process orientation, and continuous improvement. He concludes that quality management practices adopted in industry are very much applicable in education. Similalry, Owlia and Aspinwall (1997) analyzed TQM features in higher education through case studies and found that the activities carried out in HE environment are not so different from those experienced in manufacturing or other service sectors because functions like management commitment, strategic planning, and people management are universal in nature regardless of the organization's type. These previous arguments are also supported by Lewis and Smith (1994), who argued that the core philosophy, values, and norms reflected in quality systems are appropriate in higher education including:

- An emphasis on service;
- Anticipating and meeting the needs and expectations of the constituents;
- Recognizing and improving transformation processes and systems;
- Implementing teamwork and collaboration;
- Instituting management based on leadership, knowledge-based decisions, and Involvement;
- Solving problems based on systematic identification of facts and the use of feedback systems and statistical methods or tools; and

- Implementing a genuine respect for and development of human resources – the people who work in colleges and universities.

Based on the previous discussion, it can be concluded that in higher education, TQM appears to be systematic and a streamlined philosophy for quality management and management of change (Owlia and Aspinwall, 1997). At the same time, the substantial differences between educational and manufacturing organizations need careful considerations when implementing QM (Srikanthan and Dalrymple,2003). In such a complex system in HE, the diverse needs of stakeholders and the process of satisfying them could be a major issue. It is, therefore, important to understand the meaning of QM in higher education as well as the barriers present in education systems so as to successfully adapt TQM practices in higher education.

3.1.1 Defining QM in Higher Education

Defining quality in higher education is considered by researchers as a vague and controversial term as the definitions and approaches to quality may differ according to the different stakeholders (Cheng and Tam, 1997). In education, a large number of stakeholders with divergent interests are involved and each group of them is likely to have their own definition of quality (Mahajan et al., 2014). According to several authors (Harvey and Green, 1993; Harvey and Knight, 1996; Sahney et al., 2004), the different definitions of quality in higher education can be grouped into five discrete but interrelated ways of thinking about quality. They argued that quality can be viewed as *exceptional (or excellence),* as *perfection* (or *consistency*), as *fitness for purpose*, as *value for money* and as *transformative (Figure 3.1).*

Figure 3. 1 Quality perspectives in higher education (Harvey and Knight, 1996).

- *Quality as exceptional*. Quality is regarded in terms of excellence which means "being distinctive, exceeding very high standards, and passing a set of required standards".
- *Quality as perfection or consistency*. The focus is on processes and specifications that are aimed to be perfectly met through a zero defects approach and a quality culture.
- *Quality as fitness for purpose*. This view requires that the product or service meet a customer's needs, requirements, or desires. In education, quality is defined in terms of the achievement of a desired educational or quality assurance goal.
- *Quality as value for money*. Quality is related directly to costs, efficiency, and effectiveness. It is clearly linked to accountability with more emphasis on performance indicators.
- *Quality as transformation*. According to this view, education is seen as a process of transforming the students and thereby enhancing and empowering them. The focus is on the extent to which educational experience enhances the knowledge, abilities, and skills of students.

Given these varied approaches, Srikanthan and Dalrymple (2003) present the four main stakeholders and related them to the previous approaches in the following manner:

- *Providers (e.g., funding bodies and community)*: Quality is interpreted as "value for money", as funding authorities are looking for a good return on investments.
- *Users of products (e.g., current and prospective students)*: The interpretation here is excellence as the students want to ensure a relative advantage in career prospects.
- *Users of outputs (e.g., employers)*: the interpretation of quality is fitness for purpose as employers look for competencies matching the functions.
- *The employees of the sector (academics and administrators)*: quality is interpreted as perfection (or consistency), where the behavioral norms are met, and the core ethos is upheld in order that job satisfaction can be achieved.

  The fifth interpretation is not included, but it is seen as a meta-quality concept that subsumes the others (Lagrosen et al., 2004).

In addition to the previous approaches, quality of education has been defined in a contextual manner, considering the external environment in which the institution is operating and the internal environment in which the teaching-learning process takes place (Govinda and Varghese, 1992). Dahlgaard et al., (1995) considered quality in education from a cultural perspective describing it as "an educational culture characterized by increased customer satisfaction through continuous improvement in which all employees, teaching staff, and students actively participate". Other researchers define quality management from a system approach considering the quality of inputs, processes, outputs, and multiple constituencies of an education institution (Sahney et al., 2002; Tenner and Detoro, 1992; Cheng, 1996). For instance, Cheng (1996) defines education quality as "the character of the set of elements in the input, process, and output of the education system that provides services that completely satisfy both internal and external strategic constituencies by meeting and/or exceeding their expectations".

For the purpose of this study, quality management is defined as "a managerial approach implying social and technical systems-all based on principles and practices of quality, to be implemented through, in order to satisfy the needs of the various stakeholders through these

systems. According to that definition, the social system corresponds to the soft or infrastructure factors of quality, while the technical system corresponds to the hard or core ones.

3.1.2 Barriers to Quality Management in Higher Education

According to several scholars (Venkatraman, 2007; Antunes et al., 2018), TQM remains a needed factor for the organization's survival in the current turbulent environment. However, findings from TQM-related literature concluded that in many cases, TQM has failed to produce its promised results due to several obstacles or barriers in implementing it (Koch and Fisher, 1998; Brigham, 1993). Therefore, many researchers tried to identify the major barriers that could hinder the effective implementation of quality in education (e.g., Venkatraman, 2007; Rosa and Amarel, 2007; Horine and Hailey, 1995). There are four main basic barriers that scholars have identified as limiting the use of QM practices in HEIs:

1. lack of knowledge about TQM (Venkatraman, 2007),
2. Lack of proper leadership and commitment (Brigham, 1993; Rosa and Amarel, 2007),
3. Staff resistance to change (Blankstein, 1996; Venkatraman, 2007),
4. Poor curriculum design (Kohn, 1993; Venkatraman, 2007)
5. Lack of sufficient funds and resources (Venkatraman, 2007; Horine and Hailey, 1995).

According to Venkatraman (2007), *the lack of knowledge on TQM* has been considered as a major barrier for applying TQM in education due to the misinterpretation of TQM philosophy and the lack of understanding the processes that are different in education as compared to industry.

Another barrier could be *the lack of proper leadership and commitment.* The successful implementation of QM, in general, needs strong leaders who are willing to initiate change, have a strong commitment to QM philosophy, and capable of involving all staff and members in the QM project (Brigham, 1993; Rosa and Amarel, 2007). Sometimes, these conditions are hardly met in higher education as authority delegation is complicated and it is dispersed by many, and excessively large, collegial bodies that make the change and the adoption of new approaches, inside these institutions, very difficult (Rosa and Amarel 2007).

Another barrier to applying TQM in education could be *staff resistance to change*. In higher education, most of the employees are professionals who by tradition expect autonomy and

academic freedom. Academic staff may not like being asked to rethink their teaching styles and they may be more devoted to teaching than to TQM. Hence, it may not be possible for them to adopt QM principles in a short period of time (Venkatraman, 2007; Blankstein, 1996).

In higher education, *poor curriculum design* could lead to quality failure. There could be unsuitable academic systems and procedures that serve as obstacles or bottleneck while imposing changes in curriculum or course delivery (Kohn, 1993).

Another major barrier for TQM in education could be *the lack of sufficient funds and resources*. Successful implementation of QM requires high cost, training, effort, and time. The educational institution may not have the required expertise to train the staff and may look for external training consultants which may lead to high training costs. It may have also some financial constraints as most of HEIs receive a specific amount of funds from the government. Therefore, TQM may not yield the expected outcome within a specific time frame (Venkatraman, 2007; Horine and Hailey, 1995).

In addition to the previous barriers, Rosa and Amarel (2007) identified additional barriers that could hinder the successful implementation of TQM in education such as the *absence of effective communication channels*, *the difficulty in measuring HEI's results*, *the coexistence of several purposes and objectives because of the existence of several stakeholders in HEI's environment*, and *the bureaucracy in some institutions that affect the decision-making circuits* (Rosa and Amarel, 2007).

To conclude, it can be said that applying quality management principles, concepts, and tools in higher education is not an easy process, compared to industry. In higher education, quality management deals with people, time of delivery and intangibility (i.e teaching and learning) which requires adapting models suitable to the specific features of higher education context. Moreover, Horine and Hailey (1995) argued that for successfully implementing QM in higher education, quality practices must become a routine way of doing business.

3.1.3 Quality Management Practices in Higher Education

In addition to understanding the different barriers, several researchers argued that for successfully implementing QM in higher education field, the first step should be toward adopting a relevant TQM framework that meets its missions and objectives (Venkatraman, 2007; Burli, 2012; Ardi et al., 2012). This framework should be built upon a set of core values and practices which provide the foundation of linking and integrating the key performance requirements within the quality framework (Venkatraman, 2007).

In order to gain a deeper understanding of QM practices in HE, previous empirical studies have explored the quality dimensions that constitute the TQM foundation in HEIs. Various studies and instruments were developed by individual researchers and institutions leading to the generation of a wide range of techniques, approaches, and models. For instance, Lagrosen et al. (2004) found seven dimensions that constitute the factors that have an influence on quality. They labeled these dimensions as corporate collaboration, information and responsiveness, courses offered, internal evaluations, campus facilities, collaboration and comparisons, and library resources. Sakthivel et al. (2005) developed "5C TQM Model of Academic Excellence"; that consisted of five quality dimensions, i.e. commitment of top management, course delivery, campus facilities, courtesy, and customer feedback and improvement; and establish a relationship between these quality dimensions and students' satisfaction. Hasan et al. (2008) measured the effect of five quality variables, i.e. tangibility, assurance, reliability, responsiveness, and empathy, on the students' satisfaction. Bayraktar et al. (2008) validated a set of 11 critical factors of TQM in higher education using exploratory factor analysis and confirmatory factor analysis which mainly are leadership, vision, measurement and evaluation, process improvement, program design, quality system improvement, employee involvement, recognition and rewards, student focus, and other stakeholders' focus. Sayeda et al. (2010) developed 27 critical quality factors that can be used to examine the relationship between TQM's dimensions and performance of an institution.

In addition to these previous studies, several authors used well-known quality awards (such as MBNQA model and EFQM model) as a reference in their studies in HE field. For instance, Calvo-Mora et al., (2005), used EFQM model as a reference in his study in the Spanish universities and identified five critical QM factors which include leadership, people management, policy and strategy, partnerships and resources, and process management. In a similar vein, and using the

MBNQA, Badri et al. (2006) identified six critical factors, which include leadership, process management, faculty and staff focus, strategic planning, information and analysis, and student and stakeholders' focus.

As can be noticed from the above discussion, there are different dimensions for quality management due to the various approaches and perspectives adopted in these studies. Therefore, and in order to determine the common practices in higher education, the researcher reviews the different studies that have been implemented exclusively in higher education as shown in table 3.1. According to this review, the present study identified a set of nine practices which mainly are *top management support, student focus, supplier management, people management, strategic planning, process management, information & analysis, continuous improvement, and program design*. The reasons for selecting these practices are:

- They have been used frequently by different researchers in the higher education field.
- They have been identified as key practices in TQM implementation in both manufacturing and service industries (e.g. Flynn et al. 1994; Rahman, 2004; Zeng et al., 2015).
- They constitute practices that represent the soft and hard components of TQM which is the main concern of the current study.

Based on the previous literature that classify and distinguish between soft and hard QM (Flynn et al., 1995; Rahman and Bullock, 2005; Zeng et al., 2017; Khan and Naem, 2018), the same approach has been used for classifying these practices into soft and hard QM in higher education as shown in table 3.1.

Table 3. 1 Soft and Hard QM practices in the current study

Variable	Supporting References in HE field
Soft QM Practices	
Top Management Support: Directors' long-term commitment to the QM philosophy.	Osseo-Asare and Longbottom,2002;Da Rosa et al., 2003; Calvo -Mora et al., 2005,2006; Sakthivel ,2005,2007; Badri et al., 2006; Sahney et al., 2006,2008;Venkatraman ,2007; Bayraktar et al.,2008; Burli et al.,2012;Mehta et al.,2014 ; Sadeh & Garkaz2015; Aminbeidokhti et al., 2016; Psomas & Antony,2017
Strategic Planning: The formulation and revision of the vision, mission, policies and objectives considering needs and expectations of different stakeholders.	Osseo-Asare and Longbottom,2002;Osseo-Asare et al,2007; Rosa et al., 2003; Calvo-Mora et al., 2005,2006; Sahney et al., 2006,2008; Badri et al.,2006; Burli et al.,2012; Psomas & Antony, 2017
People Management: Recognize staff performance on quality; encourage team working; provide training; involve staff in quality decision	Osseo-Asare and Longbottom,2002; Calvo-Mora et al.,2005,2006; Venkatraman 2007; Burli et al.,2012; Mehta et al.,2014; Sadeh & Garkaz2015; Aminbeidokhti et al., 2016; Psomas & Antony,2017
Supplier Management: working closely and cooperatively with suppliers.	Rosa et al., 2001,2003; Calvo-Mora et al.,2005,2006; Venkatraman,2007; Psomas & Antony,2017
Student Focus: Determining students' needs and expectations then meeting them.	Badri et al.,2006; Bayraktar et al.,2008; Sayeda et al.,2010; Aminbeidokhti et al., 2016; Psomas & Antony, 2017
Hard QM Practices	
Process Management: It involves the administrative, educational, and research process	Rosa et al.,2001**;** Osseo-Asare et al.2002**;** Calvo-Mora et al., 2005,2006; Badri et al., 2006; Venkatraman ,2007**;** Bayraktar et al.,2008**;** Sayeda et al.,2010**;** Burli et al., 2012**;** Sadeh & Garkaz2015**;** Psomas & Antony,2017
Information & Analysis: Collect timely data on quality issues; quality data are available to directors and staff; quality data are used for quality improvement	Badri et al.,2006; Osseo-Asare et al.,2007; Mehta et al.,2014; Venkatraman ,2007;Bayraktar et al.,2008;Sayeda et al.,2010; Aminbeidokhti et al., 2016; Psomas & Antony,2017
Continuous Improvement: The regular measurement, evaluation, and improvement of administrative and academic processes as well as facilities.	Sakthivel 2005,2006; Sahney et al.,2008; Sayeda et al.,2010; Mehta et al.,2014; Aminbeidokhti et al., 2016; Psomas & Antony, 2017
Program Design: The regular review and update of academic programs considering Stakeholders' needs and the technological advances.	Bayraktar et al.,2008, 2013; Asif et al., 2013

Source: the researcher, based on the review of studies in HE.

3.1.4 Soft QM Practices:

Following the classification of soft practices provided commonly in the previous studies (e.g., Flynn et al., 1995; Rahman, 2004; Bakotić & Rogošić, 2015), the soft QM practices in the current study include top management support, strategic planning, people management, supplier management, and student focus.

A) Top Management Support:

Management support or leadership is related to the role of management bodies in universities. They help define a university's mission, values and goals, promoting a quality culture and the involvement of the staff on QM activities (Manatos et al. 2018). Most empirical studies on QM provide a common view that management support is the main driver of various quality management practices when constituting TQM (Basu et al., 2018; Kaynak, 2003; Kim et al., 2012; Sila and Ebrahimpour, 2005; Zu et al., 2008).

Studies conducted specifically in the higher education field reach a similar conclusion that leadership is crucial and is the starting point of the various aspects of quality management systems (e.g., Badri et al., 2006; Calvo-mora et al., 2005; Sadeh and Garkaz, 2015).

Commitment and support of top management of a university department, faculty or institute (including dean, associate deans, department/institute heads and directors) are required to provide adequate resources for implementing quality management (Sakthivel, 2007). Also, it is the task of top management to provide quality education through the employment of qualified, experienced, competent, sympathetic lecturers and faculty members and creating congenial and friendly atmosphere through empowering staff (Sadeh and Garkaz, 2015). In fact, leaders should give adequate attention to their people to increase service quality (Kanji et al. 1999). To be more specific, leaders should provide working conditions that allow employees to use all their abilities, improve their skills, and feel comfortable in their job (Sakthivel, 2005). In short, top management support is the engine, the driver, and the soul of all aspects of the quality system.

B) Strategic Planning

Strategic planning examines how the organization formulates and revises its vision, mission, strategic objectives, and action plans along with the needs and expectations of different stakeholders (Manatos et al., 2018).

The theoretical and empirical literature analyzed focus on the development and implementation of specific quality policies and strategies (Richandran and Rai 2000; Saraph et al. 1989), and on how they should be integrated with the organization's policies and strategies (Wilson and Collier 2000).

Moreover, the criteria for several quality excellence models (such as MBNQA and EFQM models) show how significant strategic planning is as a core element in quality improvement activities. Strategic planning should be put into practice through the deployment of the key processes, suitable policy and staff management, and the establishment of partnerships (Winn and Cameron 1998).

Detert and Jenni (2000) speak of a 'system thinking', which requires all members of the organization to take into account how their actions affect those of other people in the university institution. In higher education, this overall vision may be demonstrated using clear goals shared by all professors, students, and managers. These goals must take shape in all activities of the university via the strategic planning process (Zink and Schmidt, 1995).

The learning-centered education and operational performance are main strategic issues that need to be integral as parts of the organization's general planning in HEIs. Specifically, learner-centered education is considered as a strategic view of education. The focus is on the drivers of student learning like student determination, student and stakeholder satisfaction, new markets, and market share. This means that strategic planning in HEIs should focus on the real needs of students, including those derived from market requirements and national responsibilities (Badri et al., 2006).

C) People Management:

The importance of people management is emphasized by Ahmad and Shroeder (2002) and Mukherjee et al. (1998), who note that people management is the cornerstone on which an important part of the success of TQM rests since the quality improvement is one of organizational learning based on people.

People management includes several activities such as appropriate selection, training and development, rewards (Flynn et al.,1994), the commitment to and involvement with quality (Ahire et al., 1996), or the establishment of an effective communication system (Zink, 1995).

In higher education, this dimension address key human resource practices – those directed toward creating and maintaining a high-performance workplace with a strong focus on students and learning and toward developing faculty and staff for adaptation to change. It covers faculty and staff development and management requirements in an integrated way, which is aligned with the organization's strategic objectives. It includes also the work environment and the faculty and staff support climate (Badri et al., 2006).

In higher education, this factor is one of the most important QM factors because most of the processes in the HEIs are performed by the people either in the administrative divisions or in the academic departments. Consequently, and in order to do processes appropriately, deliver the best service, and gain competitive advantages, HEIs should recruit, train, and develop motivated and committed employees (Calvo-Mora et al. 2005).

D) Supplier Management

The importance of the relationships with suppliers and managing resources is an aspect frequently addressed in the literature on quality management (e.g., Dow et al. 1999; Eskildsen and Dahlgaard, 2000).

In higher education field, supplier management is not a subject that is frequently discussed in the literature. However, universities, like any other organizations, must optimize the scarce resources they have and appropriately manage the suppliers of specific inputs, which represent a significant cost in budgetary terms (Calvo-mora et al, 2005).

According to Osseo-Asare and Longbottom (2002), quality management in HEIs should seek to successfully manage their partnerships with suppliers in order to provide funding for research,

successfully implement quality improvement initiatives, and deal with ever-growing student numbers. Also, organizational partnership should be managed in a manner that appropriately support processes. Several authors (e.g., Douglas et al., 2006; Calvo-Mora et al., 2005) believe that doing effective processes and offering good and standard service require proper allocation of resources and effective management of suppliers.

E) Student Focus

Like other industries, customers in HEIs are the main element for quality initiatives. It is essential to identify them, along with establishing the processes to determine each of their needs to be satisfied (Ali et al., 2010). However, in education, it is not simple to identify customer requirements as different parties – students, staff, parents, companies, and society- have a stake in the quality of education being delivered by the educational institutions (Sahney et al. 2004).

The review of literature in HE revealed that there are several ways and perspectives that scholars used to classify customers in HE. For instance, Madu et al. (1994) have classified customers, in higher education, into input customers (including parents and students), transformation customers (faculty and staff), and output customers (corporations and society). Kanji et al. (1999) have classified customers of higher education into primary and secondary groups according to their locations i.e. whether internal or external, and the frequency of interactions the institution has with them. While the educator (as an employee) is the primary internal customer, the student (as an educational partner) is the secondary internal customer. The student is also the primary external customer and his/her parents and recruiting organizations constitute secondary external customers

While creating a bit of controversy, most of the studies conducted in HE focus more on the students as they are the main customers of HEIs suggested by TQM terminology (Kanji and Malek, 1999; Sirvanci,2004; Bayraktar et al., 2008), and they are the primary recipients of service, acquiring knowledge and information (Sakthivel,2007). In order to successfully implement TQM, some of the concerns related to the students should be considered such as collection and evaluation of student complaints, careful consideration of course-evaluations, the support of student club activities, and the follow-ups of alumni (Bayrakatr et al., 2008).

3.1.5 Hard QM Practices:

Following the classification of hard QM practices provided commonly in the previous studies (e.g Flynn et al., 1995; Rahman, 2004; Bakotić & Rogošić, 2015), the hard QM practices in this study include process management, information and analysis, continuous improvement, and program design.

A) Process Management:

In higher education, the characteristics of key processes are different from the manufacturing perspective but they are similar in terms of their management and improvement (Calvo-mora et al., 2005; Zink, 1995). In general, process management refers to activities related to managing and improving design, equipment maintenance, reducing the variability, and inspection of processes, etc.(Calvo-mora et al., 2005).

According to several scholars (e.g., Calvo-mora et al., 2005; Psomas et al., 2017), the key processes in HE include administration, teaching, and research. Education is a service (Reavill,1998) and services are outcomes of processes including a set of interrelated activities that transform input to output (Devinder and Datta,2003).

Consequently, high-quality services could be delivered to the customers only if all processes are managed effectively (Sadeh and Garkaz, 2015). Bayraktar et al. (2008) stated that administrative, academic, and non-academic processes such as facility maintenance, cleaning of the overall building, functionality of classrooms, laboratories should be controlled and improved through comprehensive statistical data collection.

B) Information and analysis

Information and analysis refers to the extent to which an organization gathers quality data, regularly measures quality, and uses performance data from internal operation as well as suppliers, customers, and competitors (Winn and Cameron, 1998). In higher education, information and analysis is a major QM dimension as collecting information is needed to enable these institutions to effectively measure and analyze performance and manage organizational knowledge to drive improvement in student and operational outcomes (Badri et al., 2006).

Information and analysis make the basis for continual performance improvement which lies at the core of TQM. Therefore, many types of data and information are needed for performance measurements in organizations, which can help to improve the product/service quality on a continual basis (Asif, 2013). Similarly, the decision in the universities and HEIs should be based on the analysis of data and information provided by different sources (Manatos, 2018). For instance, in relation to teaching and learning, any change to a course or to a program in the universities should be supported by the results from the reports of the program coordinators, and the results from collecting the student opinion (e.g., using surveys, interviews, committees). Moreover, the change has to be validated by different bodies, such as the scientific and pedagogic councils (Manatos, 2018). In this way, the decision is made according to the opinions of different sources including coordinators, students, and academic bodies.

Moreover, information and analysis of data has an important role in identifying the opportunities for improvement and in comparing the actual performance against the internal standards such as process improvement as well as the external standards such as benchmarking with other organizations (Tsang and Antony, 2001)

C) Continuous Improvement

Continuous improvement in the quality of product or service is one of the major dimensions of TQM program. It means searching for never-ending improvements and developing processes to find new or improved methods in the process of converting inputs into useful outputs (Sadikoglu and Zehir, 2010).

According to Pearce et al. (2000), continuous improvement dictates the way and manners the managers offer a form of strategic control that allows their organizations to respond more proactively and opportune to rapid developments in hundreds of parts that influence an organization's success. It helps in reducing the process variability thereby continuously improving the output performance (Sadikoglu and Zehir, 2010). Corbett and Rastrick (2000) asserted that in TQM, the best way to improve organizational performance is to continuously improve the performance of activities.

Many of the TQM literature highlighted another concept related to continuous improvement that is, quality assurance (Boaden and Cilliers, 2001; Jabnoun and Khafaji, 2005). In higher

education context, quality assurance is defined as one of the mechanisms that contribute to the recognition of learning. This system includes the means of developing and improving national or local policy on qualifications, institutional measures, quality assurance processes, assessment and awarding process, skills recognition, and other mechanisms that link education and training to the labor market and civil society (EQUIS, 2012; OECD, 2007; QAA, 2004). The previous definition reveals that quality assurance is a continuous, dynamic and integrated process for maintaining and improving quality rather than simply a system of evaluation (Ahmed, 2008). Therefore, quality assurance mechanisms should be integrated into every part of the educational organization set up in order to integrate quality in all aspects of the educational process.

Corbett and Rastrick (2000) asserted that the best way to improve organizational output is to enhance performance continually. Accordingly, HEIs are tasked with the responsibility of demonstrating the required quality in their courses and for such quality to be monitored through continuous improvement, in order to integrate the newly discovered knowledge and, in turn, improve the learning environment (Ahmed, 2008).

D) Program Design

Program design in HEIs could be considered a counterpart of product/service design in manufacturing/services as academic programs are the main products provided to the stakeholders such as students, industry, and the community at large (Asif et al., 2013; Bayraktar et al., 2008).

These programs should be reviewed and updated regularly in order to meet the changing needs of stakeholders as well as the technological advances (Bayraktar et al., 2008). Interdisciplinary study areas, as well as necessary facilities to conduct such types of study, should be considered on the development of curriculum and programs. SERVQUAL and Quality Function Deployment (QFD) approaches may be utilized in the program design as tools to penetrate TQM into the program development stage (Sahney, 2004).

3.2 Innovation in Higher Education

3.2.1 The Relevance of Innovation in Higher Education

Innovation in higher education environment is considered important and it has been said that universities should rely on several innovation types in order to survive and achieve a competitive advantage (Jaskyte, 2004). Albury (2005) found that innovation has the ability to improve the learning outcomes and quality of the provision of education. Similarly, Brodhag (2013) argued that innovation can help the educational system in customizing the educational process. Thus, innovation within the higher education sector is considered the main engine for economic and social development (Al-Husseini and Elbeltagi, 2016).

Moreover, and through focusing on innovation-based development, HEIs can become competitive leaders in the education market through the creation of new forms of education and the use of perfect control mechanisms in each educational institution. Consequently, this will give these institutions the opportunity to create a unique educational space capable of meeting the needs of society in quality education with specific opportunities for clients in the educational market. Thus, higher education systems should seek to innovate, that is, HEIs should rethink their working model, provide their graduates with the skills and knowledge appropriate to the job market, and create knowledge that can be marketed in new products and services (Antunes et al., 2018).

In addition, several empirical studies have demonstrated and confirmed the role that innovation could play within HE and how it could be stimulated. For instance, Aminbeidokhti et al. (2016) found that innovation of faculty members within public universities in Iran could be enhanced through organizational learning. They argued that suitable sharing, transfer, and use of knowledge provide an opportunity for members to learn and participate and also motivate them to produce and use that new knowledge for innovation. A survey of 439 faculty members within public and private universities in Iraq, conducted by Al-Husseini and ELbeltagi (2016), found that the style of transformational leadership could significantly enhance product and process innovation in both sectors because leaders can inspire their members through team spirit and collaboration to engage in innovative activities. Additionally, Latif et al. (2019) empirically investigate the direct and indirect relationships between knowledge management, intellectual capital, innovation, and organizational performance in public universities in Pakistan. They found that knowledge

acquisition, sharing, and utilization in research universities can promote its intellectual capital and foster innovation which in turn will lead to enhanced organizational performance.

3.2.2 Defining Innovation in Higher Education

Regarding higher education, several authors provide definitions to describe innovations more specifically in that sector. According to Antunes et al. (2018), innovation in HEIs can be understood as those procedures or methods of educational activity that differ from the established ones and that can increase the university efficiency level in the competitive environment. It is the capability of the institution to introduce new academic programs, curriculums, teaching methods, and the like in order to be more competitive in a turbulent environment (Iqbal et al., 2018). Similarly, Ngoc-Tan and Gregar (2018) broadly describe innovation in higher education as new developments in any or all aspects of the educational system including theory and practice, curriculum, teaching and learning, policy, technology, institutions and administration, institutional culture, and teacher training. Rivas (2000) defines innovation as a "consistent action in the process of incorporating something new into the system of the organization, resulting in the modifications of its structure and operations, to improve its effects in order to achieve educational goals. Cohen and Ball (2007) also define educational innovation as a "departure from current practice-deliberate or not, originating in or outside, which is novel in educational policies, practices, curriculum design and implementation, assessment regimes, pedagogical technologies and resources, teacher capacities, etc…". According to Owston (2007), innovation in the education sector encompasses *pedagogical* and *organizational* innovation. Pedagogical innovation deals with teaching and learning, such as innovative curricula, innovative teaching methods, and professional development programs, while organizational innovation deals with broader aspects such as organizational structure, administrative roles, authority allocation, budgeting of the organization and its units.

Based on the previous definitions, it can be concluded that innovation in higher education is the introduction of (1) new products and service, e.g. new curricula, (2) new processes for delivering services, e.g. use of ICT in e-learning services, (3) new ways of organizing their activities, e.g. ICT to communicate with students, parents, and (4) new marketing techniques, e.g. pricing of postgraduate courses. Therefore, a new idea in higher education could be categorized as

a technical innovative idea (e.g., product or process) or as an administrative one (such as structural changes).

3.2.3 Innovation Types in Higher Education

There are several classifications of innovation in the HE literature. For instance, Hsiao et al. (2009) and Chen et al. (2010) suggested that innovation is related to seven different areas within public universities in Taiwan: Leadership, administrative operations, student affairs, curricula and instruction, teachers' professional development, resource applications, and the campus. Avila et al. (2017) classify innovation in higher education into structural innovation (involving changes in structures, hierarchies, and governance in an organization) and operational innovation (involves the introduction of tools that could enhance and maximize the institution's operations). Chen and Chen (2008) differentiated between technical and administrative innovation within different universities in Taiwan. They concluded that technical innovation is related to the academic aspects such as research patents, academic communication, and academic publishing, while administrative innovation involves marketing innovation (e.g number of conferences) and organizational structure innovation (e.g. whether the institute is a learning organization). Other researchers, such as (Al-Husseini and El-Beltagi, 2016), have classified innovation in HEIs into product innovation (such as courses, research projects, teaching materials, and curricula) and process innovation (such as using new technology, implementing new incentives and reward systems). Additionally, and according to OECD (2009), innovation in educational environments includes the introduction of new products/services such as curricula, new processes for the delivery of services, the use of (ICT) in e-learning services, new ways of organizing activities such as using ICT to communicate with students and colleagues, and new marketing techniques (e.g. the pricing of postgraduate courses). Despite the existence of various classifications of innovation in higher education, several authors confine and categorize these classifications into technical and administrative innovation (e.g., Obenchain et al., 2004; Lasakova et al., 2017; Al-Husseini and El-Beltagi, 2016; Luskova, 2013; Avila et al., 2017; Hewitt-Dundas and Roper, 2018). Table 3.2 shows examples and applications of these innovation types in higher education.

Table 3. 2 Examples and application of technical/administrative innovation in HEIs

Innovation Type	Examples	Supporting References
1) Technical Innovation		
a) Product Innovation	▪ Creating new programs /services for students. ▪ Converting existing programs/services into different format. ▪ Extending programs/services to new groups of students. ▪ Improvements in curriculums, courses, and research projects ▪ Masters and programs offered to post-graduate students.	Obenchain, 2004; Lasakova (2017), OECD (2010); Al-Husseini and El-Beltagi (2016); Luskova (2013); Avila (2017); Hewitt-Dundas and Roper (2018)
b) Process Innovation	▪ Pedagogical practices ▪ Student assessment practices ▪ Use of modern e-learning technologies and information technologies. ▪ Incorporate new techniques/inputs in producing programs/services ▪ Instructional designs ▪ Innovative teaching methods (e.g online courses, modern electronic interactive teaching aids, virtual learning environments)	OECD (2010); Luskova (2013); Zhu and Nadine (2014); Obenchain (2004); Walder (2017)
2) Administrative innovation	▪ Levels/units of organization ▪ Work autonomy ▪ Recruitment ▪ Quality control ▪ Specific arrangements for improvement ▪ Use of teamwork ▪ Decision-making participation ▪ Informal collaboration ▪ Creating new organizational structure for managing people ▪ Organizational culture innovation ▪ Synergies with external entities	OECD (2010); Chen et al. (2010); Obenchain (2004); Avila et al. 2017)

Source: The researcher based on the review of the literature

3.2.4 Challenges and Barriers to Innovation in Higher Education

With societal changes rooted in internationalization and information technology progress, higher education faces several challenges as changes in government regulations, social, and technological conditions strongly affect their operations in the current turbulent environment (Lasakova et al., 2017). Like other sectors in manufacturing and services, higher education is affected by the innovations in economies globally driving them to rethink their model of functioning; trying to

provide the graduates with skills and knowledge suitable for the current labor market and to create knowledge that can be commercialized in new products and services (Barber et al. 2013).

Several scholars have identified some of the issues that HEIs should cope with in order to improve innovation (e.g., Avila et al., 2017; Lasakova et al., 2017; Barber et al., 2013). The number of international students had increased and the research collaboration expanded making HEIs more competitive (Barber et al., 2013). Therefore, HEIs need to raise the quality of services offered through innovative practices (Lakasova et al., 2017).

Several scholars have identified several barriers to innovation in HEIs. In particular, the more diffused are:

- Ensuring quality assurance
- Creating synergies and cooperation
- Lack of financial resources
- Resistance to change

According to Haug (2016), HEIs face two main challenges, (a) strengthening the European higher educational area; and (b) ensuring the quality of higher education through internal and external quality assurance mechanisms. For instance, in 2009, the European Commission stressed the importance of increasing the higher education quality through modernizing the curricula, more effective funding, and improved governance of HE (EC, 2009).

In this respect, synergies and cooperation among various groups inside the HEIs internal environment are needed for successfully implementing innovative practices. However, sometimes the internal culture at HEIs is considered an obstacle and doesn't give support for that (Lasakova et al., 2017). Urbanovic and Tauginienė (2013) noted that individual academic stakeholders and institutional interests might from time to time be incompatible resulting in poor culture of responsibility at HEIs.

Another major challenge could be the lack of financial resources (e.g., Avila et al., 2017; Lasakova et al., 2017; Keogh and Fox, 2008). In most European countries, the national budget restrictions allocated to higher education act as a barrier that prevents the development of innovative practices (EC,2014). Moreover, the financial resources of universities are usually related to the number of students enrolled, the number of top research projects being developed, and the political influence (Avila et al., 2017).

Another challenge could be resistance to change. For instance, Keogh and Fox (2008) indicated that negative attitudes of academic staff toward innovations, low level of acceptance of new modes of education provision, and even their lack of awareness of the potential and quality of these innovations are considered as barriers in their analysis of a case of the e-learning embedment into a traditional university.

In addition to the above barriers, other barriers have been identified by Lasakova, et al. (2017) and they have been grouped into three main clusters: the external macro-level barriers of innovation, internal barriers within the organization's environment, and individual-level barriers. The particular categories of these barriers are summarized in table 3.3.

Considering the previous discussions, it is clear that innovation in higher education is complex and has to be nurtured via meaningful managerial processes and by various stakeholders to become an integral part of HEIs' operations.

Table 3. 3 Barriers to innovation in higher education

Clusters/Categories of barriers	**Related Barriers**
Cluster 1: External Relations	
- Disparities between HEIs' needs and regulatory framework	▪ Lack of finance in the educational sector. ▪ High level of bureaucracy by macro-level regulations, lack of information transparency and clear accountability. ▪ Legislation lacking a systematic longitudinal strategy for the development of the educational area. ▪ Rigid accreditation rules (strict, conservative and time-consuming). ▪ Rigid and time-consuming public procurement procedures
- Tensions in academic-business cooperation.	▪ Low level of trust in the relations between academics and business owners/managers ▪ Weak interplay between academia and business
- Inconsistent technological development	▪ Inconsistency in ICT tools and technologies used by the various units/departments at HEIs. ▪ Mismatch between the rapid pace of technological advancements and the considerably time consuming process of implementing ICT tools and technologies at HEIs.
Cluster 2: Internal Operations	
- Blocked Management	▪ Insufficient empowerment of executive bodies at HEIs ▪ Slow decision-making process ▪ Unclear governance structures and related responsibilities and accountability of HEI's representatives ▪ Lack of coordination and communication from HEI's management to employees ▪ Lack of communication between different units and departments at faculties

Clusters/Categories of barriers	Related Barriers
	▪ Inconsistent management practices across faculties and loosed-coupled management between different departments ▪ Conservative and bureaucratic organizational culture ▪ Inefficient utilisation of financial resources, insufficient financial support for new emerging organisational units ▪ Lack of effective inspection that would aim to help HEI's employees to improve their skills ▪ Lack of material, technical and technological equipment and support
- Rigid human resource management operation	▪ Remuneration that does not support innovations, or innovation efforts are just occasionally incentivized (being not systematically involved in the remuneration decisions) ▪ Job descriptions do not delineate explicitly innovation-tied activities and responsibilities of employees ▪ Work overload of the academic staff and poor planning and organization of work
Cluster 3: People Related Barriers	
- Unprepared academic staff	▪ Prejudices against modernization, personal negative attitudes and resistance to change, fear, uncertainty as well as worries that things cannot be changed, lack of interest of more conservative teachers ▪ Obsolete forms, methods and procedures for evaluating students ▪ Lack of awareness about innovative ways of teaching ▪ Insufficient ICT-related skills ▪ Negative attitude toward innovation
- Distracted students	▪ Indifferent approach and lack of interest in learning ▪ Lack of participation and involvement in the decision-making processes and governance functions at HEIs ▪ Insufficient ICT-related skills

Source: Avila et al. (2017)

3.3 Organizational Performance in Higher Education

Education today is subject to the same pressures of the marketplace. Profound changes in the competition have made HEIs think like business to the extent that students are now being treated as customers. In addition, the stakeholder demands are getting more and more complex, which must be attended to whether the educational organization must maintain its competitive advantage. The HEIs then must ensure that the students receive high-quality service. HEIs have a responsibility to produce graduates that are able to accommodate challenges emerging in society, such as graduates producing high-quality profiles and competence in their respective professions (Suryadi, 2007).

According to Autunes et al. (2018), the higher education industry worldwide is facing a dynamic and unstable environment due to tendencies such as changing demographics in students' population, decrease in public funding, and the increasing importance of information and communication technology in learning and teaching process. HEIs are changing from a public service to a market-driven one (Kettunen, 2003), and they now face pressing concerns such as international competition (Venkatraman, 2007). For that reason, HEIs are faced with the need for improving many of their existing management practices and attitudes. One of the current issues of significance is the need for performance management, particularly the measurement of key performance indicators (Suryadi, 2007). As a consequence, universities are increasingly looking to new forms of internal management. In particular, there is an emphasis on performance, sometimes measured on macro-level (such as in international or national terms) or on a micro-level (such as measuring performance on organizational level). This emphasis on performance is also witnessed within institutions, with a strong focus on the performance of academic units and professional services, and at the level of the individual member of staff. As a result, there is increasing interest in approaches to performance management (Taylor and Baines, 2012).

In recent years, many new approaches and models have been developed to help measure strategy and have been adopted by business and academia. A number of models have achieved a higher prominence in the measurement of performance in public sector organizations and in higher education, in particular, such as: (1) The European Quality Framework, (2) Malcolm Baldridge Award Framework, (3) Balanced Scorecard, (4) aggregated key performance indicators, and (5) Dashboards. Table 3.4 provides a description of these models of performance.

Table 3. 4 An analysis of the performance measurement approaches used in HEIs

Performance Measurement Approach	**Format and Features**	**Merits**	**Constraints**
European Foundation for Quality Management (EFQM)	Provides a framework for business excellence using nine criteria based on 'enablers' (Leadership, People, Policy & Strategy, Partnerships & Resources, Process) and results (People results, Customer results, Society results, and Key Performance results)	-Emphasizes people as central to business success -Ensures that society results are more predominant than in the other approaches	Has developed from quality assurance 'roots' of the European Quality Award and retains the onerous elements of Quality Assurance mechanisms.
Balanced Scorecard (BSC)	A simple framework which recognizes the balance of objectives in four key areas of a business: Customer perspective; Internal perspective; Financial perspective; People perspective	-Is tied directly to the corporate goals and plans -The template can be cascaded to link all levels of an organization to the corporate strategy -Clear and simple Balanced approach Contains 'lead' and 'lag' measures	-Requires significant work (and costs) to embed at all levels of an organization -Its use of metrics to measure each of the four strategies necessitate a supporting commentary. Hence it cannot 'stand-alone'.
Aggregated Key Performance Indicators	Composite quantitative indicators are compiled reflecting both volume of business activity and results.	Easily presented and understood in 'traffic light' formats (red/amber/green) to indicate different levels of performance	May not be readily applicable to whole Higher Education Institutions.
Dashboards	presents a wide variety of data on institutional performance. These are frequently electronic and draw upon institutional management information systems to present trends and direction of travel.	Makes the 'direction of travel' of key indicators visible and provides a broader context	-No explicit link to corporate strategy -Dependant on high quality management information systems -High dependency (and costs) associated with linkages to management information systems

Source: Taylor and Baines (2012)

Despite the existence of several models for measuring performance in higher education, the European Quality Framework was the most commonly used model in higher education sector. Several authors recommend the use of the EFQM model as a helpful framework in guiding HEIs (e.g., Lauret and Mendes, 2017; Dahlgaard-Park, 2008). For example, in a research conducted by Davis (2004), comparing various models for business improvement for a university faculty, among several alternative options, the EFQM model was considered the most appropriate.

Within this framework, there are certain fundamental concepts that are expressed and specified in nine dimensions, which serve as a guide for implementing quality management and for measuring performance or results achieved by the organization (Calvo-Mora et al., 2005). These nine dimensions are, in turn, divided into five key enablers (Mainly leadership, policy and strategy, partnerships and resources, processes, and people management) and four types of results to measure performance (mainly people results, student results, society results, and institute results).

Due to the popularity of using the EFQM model as a reference in studies conducted in higher education, the measures of organizational performance were adapted from the EFQM model by focusing on four major areas: student results, people results, society results, and institute results.

Student results reflect the perceptions and indicators that the institution uses to assess its performance. The students' performance is related to the general image of the university or the academic department perceived by its customers as well as the level of quality and competitiveness of the offerings and services offered, and finally customer fidelity (Ruiz-Carrillo and Fernández-Ortiz, 2005). The external image of the institution is a key factor of competitiveness which depends to a large extent on the ability to attract potential customers (i.e students) which in turn depends on its reputation. The reputation, on the other hand, depends on the past behavior of the institution which can be used to foresee its behavior in the future (Ruiz-Carrillo and Fernández-Ortiz, 2005). The concept of reputation also complies with the necessary requirements imposed by Hamel and Prahalad (1995) to be a part of the so-called core capabilities because it is considered an intangible asset that is difficult to imitate and transfer and consequently can lead to competitive advantage to the institution. Another final aspect analyzed in this dimension is customer loyalty. It is a resource on which it is difficult to establish clear property right, but at the same time, it is difficult to imitate and transfer due to the fact that it is not marketable (Dierickx and Cool, 1989).

On the other hand, ***people results (or faculty and staff results)*** deal with the impact of the institution on its internal clients which are in our case faculty and staff members. It includes measurements related to the behavior of the human factor within the organization, the motivation, and satisfaction of the employees at work (Ruiz-Carrillo and Fernández-Ortiz, 2005). According to several scholars that applied EFQM model in HE (e.g Calvo-Mora et al., 2005; Osseo-Assare and Longbottom, 2002), people results will have a significant impact on students results and the overall results of the organization. They argued that, in the field of university education, a satisfied, motivated, and properly trained workforce will perform their jobs better and more efficiently which will have favorable impact on the students' academic results and in their satisfaction level.

For ***society results,*** this dimension reflects the social responsibility by analyzing the positive and negative impact of the organizations' activities on society (Westlund, 2001). According to Ruiz-Carrillo and Fernández-Ortiz (2005), social responsibility in this case has two-fold drivers, a responsibility imposed by external requirements (legal and/or social) and an ethical responsibility of business leaders. Clarckson (1999) claimed that the implementation of management system based on the management of these stakeholders would contribute to the long-term survival and success of any organization. A reputation of ethical and socially responsible behavior can even be a source of competitive advantage. In HE field, Calvo-Mora (2005) found that the manner in which society perceives the work performed by universities is related to and affected by the overall results of the institution and the level of satisfaction of workforce.

In addition, ***institute results*** analyze the achievements of the enterprise in all its main areas, paying particular attention to the criteria we have already mentioned. According to Calvo-Mora et al. (2005), institute results represent the overall results that university centers will achieve through customer satisfaction, employee satisfaction, and the beneficial impact it will have on society. Given the characteristics of universities and the social function of educational institutions, the results achieved by students and people will determine the overall results, i.e., institute results.

3.4 The Relationship between Quality Management Practices, Innovation, and Organizational Performance in Higher Education.

Several scholars support the ***positive impact of quality management practices on performance*** of higher education institutions. According to Saiti (2012), there is a substantial impact of TQM on the improvement mechanisms and outputs in education, contributing to a country's social and economic well-being. Ardi et al. (2012), showed that quality management makes a significant contribution to the performance of HEIs, such as financial savings, enhanced morale, raised responsiveness, improvement of customer service and processes, and development of a sense of teamwork. Similarly, Psomas and Antony (2017) found that the successful implementation of QM elements in higher education could achieve significant results with regard to the internal and the external environment of the institution. Despite the existence of several studies conducted on the relationship between quality management practices and performance in higher education (e.g., Calvo-Mora et al., 2005; Badri et al., 2006; Sayeda et al., 2010; Psomas and Antony, 2017), most of them consider the integrated view of QM without explicitly dividing them into soft and hard QM practices. However, some studies provide evidence that could support the multidimensional approach of QM. For instance, Calvo-Mora et al. (2005) found that soft QM factors (leadership and people management) and hard QM factors (Process management) had a significant impact on performance results. They also argued that institutions should strengthen, support, and promote the development and improvement of the teaching and administrative process to achieve better performance. Similarly, Badri et al. (2006), found that factors such as strategic planning and people management (soft QM) can directly affect process management (Hard QM) which in turn will have an impact on performance improvement in HEIs.

On the other hand, studies that consider ***the relationship between quality management and innovation*** in higher education are relatively few compared to the other manufacturing and sector. However, they support evidence of the impact of soft and hard QM elements on innovation (Aminbeidokhtiel el al., 2016; Al-husseini and Elbeltagi, 2016; Chen and Chen, 2012).

Regarding the impact of soft QM on innovation, Aminbeidokhtiet al. (2016), found that top management support play an influential role in the fulfillment of the organizational innovation through providing the conditions of professional cooperation between faculty members, designing instructional courses based on the learning of the up-to-date topics, having proper cooperation between university and other governmental and non-governmental organizations, providing new

instructional facilities, changing the organizational structure of the university, amending the professors' selection methods, and accepting the suggestions and criticisms in the universities. They also found that people management can positively promote innovation as suitable sharing and transfer of knowledge provide an opportunity for the staff members to learn and participate and also motivate them to apply the new knowledge for innovation. Similarly, Al-husseini and EL-beltagi (2016) found that top management support and people management are two important assets for fostering innovation in higher education. They argued that top managers should create a culture that encourages staff members to innovate by placing more emphasis on team spirit and collaboration among them which, in turn, could lead to the development of product and process innovation. They also found that factors related to human resources such as motivation, training, and adopting new technologies by the staff could lead to product and process innovation in higher education.

For the impact of hard QM on innovation, there are some studies that provide evidence that hard QM practices can also facilitate and foster innovation in higher education. For instance, Venkatraman (2007) proposed a framework for implementing QM in HE and he argued that successful implementation of TQM in higher education could be achieved by adopting a TQM framework that focuses on continuous improvements in the hard processes, namely teaching/learning, which in turn could foster innovation by enabling HEIs to be aware of the changing customer needs and responds immediately to those needs. Similarly, Aminbeidokhti et al. (2016) concluded that total quality management can reinforce knowledge sharing and innovation in HEIs through continuous improvement. They suggested that the instructional plans to be as creative as possible and help the continuous improvement in training which in turn could foster and increase the innovative ideas.

In addition to the impact of quality management on innovation and organizational performance, other studies showed that ***innovation is positively related to organizational performance in higher education***. For instance, Jaskyte (2004) argued that universities have to rely on product and process innovation so as to raise educational performance. Obendhain and Johnson (2004) indicated that the study of product and process innovation in HE is essential as the educational quality is reliant upon both product and process being adaptive to change. Chen and Chen (2012), also, argued that innovation can enable universities to achieve competitive advantage

and increase their chance of being alive in the future. Recently, Iqbal et al. (2018) found that innovation is significantly instrumental to the performance of research universities as it can lead to increased research productivity, student satisfaction, curriculum development, and responsiveness to the environmental challenges. However, the studies conducted in the education context pay more focus on technical innovation compared to the administrative one (e.g., Al-husseini and El-beltagi, 2016; Iqbal et al., 2018).

3.5 Higher Education in Italy: Context and Trends

In Italy, in the academic year 2017/2018, were active 97 higher education institutions and 12 research centers, according to data reported by the Italian Ministry of University and Research, (http://statistica.miur.it/scripts/InfoAtenei/prima.asp).

According to Rossi (2010), HEIs have been developed in Italy, over the centuries, in several waves: Before the French Revolution, there were a large number of universities created, mostly in medieval times, a period which saw the creation of a number of specialized universities (such as the 'politecnici' of Milan, Turin and Bari, specializing in engineering and architecture, Bocconi University in Milan, specializing in economics, and L'Orientale of Naples, specializing in Asian languages). On the other side, the new universities, those created since 1945, constitute a more numerous group as they were created to answer the rising need for education going with the period after the WWII.. Between 1990 and 2000, this system was complemented with private universities offering distance learning educational services.

In addition to their historical origins, Italian universities have encountered several changes and innovations especially in the period from the 1980s until the early 1990s. During this period, numerous changes introduced into the system of rules governing the relationship between universities and the central government which was previously characterized by very strong centralization.

According to Vaira (2011), until the beginning of the 1990s, the Italian HE way of governance was characterized by, (1) high centralization of regulation with a strong and pervasive role of the state in administering HE (e.g., curricula, disciplines, funding and budgeting, recruitment and careers, workforce regulation, and student fees), (2) consolidated corporative tradition in the academic community, and (3) high centralization in the provision of funds to

universities, with university budgets characterized by firm itemization and funds allocated strictly according to each budget item.

In the last 30 years, Italy has introduced a series of reforms in higher education in order to move from a centralist-state model to a devolved system in which universities have greater autonomy to allocate their financial resources, define their teaching offerings, and decide their research priorities (Arena et al., 2010).

In 1993, the Italian legislation did some reforms and changes, with the ministry giving annually a lump sum to each university and providing them with freedom on deciding how to spend it (Law 537/1993). This reform was consistent with various other changes developed in Europe and globally which share core elements of the new public management paradigm (NPM) (Gonzalez, 2019). The same act provided the first operational framework that revised the existent evaluation mode, focused on formal administrative routine verification (Neave, 1998). It introduced a different evaluative mechanism that focuses more on self-evaluation whereby the Internal Evaluation Units (IEUs) have the main responsibility in the evaluation process at universities (Lumino et al., 2017). In the late 1990s, a more comprehensive reform was launched in order to change to the structure and function of universities within the frame outline developed by the Sorbonne Declaration and then by the Bologna process (Moscati, 2009). Accordingly, several functions were revised and reshaped including academic staff recruiting, teaching autonomy, curricular structure, and the quality assurance system. Most of these reforms resulted in more freedom and flexibility for university administrators to handle their different functions and tasks. For instance, the responsibility for staff recruitment and degree courses was handed for university with only slight control by the central bodies as well as the bachelor/master scheme and a curricular differentiation for all teaching programs were introduced in the name of autonomy (Lumino et al., 2017).

More recently, in the 2010s, the Italian HE developed a new reform called Gelmini Reform (Law 240/2010), whose rationale was to enhance quality and efficiency by assuming performance and accountability as its basic principles. The main distinctive traits of this reform are:

- The emergence of a new kind of leadership in universities
- Strengthening the authority of central bodies with strong planning and financial powers (Namely Rector, Academic Senate, and Administration Board)
- Increasing the role of external stakeholders in institutional governance at the local level.
- A standardization of academic degree structure, accredited through a system based on minimum quality standards
- Establishing a new performance-oriented evaluation system aimed to reform recruitment and managerial structure inside universities.

In line with European Quality Assurance guidelines, self-evaluation and external evaluation tools have been introduced to measure institutional, organizational and individual performance in addition to the redesign of a formally independent evaluation authority (namely the National Agency for Evaluation-ANVUR).

In short and based on the above discussion, it can be concluded that the previous trends and interventions have ultimately increased the universities' decisional autonomy, reduced the extent of direct government control over the university system, and have arguably contributed to intensifying competition for enrolment and for research funds among universities in Italy.

Chapter 4 Research Framework and Methodology

Chapter Outline

4.1 Research gap analysis; **4.2** Hypotheses of the study; **4.2.1** Soft and hard QM practices relationships**; 4.2.2** Quality management and innovation relationships**; 4.2.3** Innovation and organizational performance relationships**; 4.2.**4 Quality management and organizational performance relationships**; 4.2.5** The mediating effect of hard QM and innovation**; 4.3** The research model**; 4.4** Data collection method**; 4.5** Questionnaire design and measures**; 4.6** Sample design**; 4.6.1** Target population**; 4.6.2** Sampling technique and data collection; **4.7** Data analysis techniques.

Introduction

After reviewing the literature in the previous two chapters for quality management, innovation, and organizational performance, several research gaps have been addressed. The main aim of this chapter is to discuss these research gaps which will help in formulating the related hypotheses and developing the research model of the study. Then, the chapter will discuss and justify the method used for collecting data and how the measures have been developed for the collection. Then, the chapter will discuss the population and sampling design. The chapter then ends with discussing the data analysis techniques that will be used for analyzing the collected data and interpreting the results which will help in answering the research questions, examining the formulated hypotheses, and achieving the research objectives.

4.1 Research gap analysis

From what has been discussed during the previous two chapters, it can be concluded that both quality management practices and innovation play a crucial role in achieving the organization's success and survival in the current turbulent environment (Zeng et al., 2017). Nowadays, HEIs put more focus also on quality and innovation in order to cope with the current challenges in their context, as implementing quality will enable them to adapt to the environmental changes, while innovation could lead to providing better services to the students and society (Al-husseini and El-beltagi, 2016; Aminbeidokhti et al., 2016).

The literature review provided several insights into the role of QM in enhancing innovation and performance as the adoption of quality management in innovative activities helps the organization to upgrade itself with respect to customer needs, to minimize the activities that don't create value, and to reduce time and costs in the development of new products and services (Antunes et al., 2017).

Despite the existence of numerous studies developed in the relationship between quality management, innovation, and organizational performance, several research gaps have been addressed through the previous review of the literature. ***First***, since quality management practices were initially adopted and implemented in the manufacturing industry, there is a well-developed literature on the relationship between QM and innovation as well as organizational performance in that sector compared to other sectors in the service industry (Joiner, 2007; Prajogo and Sohal, 2003; Khan and Naem, 2018). Studies examining these relationships in higher education field are also few as most of the studies conducted in that field focus more on examining the applicability of QM framework in HEIs (e.g., Venkatraman, 2007; Kanji et al., 1999; Owlia and Aspinwall, 1997) or on identifying the factors of QM in HEIs (e.g., Bayrakter et al., 2008; Calvo-Mora et al., 2005; Sahney et al., 2008).

Second, previous literature has got mixed results on the relationship between QM and innovation (Prajogo and Sohal,2003; Santos-Vijandea and Alvarez-Gonzalezb,2007; Hoang et al.,2006; Zeng et al., 2015). One probable reason can be that most of the studies adopted an integrated approach, considering QM as a single factor without focusing on investigating the different effects each QM dimension may have on innovation (Martinez-Costa and Martinez-Lorente,2008; Abrunhosa and Sa, 2008). Accordingly, recent studies adopted the multidimensional approach of QM in order to distinguish between soft and hard QM practices to

explain this controversy (Zeng et al., 2017; Khan and Naem, 2018; Esrig-Tena et al., 2018). However, there is a lack of these studies in the services sector (Segarra-Ciprés et al., 2017) and in higher education (Tari and Dick, 2016), as most of the studies that adopted this classification focused more on the manufacturing firms (e.g., Kim et al.,2012; Zeng et al., 2015;2017) and High-Tech companies (e.g., Hung et al., 2010; Escrig -Tena et al., 2018). Therefore, several studies recommend the need to extend this multidimensional approach to the service sector in order to extend the generalizability of the results (Zeng et al., 2017; Ershadi et al., 2019).

Third, most of the empirical studies that examine the relationship between quality management and innovation have usually focused on studying one type of innovation (mainly technical innovation), with paying attention only to product innovation (e.g., Zeng et al.,2015; Prajogo and Hoang, 2008), or process innovation (e.g., Abrunhosa and Sa, 2008; Camison and Puig-Denia 2016), or, in some cases to both of them (e.g., Hung et al., 2010; Martinez-Costa and Martinez-Lornte, 2008; Song and Su, 2015), with a little consideration to the administrative innovation type (Kim et al., 2012). It can be argued that such a narrow view of innovation is a barrier that causes a misunderstanding of the impacts of QM on innovation (Kim et al., 2012). It was also argued that administrative innovation can be considered as the prerequisite for, and as a facilitator of, the efficient use of technical innovation as the changes in the operating (technical) and social (administrative) systems, should happen simultaneously (Damanpour and Aravind 2012; Azar and Ciabuschi, 2017).

Finally, there is a lack of consensus in the literature regarding the impact of QM on organizational performance (Rahman and Bullock, 2005; Khan and Naem, 2018). There are mixed results regarding whether soft QM has a direct or indirect impact on organizational performance (Calvo-Mora et al., 2013), and which dimension is more important in order to yield superior organizational performance (Khan and Naem, 2018).

Taking into account the state of the art in QM, innovation, and organizational performance relationships, the purpose of this study is to understand the twofold view of QM (soft and hard QM) analyzing its direct and indirect impacts on innovation types (administrative and technical innovation) and organizational performance in higher education.

4.2 Hypotheses of the study:

4.2.1 Soft and Hard QM Practices Relationships

The segmentation of quality management practices into soft and hard QM proposed by Flynn et al. (1995), has been supported by many studies such as (Ho et al., 2001; Sousa and Voss, 2002; Rahman and Bullock, 2005; Zeng et al., 2015).

While QM theory indicates both soft and hard quality practices have to be present to produce success (Kaynak, 2003), QM literature provides mixed results on the relationship between soft and hard quality practices (Sousa and Voss, 2002; Nair, 2006). For instance, Powell (1995), Dow et al. (1999), and Terziovski and Samson (1999) concluded that soft practices can improve performance even without hard practices since soft practices are difficult to imitate.

On the other hand, several studies suggest that organizations must have appropriate soft practices in place to create conditions that allow effective diffusion and utilization of hard practices (Rahman and Bullock, 2005). Flynn et al. (1995), Wu (2015) and Zeng et al. (2015) also provided empirical evidence to support that soft components of QM have a positive effect on performance if hard components are established, that is, soft practices work through hard practices to produce quality improvement. They contend that a sound soft QM system can nurture a corporate culture of autonomy, cooperation, and teamwork, which provides support for the successful implementation of QM techniques and tools.

Despite few empirical studies have examined soft-hard quality relationships in HE, they provided support to the research hypothesis. For instance, Calvo-Mora et al. (2005) examined the perceptions of 111 senior staff at Spanish universities regarding the relationship between quality management practices using the EFQM model as a reference. They found that certain factors such as leadership and policy and strategy (considered as soft QM) have a direct impact on process management (considered as hard QM). Similarly, Ali et al. (2010) examined the impact of HR-TQM factors or the soft factors related to successful TQM implementation and they concluded that soft factors -such as team working, customer focus, and leadership- are critical factors in implementing successful TQM and producing performance excellence in universities. Based on the previous discussion, the following hypothesis is proposed:

H1: Soft quality practices are positively associated with hard quality practices.

4.2.2 Quality Management and Innovation Relationships

According to several scholars (Feng et al. 2006; Prajogo and Sohal, 2004), soft QM practices such as leadership and people management are related to product innovation. Zeng et al. (2015) argued that soft QM enables open communication and supports developing creative ideas, which is essential for creating the right climate for developing innovation. In the same vein, Jackson et al. (2016) suggest that management support for quality and communication of QM philosophy could foster innovation by establishing shared vision and challenging targets that inspire employees to improve performance, encourage training, and promote recognition of employees' suggestions and creative performance.

Other studies have shown that hard QM practices can have a positive impact on innovation (Kim et al., 2012; Perdomo-Ortiz et al., 2006), as they help in developing new routines to implement best practices as a learning base and support innovative activities (Kim et al., 2010). In addition, creating a culture of basing decision making on timely information and benchmarking, provides the opportunity to enhance innovation (Sadikoglu and Zehir, 2010).

Although the studies conducted on QM-Innovation relationship in HE are still few, compared to other studies in manufacturing and other service industries, in general, they support the positive influence that quality management practices can have on innovation. For instance, Antunes et al. (2018) contended that TQM practices are a powerful tool for enhancing innovation in HEIs which will lead to providing better services, not only for internal customers, but for the society as a whole. Similarly, Aminbeidokhli et al. (2016) found that QM practices such as teamwork, leadership, and communication have an indirect impact on organizational innovation through organizational learning. In addition, Liao et al. (2010) suggest that HEIs should realize the relationship between QM and innovation which will help them to adjust their courses to meet the needs of various customers and markets in contrast to the traditional closed systems. Accordingly, the following hypotheses are suggested:

H2: Soft quality practices have a positive impact on innovation.

H2a: Soft quality practices have a positive impact on administrative innovation.

H2b: Hard quality practices have a positive impact on technical innovation.

H3: Hard quality practices have a positive impact on innovation.

H3a: Hard quality practices have a positive impact on administrative innovation.

H3b: Hard quality practices have a positive impact on technical innovation

4.2.3 Innovation and Organizational Performance Relationships

Regarding the relationship between innovation and organizational performance, Cheng et al. (2010) and Walker (2004) consider innovation as a critical enabler to obtain a dominant position and to achieve higher profits in the current rapidly changing and complex business environment. Moreover, several empirical studies have confirmed the positive relationship between innovation and organizational performance (e.g., Gunday et al., 2011; Khan and Naeem, 2018). Other studies further suggested that organizational performance is influenced by both administrative, and technical innovation (e.g., Kim et al., 2012; Jaskyte, 2011). For instance, Mabrouk and Mamoghli (2010) have investigated technical innovation-performance relationships in the banking sector and they found that process and product innovation improve the profitability and performance of the firm. On the other hand, Yavarzadeh et al. (2015) have investigated the relationship between administrative innovation and performance in tax affairs general administration in Iran and they found that administrative innovation has a significant positive impact on organizational performance in terms of financial, growth, customer, and internal process. Similarly, Aboelmaged (2014) conducted a study in manufacturing and service industries and he found that high levels of administrative innovation contribute to increasing the quality level and overall performance of the studied organizations.

Studies conducted in higher education field also found that innovation is vital for universities in order to continuously improve their performance (Chen and Chen, 2012; Jaskyte, 2004). For instance, Jaskyte (2004) argued that universities have to rely on product and process innovation so as to raise educational performance. Obendhain and Johnson (2004) indicated that the study of product and process innovation in HE is essential as educational quality is reliant upon both product and process being adaptive to change. Chen and Chen (2012) also, argued that innovation can enable universities to achieve competitive advantage and increase their chance of being alive in the future. Iqbal et al. (2018), studying a sample of 217 academic and administrative personnel from research universities in Pakistan, found that innovation is significantly instrumental to the performance of research universities as it can lead to increased research productivity, student

satisfaction, curriculum development, and responsiveness to the environmental challenges. According to the above discussion, the following hypotheses are proposed:

H4: Innovation has a positive impact on organizational performance.

H4a: Administrative innovation has a positive impact on organizational performance.

H4b: Technical innovation has a positive impact on organizational performance.

4.2.4 Quality *Management Practices and Organizational Performance Relationships*

Several scholars (Flynn et al., 1995; Kaynak, 2003; Powell, 1995) documented the positive relationship between quality management practices and performance. For instance, García-Bernal and Ramírez-Alesón (2015) found that the implementation of TQM improves the operational performance of organizations, which ultimately affects the other dimensions of performance such as financial performance, customer satisfaction, and other stakeholders' performance.

Moreover, some studies found a direct impact of soft QM practices on organizational performance (e.g., Flynn et al.,1995; Rahman and Bullock, 2005), as they help to create an organizational climate supporting the application of hard QM practices.

At the same time, other studies (e.g., Fotopoulos and Psomas, 2009; Kaynak, 2003) found that effective implementation of hard QM practices, as in timely collecting and disseminating important quality data and information throughout the organization, directly enhances an organization's ability to consistently provide products and services of satisfactory quality to its customers.

In HE, several studies found a positive relationship between quality management practices and performance (e.g., Badri et al., 2006; Calvo-mora et al., 2005; Psomas and Antony, 2017; Sayeda et al., 2010). For instance, Sayeda et al. (2010) found that the TQM dimensions significantly influence all the HEI's measures of performance having a significant bearing on institutional effectiveness. Psomas and Antony (2017) also found that TQM is significantly related to performance results proposing that HEIs can establish a robust TQM model that can help them approach business excellence, apply for competitive quality awards, and derive significant benefits. Hence, the following hypotheses are proposed:

H5: Soft quality practices have a positive impact on organizational performance

H6: Hard quality practices have a positive impact on organizational performance.

4.2.5 The Mediating Effect of Hard QM Practices and Innovation

While some studies link the soft QM practices directly to performance (Ahire and O'Shaughnessy, 1998; Rahman and Bullock,2005; Sanchez-Rodriguez and Martinez-Lorente, 2004), other empirical findings in the literature suggest that the soft QM practices indirectly affect quality performance through the hard QM practices. For instance, Ho et al. (2001) evaluated a mediation model of QM practices and quality performance. They found that hard QM practices fully mediate the effect of soft practices on quality performance. Similarly, in Kaynak's (2003) TQM model, the soft QM practices such as management leadership, training, and employee relations were hypothesized to indirectly affect firm performance through the hard QM practices such as quality data and reporting, product/service design, and process management. Recently, Khan and Naem (2018) studied the relationship between soft and hard quality management practices, service innovation, and organizational performance using a sample of 318 respondents from telecommunication operators in Pakistan and they concluded that soft quality practices enhance the direct impact of hard quality practices on organizational performance. Therefore, the following hypothesis is proposed:

H7: The relationship between soft QM practices and organizational performance is mediated by hard QM practices.

On the other hand, some studies that examined the impact of QM on innovation have modeled the relationship between QM and innovation in the sequence from soft, to hard, then to innovation (Kim et al., 2012; Zeng et al., 2015; Escrig-Tena et al., 2018; Khan & Naem, 2018). These authors suggest that hard practices are instrumental to enable more soft practices to have an effect on innovation. Kim et al. (2012) concluded that process management can improve innovation when supported by a set of soft and hard QM practices. Similarly, Zeng et al. (2015) argued that when supported by the soft QM, hard QM can have a positive impact on innovation not only directly but also indirectly through an accumulative effect derived from soft QM.

Moreover, some studies found that the relationship between QM practices and organizational performance is only an indirect one that is mediated through innovation (Su et al., 2008; Iqbal et al., 2012; Khan and Naeem, 2018). For instance, Khan and Naem (2018) proposed that innovation

enhances the direct impact of soft/hard quality practices on organizational performance. Therefore, the following hypotheses can be proposed.

H8: The relationship between soft QM practices and organizational performance is mediated by innovation.

H8a: The relationship between soft QM practices and organizational performance is mediated by administrative innovation.

H8b: The relationship between soft QM practices and organizational performance is mediated by technical innovation.

H9: The relationship between soft QM practices and performance is mediated sequentially by hard QM practices and innovation.

H9a: The relationship between soft QM practices and performance is mediated sequentially by hard QM practices and Administrative innovation.

H9b: The relationship between soft QM practices and performance is mediated sequentially by hard QM practices and technical innovation.

4.3 The Research Model

Based on the previous discussion and the hypothesized relationships between soft and hard quality management practices, innovation, and organizational performance, the research model was developed in order to examine the different effects of soft/hard quality management practices on organizational performance through the mediating role of innovation types as shown in figure 4.1.

Figure 4.1 shows that there are five aspects of the model: 1) The direct relationship between soft QM and hard QM; 2) The direct relationship between QM practices (soft and hard) and innovation.; 3) The direct relationship between QM practices (soft and hard) and organizational performance; 4) The indirect relationship between soft QM practices and organizational performance through the mediating effect of hard QM practices.; 5) The indirect relationship between soft QM practices and organizational performance through the sequential mediating effect of hard QM and innovation.

The independent variable in this model is soft QM, whereas the dependent variable is the organizational performance. On the other hand, hard QM and innovation types (administrative/technical innovation) are considered the intervening (mediating) variables between soft QM and organizational performance.

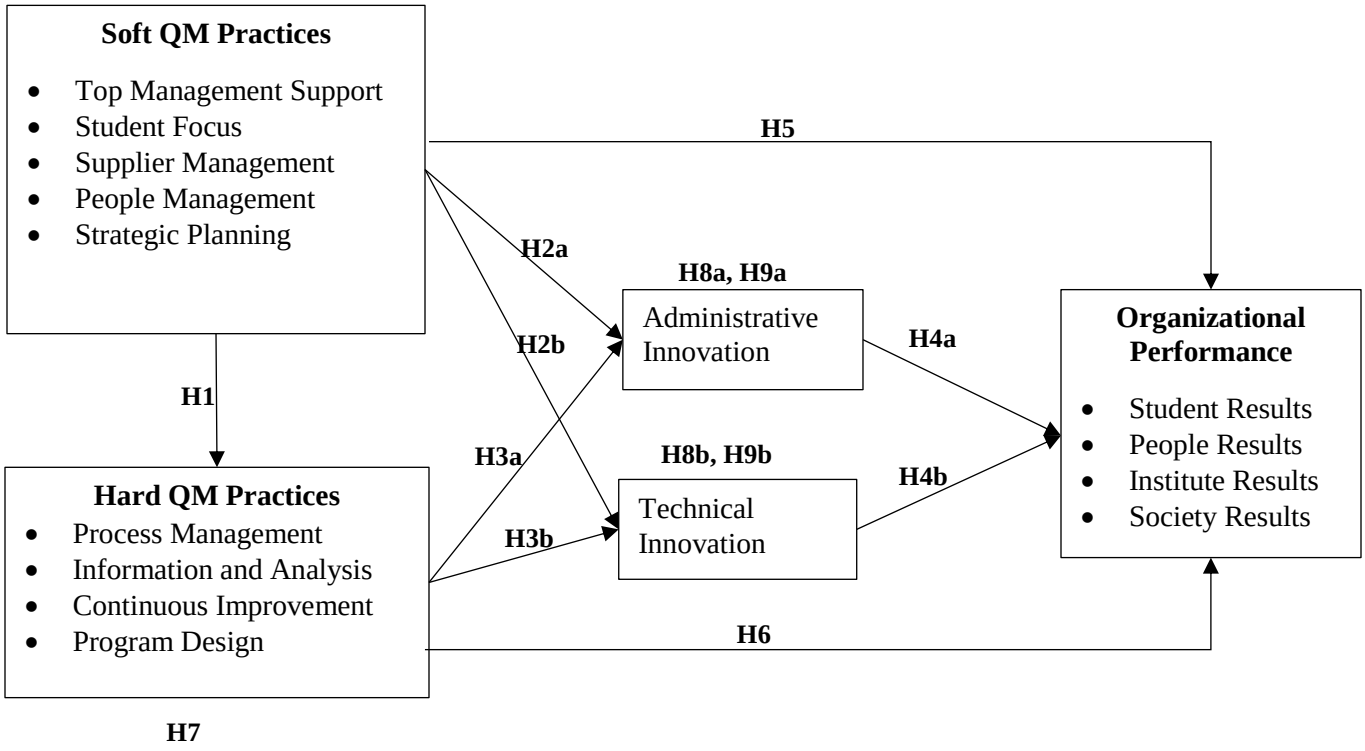

Figure 4. 1 The research model

4.4 Data Collection Method

Adopting the quantitative approach, the survey was selected as the most appropriate methodology for this study because of three main reasons. First, it helps the researcher to collect a large amount of data from a sizeable population using a questionnaire (Saunders et al., 2016). Secondly, a survey is commonly used for answering "who", "what", "where", "how much", and "how many" research questions (Saunders et al., 2016). All the types of research questions in the thesis, as previously mentioned in chapter 1, are *what* and *how*. Such question types are entirely appropriate for the survey methodology. Thirdly, the data collected using a survey can provide several possible explanations of the relationships between variables and posit models of these relationships

(Saunders et al., 2016). Accordingly, the survey will be beneficial to the aim of this study as it mainly developed to examine the relationships between different variables and to propose a model explaining the different paths between them.

According to Saunders et al. (2016), the survey methodology can be implemented using two data collection methods: Self-administered questionnaire and structured interviews. A self-administered questionnaire is a method for collecting primary data in which respondents are requested to complete the same set of questions in a predetermined order by themselves (Collis and Hussey, 2014). This type encompasses three subtypes; (1) the delivery and collection questionnaire, where the researcher delivers the questionnaire by hand to each respondent and collects it later (Gray, 2009), (2) The postal questionnaire, which is sent by post to selected respondents, and (3) Internet survey or e-mail based surveys administered either via a website or via a word-processed document attached to an e-mail.

On the other hand, with the structured interview, the interviewees are asked the same set of questions in a predetermined order by the interviewer, who record responses (Saunders et al., 2016). The researcher can collect the data either by one of two methods: (1) In the telephone questionnaire, he/she telephones the respondents and completes the questionnaire based on their answers. This method is the most widely used in survey research, because of the high proportion of the population that has access to household telephones. 2) In the interview questionnaire, sometimes called interview schedules, the interviewers meet the respondents face-to-face and ask them questions directly (Saunders et al., 2016).

Of these above-mentioned methods, the study used self-administered questionnaire and the e-survey method for distribution for the following reasons. First, the thesis employed the survey to collect a large amount of quantitative data from academics located in several universities around Naples (Campania Region). In this regard, using self-administered questionnaire through e-survey is advantageous because it is cheaper and quicker to administer than the structured interview. Secondly, self-administered questionnaires are more convenient for respondents since they can fill the questionnaire whenever and as long as they want (Bryman and Bell, 2015). Moreover, the e-survey technique is recommended by several scholars when the sample size is large and geographically dispersed (Saunders et al., 2016). Finally, a self-administered questionnaire is a traditional data collection method in prior empirical studies on quality management, innovation,

and organizational performance (e.g., Calvo-Mora et al., 2005; Khan and Naeem, 2018; Zeng et al., 2017). Consequently, a self-administered questionnaire is chosen over a structured interview as the main data collection method in this thesis.

4.5 Questionnaire Design and Measures

This study uses a self-administered questionnaire with closed-ended questions to collect data from members of the staff in different departments in the universities located in Naples City in Italy. The questionnaire was designed on the basis of relevant literature, so the instruments used to measure the different constructs were taken from validated scales. Because the original scales were in English, the researcher followed standard translation and back-translation procedures to produce the Italian versions as recommended in the literature (Saunders et al., 2016).

All variables were measured using a seven-point Likert Scale ranging from 1=Completely disagree to 7=Completely agree. Face and content validity were addressed with a panel of experts (academicians involved in senior administrative posts with experience in quality management application in HEIs) in order to assess the clarity of questions, determine the length of time required for completion, and examine the appropriateness of the questions asked. Based on their feedback, some modifications were made to ensure that the questions were suitable for the Italian context.

The layout of the questionnaire encompasses four parts besides the introduction which explained the purpose of the study and contact details in case the participants should have any further inquiries (see Appendix).

Part 1 (Demographic Characteristics): This part asks the members of the staff for their demographic information including their current academic qualification, their department, their role in the department (directors or non-directors), and finally their role in QM activities in the department.

Part 2 (Quality Management Practices): QM was measured by 41 items adapted from studies conducted exclusively in HE (Calvo-Mora et al., 2005,2006; Bayraktar,2008; Sadeh and Garkez, 2015; Psomas & Antony,2017). The QM practices in our scale were separated into two higher-order constructs, soft and hard QM. As shown in table 4.1, soft practices are totally measured by 24 items (3 for top management support, 6 for strategic planning, 3 for supplier

management, 8 for people management, and 4 for student focus), while hard QM practices are measured by 17 items (7 for process management, 3 for information and analysis, 3 for continuous improvement, and 4 for program design).

Table 4. 1 Quality management practices items

No.	*Statement*	*References (adapted from)*
Soft Quality Management Practices		
	Top Management Support	
1	Directors (Head of Department) actively participate in quality improvements efforts and support the improvement process.	Psomas & Antony,2017 ; Sayeda et al.,2010 ; Badri et al.,2006; Ardi,2012; Bayraktar,2008
2	Directors encourage students' and staff involvement in the improvement actions.	Burli,2012 ; Calvo Mora,2005 ; Calvo Mora,2006 ; Bayraktar,2008
3	Directors empower faculty members and staff to manage and solve quality problems.	Sadeh & Garkaz,2015 ; Psomas & Antony,2017
	Strategic Planning	
4	The departments' policies and strategies are in line with its mission, vision, and values.	Burli,2012; Calvo Mora,2005; Calvo Mora,2006; Sadeh & Garkez,2015
5	The departments' policies and strategies are clearly formulated and documented	Burli,2012; Calvo Mora,2005; Calvo Mora,2006; Sadeh & Garkez,2015
6	There is a formal process of reviewing and updating policies and strategies	Burli,2012; Calvo Mora,2005; Calvo Mora,2006
7	Policies and strategies are communicated at all levels of the department.	Psomas & Antony,2017
8	The formulation and revision of policies and strategies include the needs and expectations various stakeholders.	Sadeh & Garkez, 2015; Psomas & Antony, 2017
9	Goals are set out in writing and in a clear and quantifiable manner.	Burli,2012; Calvo Mora,2005; Calvo Mora,2006;
	Supplier Management	
10	The suppliers of the institution are not many.	Psomas & Antony, 2017
11	The institution has close and long-lasting relationships with the suppliers.	Psomas & Antony, 2017; Garcia & Lorente, 2014; Calvo-Mora, 2005; Calvo-Mora, 2006
12	I think that beyond the lower price criteria other factors of the quality as time, quality of products and services are used in evaluating and selecting suppliers.	Psomas & Antony,2017; Garcia & Lorente, 2014.
	People Management	
13	The academic performance of faculty members (professors and researchers) is appraised regularly.	Psomas & Antony; Sayeda et al., 2010

No.	*Statement*	*References (adapted from)*
14	The pedagogical performance of faculty members is appraised regularly.	Psomas & Antony; Sayeda et al., 2010
15	The performance of employees is appraised regularly.	Psomas & Antony; Sayeda et al., 2010
16	Teaching staff and employees participate in meetings, the agenda of which is related to quality improvement planning	Psomas & Antony, 2017
17	Teaching staff and employees feel that they are motivated to improve their performance	Sadeh & Garkez, 2017; Burli, 2012
18	There are suitable channels for sharing and communicating, "better practices", knowledge, and experience.	Psomans & Antony, 2017
19	Our department has cross-functional teams and supports teamwork	Bayraktar, 2008
20	Special training for job-related skills is provided to faculty members and staff	Bayraktar, 2008
Student Focus		
21	Students' opinions and suggestions for quality improvement are determined and analyzed carefully.	Psomas & Antony,2017; Bayraktar,2008; Badri,2006
22	The teaching staff are in close contact with the students and have close relationships with them	Psomas & Antony,2017; Badri,2006
23	We provide a variety of extracurricular activities for students.	Bayraktar,2008; Asif,2013; Badri,2006;
24	Students are encouraged to submit complaints and proposals for quality improvement	Psomas & Antony, 2017; Bayraktar, 2008
Hard Quality Management Practices		
Process Management		
25	The teaching activity envisages the students' needs and expectations	Calvo Mora,2005; Calvo Mora,2006; Burli,2012; Sadeh & Garkez,2015; Bayraktar,2008
26	The teaching activity envisages the needs and expectations of the companies, community or the society in general	Calvo Mora,2005; Calvo Mora,2006; Burli,2012; ; Sadeh & Garkez,2015
27	The research activity envisages the students' needs and expectations	Calvo Mora,2005; Calvo Mora,2006; ; Sadeh & Garkez,2015
28	The research activity envisages the needs and expectations of the companies, community or the society as a whole	Calvo Mora,2005; Calvo Mora,2006; ; Sadeh & Garkez,2015
29	Our institution has modern facilities (e.g. laboratories, library, computers, internet, video players) to enhance the effectiveness of education	Bayraktar,2008; Asif,2013
30	Facilities (e.g. classrooms, laboratories, computers, heating systems and air conditioners) are maintained in good condition according to periodic maintenance plans.	Bayraktar,2008; Asif,2013;Psomas & Antony,2017
31	Our department collects statistical data (e.g. error rates on student records, course attendances, employee turnover rates) and evaluates them to control and improve the processes	Bayraktar,2008; Asif,2013; Psomas & Antony,2017

No.	*Statement*	*References (adapted from)*
	Information and Analysis	
32	Quality data are taken into consideration by the teaching staff and employees during their daily tasks	Psomas & Antony,2017; Sayeda,2010; Badri,2006;
33	Quality data (e.g. errors, nonconformities) and the performance indexes of the institution are recorded and analyzed	Psomas & Antony,2017; Sayeda,2010; Bayraktar,2008
34	Our department benchmarks the academic and administrative processes with other departments.	Psomas & Antony,2017; Bayraktar,2008; Badri,2006;
	Continuous Improvement	
35	The areas in the department and the procedures that need improvement are determined	Psomas & Antony,2017; Bayraktar,2008
36	The institution keeps track of the changes/demands of industry and proactively responds accordingly (e.g. revision of courses and syllabus to address the emerging and recent trends and technology).	Sayeda et al., 2010; Psomas & Antony,2017
37	Efforts are being taken by the department to update the library, laboratory facilities and courses following the recent updates/advances in science and technology.	Sayeda et al., 2010; Psomas & Antony,2017
	Program Design	
38	Students' requirements are thoroughly considered in the design of curriculum	Bayraktar,2008; Asif,2013
39	The experienced academicians' suggestions are thoroughly considered in the design of curriculum.	Bayraktar,2008; Asif,2013
40	Curriculum and academic programs are evaluated and updated every year.	Bayraktar,2008; Asif,2013
41	University facilities (e.g. laboratories and hardware) and resources (e.g. Finance and human resources) are considered in the development and improvement of the curriculum and programs.	Bayraktar,2008; Asif,2013

Part 3 (Innovation): Innovation was measured using 10 items reflecting the acceptance of new ideas related to technical and administrative innovation. Technical innovation is considered a higher-order construct consisting of product and process innovation and it has been measured using the scale developed by Al-Husseini and Elbeltagi (2016) for the HE field. Administrative innovation items were adapted from several studies (Walker, 2006; Wang and Ahmed, 2004). The complete scale for innovation is shown in table 4.2.

Table 4. 2 Innovation items

No.	*Statement*	*References (adapted from)*
	Administrative Innovation	
1	Our department implemented new or improved existing structures such as project team or departmental structures, within or in-between existing structures	Kim et al., 2012; Skerlavaj et al., 2010
2	Our department staff members can try new ways of doing things while still respecting the university`s procedures	Wang & Ahmed, 2004
3	When the university changes the administrative procedures, our staff is slow to adapt	Wang & Ahmed, 2004
4	We encourage the staff to work together (cooperation in teams or best practices sharing) when needed to be more effective in handling new administrative issues.	Walker, 2006
	Technological Innovation	
	Product Innovation	
5	Our institution constantly emphasizes development and doing research project	Alhusseini & Albeltagi, 2016
6	Our institution often develops teaching materials and methodologies	Alhusseini & Albeltagi, 2016
7	Our institution often develops new programs/services for members of staff and students	Alhusseini & Albeltagi, 2016
	Process Innovation	
8	Our institution is developing new training programs for staff members	Alhusseini & Albeltagi, 2016
9	Our institution encourages teamwork and relationships between staff members	Alhusseini & Albeltagi, 2016
10	Our institution is trying to bring in new equipment (i.e. computers) to facilitate educational operations and work procedures	Alhusseini & Albeltagi, 2016

Part 4 (Organizational Performance): Organizational performance was measured using 14 items for four basic first-order constructs (student results, people results, institute results, and society results) according to previous literature in HE (Calvo-mora et al., 2005; Psomas and Antony, 2017). The complete scale for organizational performance is shown in table 4.3

Table 4. 3 Organizational performance items

No.	Statement	Supporting articles
	A) Student Results	
1	There is a significant decrease in student dropout rate over the past three years	Calvo-Mora,2005; Burli,2012
2	There is an improvement in graduation rate over the past three years.	Calvo-Mora,2005; Burli,2012
3	I feel that there is a significant increase in number of high merit students opting to our institute	Calvo-Mora,2005; Burli,2012
	B) People Results (Faculty/Staff)	
4	I feel that faculty and staff members satisfaction has increased over the past three years.	Psomas & Antony,2017; Burli,2012; Badri,2006
5	I feel that the number of students for each teacher in the last three years has become easier to manage	Sayeda et al., 2010
6	I feel that the scientific performance of the teaching and research staff has significantly improved over the last three years.	Sayeda, 2010; Calvo-Mora; 2005
7	I feel that the performance of teaching and teaching staff has significantly improved over the last three years	Sayda, 2010; Calvo-Mora, 2005
	C) Institute Results:	
8	Number of research papers published by PhD students and faculty have increased over the past three years.	Burli,2012; Badri,2006; Calvo-Mora,2005
9	I think that more and more high ranked students are have enrolled in programs in the last three years.	Burli,2012; Calvo-Mora,2005
10	The number of research projects obtained from public institutions has increased over the past three years	Calvo-Mora, 2005
	D) Society Results:	
11	There is an active involvement of the department in social events.	Psomas & Antony,2017;
12	I feel that the department's reputation and image has increased in the civil society, over the past three years.	Psomas & Antony,2017; Sayeda et al., 2010; Calvo-Mora,2005; Sayeda et al.,2010
13	I feel that there is a significant increase in support of cultural or support activities.	Burli, 2012; Calvo-Mora, 2005
14	The department is actively involved in the protection and preservation of the environment (rational processing of solid and liquid waste, recycling etc.)	Psomas & Antony,2017; Burli,2012; Calvo-Mora,2005

4.6 Sample Design

Following the questionnaire development, designing a sample that is representative of the population is essential for a survey methodology (Collis and Hussey, 2014). The sample design requires making decisions about the target population, sampling techniques, and sample size. This section explains the decisions regarding these issues in the thesis.

4.6.1 Target Population

A population is a precisely defined body of people or objects under consideration for statistical purposes (Collis and Hussey, 2014). The target population in this study comprises all the academic teaching staff (Full Professors, Associate Professors, Researchers) working in different academic departments in the public universities located in Naples (Italy).

The rationale behind selecting the academic staff is that they are the major workforce and they have a decisive role in ensuring the quality of education (Kleijnen, 2011). They are the core employees so they can easily assess the different QM practices adopted within their departments, the innovation activities undertaken inside their departments, and the overall performance of their department. Moreover, the academic staff are one of the most important assets of HEIs and a source of competitive advantage, because of their knowledge creation and sharing activities (Kim and Ju, 2008). According to Schneckenberg (2009), staff members can define curricula, plan study programs and courses, and communicate and interact with students about teaching and learning strategies.

For these above-mentioned reasons, this study included in the population all the academic staff from various departments with six public universities located in Naples (Italy). The total number of teaching staff in each of these universities is shown in table 4.4.

Table 4. 4 Total number of academic staff in each university considered in the study.

University	**Academic Position**			**Total**
	Full Professor	***Associate Professor***	***Researcher***	
University of Naples Federico II	630	887	524	**2041**
University of Campania Luigi Vanvitelli	222	365	255	**842**
Parthenope University of Naples	97	108	87	**292**
University of Naples "L'Orientale"	56	75	22	**153**
University of Salerno	231	397	215	**843**
University of Sannio	42	80	56	**178**
Total	**1278**	**1912**	**1159**	**4349**

Source: https://cercauniversita.cineca.it/

4.6.2 Sampling Technique and Data Collection

According to Saunders et al. (2016), there are two kinds of sampling techniques: Probability or representative sampling and non-probability or judgmental sampling. With probability sampling, the possibility of each case to be picked out of the population is acknowledged and equal for all cases. The probability sampling techniques include simple random, systematic, stratified random, cluster, and multi-stage sampling technique. For non-probability sampling, each case is chosen based on the subjective judgement of researchers. The non-probability sampling consists of quota, purposive, snowball, self-selection, and convenience.

In this study, non-probability sampling using self-selection method was employed to select respondents for the main study. Self-selection is one type of the volunteer sampling techniques in which the researcher allows each case (usually individuals) to identify their desire to take part in the research by advertising to those specific individuals through media or by asking them to take part in the research and collecting data from those who respond (Saunders et al., 2016).

Following this technique, the researcher first developed a list of all email addresses of academic staff in every department at the above-mentioned universities. To ensure that the number of respondents will be sufficient for analyzing data and for generalizing the results, the questionnaire was sent by e-mail to all the teaching staff using an online platform (www.limesurvey.com) inviting them to participate by answering the questionnaire in the period from May 2018 until August 2018. A total of 356 usable responses were collected during that period. It should be stressed that the most common rule to determine sample size for PLS estimation consists in determining the sample according to the most complex multiple regression

in the model, which consists in either the number of indicators on the most complex formative construct or the largest number of antecedents leading to a construct in the inner model (Barclay, Higgins, & Thompson, 1995). Once determined which is greater, the sample size required is 10 cases per predictor. In the proposed model, the most complex regression involves the number of structural paths directed at the organizational performance construct, which are four. Thus, according to this rule, the minimum sample size necessary would be 40. With 356 responses, the PLS analysis appears to have sufficient power.

4.7 Data Analysis Techniques

Structural equation modeling (SEM) was used in this study to examine the direct and indirect relationship between quality management practices, innovation, and organizational performance. Hair et al. (2011) described SEM as a family of statistical models that explain the relationships among multiple variables. It is a multivariate technique combining aspects of factor analysis and multiple regression that enables the researcher to estimate the direct and indirect effects of independent variables on dependent variables (Hooper et al., 2008).

There are two approaches to estimate the relationships in structural equation modeling. One is covariance-based and represents constructs through factors (CB-SEM); the other is least-squares based or components based and represent constructs through components (PLS-SEM). Each is appropriate for a different research context, and researchers need to understand the differences in order to apply the correct method (Hair et al., 2011;2014).

While CB-SEM and PLS-SEM are two different approaches to the same problem, namely, the analysis of cause-effect relations between latent constructs (Hair et al., 2011), they differ not only in terms of their basic assumptions and outcomes, but also in terms of their estimation procedures (Hair et al., 2014; Shook et al., 2004). PLS-SEM uses a regression-based ordinary least squares (OLS) estimation method with the goal of explaining the latent constructs' variance by minimizing the error terms and maximizing the R^2 values of the target (endogenous) constructs (Hair et al., 2014; Ringle et al.,2012). CB-SEM, on the other hand, follows a maximum likelihood (ML) estimation procedure and aims at ‘‘reproducing the covariance matrix (i.e., minimizing the difference between the observed and estimated covariance matrix), without focusing on explained

variance'' (Hair et al., 2011). In other words, with CB-SEM, the R^2 is a by-product of the overall statistical objective of achieving good model fit (Hair et al., 2014).

Although most of the characteristics and advantages of CB-SEM also apply to PLS-SEM, PLS-SEM can provide advantages over 1G techniques and CB-SEM techniques for preliminary theory building, while CB-SEM has advantages over PLS in terms of model validation. PLS incorporates several statistical techniques that are not part of CB-SEM-such as principal components analysis, multiple regression, multivariate analysis of variance, redundancy analysis, and canonical correlation-without inflating the t-statistic, as would happen if each analysis were conducted separately from the others. Several considerations are important when deciding whether to apply PLS-SEM or CB-SEM. Table 4.5 summarizes recommendations on when to use PLS-SEM Versus CB-SEM.

Table 4.5 Rules of Thumb for Selecting CB-SEM or PLS-SEM

Research Goal
▪ If the goal is predicting key target constructs or identifying key "driver" constructs, select **PLS-SEM**.
▪ If the goal is theory testing, theory confirmation, or comparison of alternative theories, select ***CB-SEM***.
▪ If the research is exploratory or an extension of an existing structural theory, select **PLS-SEM**.
Measurement Model Specification
▪ If formative constructs are part of the structural model, select **PLS-SEM**. (Note that: formative measures can also be used with ***CB-SEM*** but to do so requires accounting for relatively complex and limiting specification rules.)
▪ If error terms require additional specification, such as covariation, select ***CB-SEM***
Structural Model
▪ If the structural model is complex (many constructs and many indicators), select **PLS-SEM**.
▪ If the model is non-recursive, select ***CB-SEM***.
Data Characteristics and Algorithm
▪ If your data meet the ***CB-SEM*** assumptions exactly, for example, with respect to the minimum sample size and the distributional assumptions, select ***CB-SEM***; otherwise, **PLS-SEM** is a good approximation of CB-SEM results.
Sample Size Considerations
– If the sample size is relatively low, select **PLS-SEM**. With large data sets, ***CB-SEM*** and **PLS-SEM** results are similar, provided that a large number of indicator variables are used to measure the latent constructs (consistency at large).
– **PLS-SEM** minimum sample size should be equal to the larger of the following: (1) ten times the largest number of formative indicators used to measure one construct or (2) ten times the largest number of structural paths directed at a particular latent construct in the structural model.

Normality
• If the data are to some extent nonnormal, use **PLS-SEM**; otherwise, under normal data conditions, ***CB-SEM*** and **PLS-SEM** results are highly similar, with ***CB-SEM*** providing slightly more precise model estimates. • If ***CB-SEM*** requirements cannot be met (e.g., model specification, identification, nonconvergence, data distributional assumptions), use **PLS-SEM** as a good approximation of CB-SEM results. • ***CB-SEM*** and **PLS-SEM** results should be similar. If not, check the model specification to ensure that ***CB-SEM*** was appropriately applied. If not, **PLS-SEM** results are a good approximation of ***CB-SEM*** result
Model Evaluation
▪ If you need to use latent variable scores in subsequent analyses, **PLS SEM** is the best approach. ▪ If your research requires a global goodness-of-fit criterion, then ***CB SEM*** is the preferred approach. ▪ If you need to test for measurement model invariance, use ***CB-SEM***.

Source: Hair et al. (2011).

According to the previous discussion and to choose the appropriate SEM tool, our study will be assessed according to the criteria in the table which will be explained in the following points:

- **Research Goal**:

  The goal of this research is to examine the relationships between different constructs with the aim of explaining the key target construct organizational performance.

  Therefore, this research is considered as a prediction-oriented research for which *PLS-SEM is more appropriate.*

- **Measurement Model Specification**:

  In the measurement model, indicators may be modeled as reflective or formative (Fornell, 1982). Reflective indicators are determined by the construct and, hence, covary the level of that construct (Chin and Gopal, 1995). A latent variable with formative indicators implies that the construct is expressed as a function of the manifest variables; the observed variables form, cause, or precede the construct. In our research model, all first-order factors are constructs specified with reflective indicators. On the other hand, we have presented hard QM practices, soft QM practices, technological innovation, and organizational performance measures as second-order factors which are also reflective. Based on that, either CB-SEM and PLS-SEM can be used.

- **Structural Model:**

  The research model is recursive (no causal loops) and it can be regarded as complex (as there are 65 indicators, 16 first-order constructs, and 4 second-order constructs). According to Hair et al. (2011), PLS-SEM is recommended in this case because it can handle complex models with many structural model relations and a large number of indicators are helpful in reducing the PLS-SEM bias.

- **Sample Size:**

  Recommendations regarding the ideal sample size for SEM analysis range from 50 to 200 observations (e.g., Anderson and Gerbing, 1988; Kline, 2005). However, the appropriate sample size for SEM models depends first on the method used. In PLS-SEM, the guideline is that the sample size should be ten times the number of arrows pointing a construct (Hair et al., 2014). In contrast, CB-SEM requires a sample size of five times the number of indicators included in the original model (e.g., a CB-SEM model with 40 indicator variables on three constructs a sample size of 200 (5X40), but if those 40 indicators are associated with the same three constructs and two constructs are predicting a single endogenous construct, then the required sample size with PLS-SEM is 20(2 X10); i.e., arrows pointing from the two exogenous constructs to the one endogenous construct).

  By applying these rules to our research, we can find that in order to apply CB-SEM, the sample size should be (65 indicators X 5) = 325. On the other hand, in order to apply PLS-SEM, The minimum sample size ten times larger than the sum of arrows-ins to predict Performance measures (4X10) = 40. So, according to the sample size, both methods are acceptable.

- **Testing for normal distribution:** The CB-SEM maximum likelihood approach, like many other multivariate statistical methods, requires multivariate normality. In contrast, PLS-SEM does not require normally distributed data (Hair et al., 2014). For choosing between the two methods, this study examined the normality (shown in detail in the next chapter) for data by examining kurtosis, skewness, and using Kolmogrov-Smirnov test for normality. The results show that the data distribution is non-normal. So, PLS-SEM is recommended in this case because no distributional assumptions are needed.

Based on the previous discussion and as shown in table 4.5, this study will use partial least squares structural equation modeling (PLS-SEM) for the following reasons (Hair et al., 2011): (a) the focus of this study is the prediction of the dependent variables; (b) the Kolmogrov-Smirnov test confirmed that none of the measurement items was distributed normally ($P<0.001$); (c) our sample exceeds the needed sample size of ten times the largest number of structural paths directed at a particular construct in the inner path model.

Table 4. 5 Summary of criteria evaluation results for choosing the appropriate SEM tool.

Criteria	**PLS-SEM**	**CB-SEM**	**Reason**
Research Goal	✓		▪ The research goal is considered as prediction-oriented research.
Measurement Model	✓	✓	▪ The relationship between first-order constructs and indicators is reflective. ▪ The relationship between second-order factors and its constructs is reflective.
Structural Model	✓		▪ The structural model is complex (65 indicators, 16 first-order constructs, 4 second-order factors). ▪ The structural model is recursive
Sample Size	✓	✓	▪ The sample size fits the requirements of both models. Minimum sample for CB-SEM=325, and for PLS-SEM=40
Normality Test	✓		▪ According to normality results, the data is non-normal.

Chapter 5 Data Analysis and Results

Chapter Outline

5.1 Data screening; **5.1.1** Missing data**; 5.1.2** Normality test**; 5.1.3** Common method bias (CMB)**; 5.2** Description of the sample**; 5.3** Overview of the Partial Least Squares Structural Equation Modeling (PLS-SEM); **5.4** Developing first-order and second-order constructs**; 5.5** Measurement Model Assessment**; 5.6** Structural Model assessment**; 5.7** Analysis of mediating and indirect effects**.**

Introduction

This chapter reports the results of data analysis with respect to research objectives and hypotheses formulated. Partial least squares structural equation modeling (PLS-SEM) analysis using Smart PLS Version 3 was employed in this study to test the hypothesized causal relationships. Data analysis in this chapter is presented into several subsections. The first section describes the process of data screening by putting more focus on handling missing data and normality tests. The second section provides details of the respondents' profile. The subsequent sections provide the results of the PLS analysis describing the formulation of the first-order and second-order constructs, the measurement model and structural model results as well as hypotheses testing. Finally, a summary of the hypotheses testing and research findings are presented.

5.1 Data Screening

Byrne (2010) indicated that data screening is very important when the researcher decides to employ the structural equation modeling (SEM) before testing the measurement model, to ensure that no assumptions are violated which may cause problems with estimation. According to Hair (2014), the primary issues that should be examined include missing data and data distribution. For this reason, our analysis starts with analyzing missing data as well as normality tests.

5.1.1 Missing Data

Structural equation modeling requires cells in data set to be complete. Only, 242 of the collected responses were complete, yet the incomplete responses were only missing on one or two items for each case. Therefore, and for deciding whether to dropout the incomplete responses or impute the data. An evaluation to the extent and type of missing data was made. According to Hair et al., (2014), if the number of missing values per indicator is relatively low (less than 5%), a mean value replacement is recommended for imputing the missing data.

As shown in table 5.1, which depicts the number and percentage of missing values per indicator, the data has only very few missing values as they range from 1 (0.3%) to 14 (4.2%) for each indicator. Therefore, mean value replacement can be used for imputation. Moreover, none of the observations has more than 10% missing values, so we can proceed analyzing the 356 respondents by imputing the missing data with mean replacement.

Table 5. 1 Number and percentage of missing values per indictor

Construct	**Items**	**Missing Values**		**Construct**	**Items**	**Missing Values**	
		Count	***%***			***Count***	***%***
Top Management	TMS1	1	0.3	**Information &**	IA1	2	0.6
Support	TMS2	1	0.3	**Analysis (IA)**	IA2	2	0.6
(TMS)	TMS3	7	2.0		IA3	2	0.6
Student Focus	SF1	2	0.6	**Continuous**	CI1	0	0.0
(SF)	SF2	0	0.0	**Improvement (CI)**	CI2	1	0.3
	SF3	3	0.8		CI3	0	0.0
	SF4	1	0.3	**Program Design (PD)**	PD1	1	0.3
Supplier	SM1	10	2.8		PD2	0	0.0
Management	SM2	15	4.2		PD3	1	0.3
(SM)	SM3	7	2.0		PD4	2	0.6

Construct	Items	Missing Values		Construct	Items	Missing Values	
People Management (PEM)	PEM1a	0	0.0	**Administrative Innovation (AI)**	AI1	1	0.3
	PEM1b	1	0.3		AI2	1	0.3
	PEM1c	7	2.0		AI3	7	2.0
	PEM2	1	0.3		AI4	0	0.0
	PEM3	1	0.3	**Process Innovation (PRCI)**	PRCI1	15	4.2
	PEM4	1	0.3		PRCI2	5	1.4
	PEM5	1	0.3		PRCI3	3	0.8
	PEM6	4	1.1	**Product Innovation (PRDI)**	PRDI1	0	0.0
Strategic Planning (SP)	SP1	1	0.3		PRDI2	0	0.0
	SP2	1	0.3		PRDI3	3	0.8
	SP3	3	0.8	**Student Results (STR)**	STR1	0	0.0
	SP4	0	0.0		STR2	1	0.3
	SP5	0	0.0		STR3	4	1.1
	SP6	3	0.8	**People Results (PER)**	PER1	1	0.3
Educational Process (EP)	EP1	2	0.6		PER2	2	0.6
	EP2	0	0.0		PER3	2	0.6
Research Process (RP)	RP1	1	0.3		PER4	0	0.0
	RP2	3	0.8	**Society Results (SOR)**	SOR1	5	1.4
Administrative process (AP)	AP1	2	0.6		SOR2	3	0.8
	AP2	0	0.0		SOR3	1	0.3
	AP3	1	0.3		SOR4	0	0.0
				Institute Results (IR)	IR1	0	0.0
					IR2	6	1.7
					IR3	2	0.6

Finally, the characteristics of the variables with completed and imputed data have been compared to determine if there are differences between them or not. To test the differences between the completed and imputed data, a descriptive statistic (mean and standard deviation) was compared for both data. Moreover, and in order to examine whether there are significant differences in the distribution between the two groups (complete cases and imputed case), a **Kolmogrov-Smirnov test** was conducted in order to indicate if the two samples of each variable have the same distribution or not (Stuart et al., 2009). The hypotheses of this test are :

H_0: The distribution of each variable is the same across the two samples (Complete and imputed)

Ha: The distribution of each variable is not the same across the two samples (Complete and imputed).

According to table 5.2, there are no significant differences in the characteristics of the variables as the kolmogrov-Smirnov test is not significant meaning that the null hypothesis is accepted and the imputation with mean replacement doesn't significantly impact the complete data characteristics.

Table 5. 2 Comparison of variable characteristics with complete cases and imputed results

	Complete Data N = 212		**Imputed Data N=356**		**Kolmogorov Smirnov test**	
Factor	**Mean**	**SD**	**Mean**	**SD**	**Test Statistic**	**P-Value**
TMS	5.20	1.49	5.23	1.47	0.323	1
SP	4.55	1.65	4.59	1.61	0.256	1
SM	4.68	1.31	4.68	1.25	0.289	1
PEM	4.43	1.54	4.46	1.51	0.361	0.99
IA	4.80	1.53	4.88	1.49	0.327	1
SF	5.02	1.48	5.09	1.44	0.406	0.99
PRM	4.77	1.36	4.79	1.32	0.348	1
PD	5.03	1.48	5.05	1.47	0.179	1
CI	4.77	1.51	4.77	1.49	0.252	1
AI	3.91	1.11	3.93	1.08	0.217	1
PRCI	4.10	1.58	4.12	1.54	0.251	1
PRDI	4.79	1.65	4.82	1.60	0.165	1
STR	4.51	1.41	4.52	1.37	0.173	1
PER	4.25	1.51	4.33	1.47	0.370	0.99
IR	4.67	1.41	4.68	1.40	0.205	1
SOR	4.73	1.63	4.78	1.61	0.235	1

5.1.2 Normality Test

In order to decide whether to use CB-SEM or PLS-SEM method, the researcher makes the normality test in order to determine which method is more suitable for the data characteristics as PLS-SEM works more efficiently with non-normal data while CB-SEM is better when the data is normal (Hair et al., 2016). Normality refers to the shape of the data distribution for an individual metric variable and its correspondence to the normal distribution, which is the benchmark for statistical methods (Hair et al., 2014).

According to Hair et al. (2014), the assessment of normality of the metric variables involves both empirical measures of a distribution's shape characteristics (skewness and kurtosis), as well as statistical tests for normality (Z-test and Kolmogorov-Smirnov test). The results of these measures are shown in table 5.3. For z-test, if either calculated z-value exceeds the specified critical value, then the distribution is non-normal in terms of that characteristic. The most

commonly used critical values are ±2.58 (.01 significance level) and ±1.96 (.05 significance level) (Hair et al., 2014). Skewness implies that the shape of a unimodal distribution is asymmetrical about its mean. Positive skew indicates that most of the scores are below the mean, and negative skew indicates just the opposite. On the other hand, positive kurtosis indicates heavier tails and a higher peak while negative kurtosis indicates just the opposite, both relative to a normal curve with the same variance. A distribution with positive kurtosis is described as leptokurtic, and a distribution with negative kurtosis is described as platykurtic (Kline,2016).

As shown in table 5.3, the results from Kolmogrov-Smirnov test show that all variables have significant values of (0.00) indicating that the data are non-normal. Further tests are conducted by calculating the data skewness and kurtosis values and the results confirm that the data is non-normal as z-values for skewness and kurtosis for most of the variables exceed the critical value of ±2.58. In this case, using PLS-SEM is recommended (Hair et al., 2011;2016).

Table 5. 3 Distributional characteristics and testing for normality of study variables

	Shape Descriptions				**Tests of Normality**	
	Skewness		**Kurtosis**			
Variable	***Statistic***	***z-value***	***Statistic***	***z-value***	***Statistic***	***Significance***
Soft (QM) Practices						
TMS	-.979	-7.59	.415	-3.79	.144	.000
SF	-.799	-6.19	-.015	-3.10	.127	.000
SM	-.390	-3.02	-.007	-1.51	.102	.000
PEM	*-.318*	*-2.47*	*-.592*	*-1.23*	.052	.023
SP	-.508	-3.94	-.696	-1.97	.122	.000
Hard (QM) Practices						
PRM	-.578	-4.48	-.037	-2.24	.072	.000
I & A	-.722	-5.60	-.070	-2.80	.116	.000
CI	-.597	-4.63	-.216	-2.31	.114	.000
PD	-.731	-5.67	-.144	-2.83	.109	.000
Innovation						
AI	-.127	-0.98	-.288	-0.49	.077	.000
PRCI	-.200	-1.55	-.696	-0.78	.076	.000
PRDI	-.668	-5.18	-.266	-2.59	.102	.000
Performance Measures						
STR	-.457	-3.54	-.196	-1.77	.095	.000
PER	-.334	-2.59	-.487	-1.29	.082	.000
IR	-.552	-4.28	-.118	-2.14	.081	.000
SOR	-.486	-3.77	-.651	-1.88	.093	.000

5.1.3 *Common Method Bias (CMB)*

Common method bias (CMB) refers to the difference between the trait score and measured score that is attributed to the use of a common method to take more than one measurement of the same or different traits (Podsakoff et al., 2003). Therefore, CMB could imply a threat in social science research given that bias may affect findings, due to systematic errors (Schwarz et al., 2017). Consequently, a full collinearity test based on variance inflation factors (VIFs) was used to detect a potential CMB situation following the guidelines described by kock and Lynn (2012), who proposed such a test in order to assess both vertical and lateral collinearity. According to Kock and Lynn (2012), the VIF should be lower than the threshold of 5 in reflective SEM models. As can be shown in table 5.4, the highest VIF is 4.3 so we can assume that there is no CMB. Hence, the constructs from our model are statistically distinct and can be used for the PLS-SEM analysis.

Table 5. 4 Full collinearity assessment (VIFs)

Variables	**VIF**
Soft (QM) Practices	
Top Management Support	2.71
Student Focus	2.41
Supplier Management	1.55
People Management	4.22
Strategic Planning	4.30
Hard (QM) Practices	
Process Management	3.62
Information and Analysis	2.32
Continuous Improvement	4.18
Program Design	4.19
Innovation	
Administrative innovation	1.00
Process Innovation	2.05
Product Innovation	2.05
Organizational Performance	
Student Results	2.37
People Results	3.77
Institute Results	3.21
Society Results	2.58

5.2 Description of the Sample:

This section describes the demographic characteristics of the participants from the different universities, as shown in table 5.5.

The departments of the universities are grouped into four basic scientific areas (Health, Humanities, Social & Legal science, and Scientific). Table 5.5 shows the distribution of respondents over these scientific areas. Of the respondents, 47.2 percent were from departments related to social and legal studies, 22.8 percent were from departments related to scientific studies, 20 percent were from departments related to health, and finally 9.6 percent were from departments related to humanistic area.

Participants were also grouped into four categories according to their academic positions. Full professors made up (31.7% of the sample), associate professors (35.7%), fixed-time researchers (10.1%), and permanent researcher (22.5%).

The respondents were also grouped according to their role in managing their departments. About 12% of the respondents have role in managing their departments (They are considered as directors, deputy directors, or members of the department council) and 87% of the respondents don't have active role in managing their departments. Moreover, respondents were also grouped according to their role in any quality management activities in their departments. About one-third (30%) were heavily involved in quality management activities, while 70% of the respondents don't have active role in quality management activities.

Table 5. 5 Demographic statistics of the Sample

	Frequency	Percentage
Academic Position		
Full Professor	113	31.7
Associate Professor	127	35.7
Fixed-Time Researcher	36	10.1
Permanent Researcher	80	22.5
Total	*356*	*100.0*
Type of Study		
Health Sciences	73	20.5
Humanities	34	9.6
Social and Legal Sciences	168	47.2
Scientific	81	22.8
Total	*356*	*100.0*
Role in managing the department		
Directors	43	12.1
Non-Directors	313	87.9
Total	*356*	*100*
Role in Quality Management Activities		
Yes	106	29.8
No	250	70.2
Total	*356*	*100*

5.3 Overview of the Partial Least Square Structural Equation Modelling (PLS-SEM)

The research model presented was tested using partial least squares (PLS), a multivariate analysis technique for testing structural models. PLS is a general method for the estimation of path models involving latent constructs indirectly measured by multiple indicators (Hair et al., 2016). This tool is primarily intended for causal-predictive analysis in which the problems explored are complex and theoretical knowledge is scarce. This technique uses a component-based approach to estimation. Because of this, it places minimal demands on sample size and residual distributions, and it allows for the use of both formative and reflective measures, something not generally achievable with covariance-based structural equation modeling techniques such as LISREL or AMOS (Chin , 1998).

Among variance-based SEM methods, PLS is regarded as the “most fully developed and general system” (McDonald, 1996, p. 240) and has been called a “silver bullet” (Hair et al., 2011). PLS is widely used in information systems research (Marcoulides and Saunders, 2006), strategic management (Hair et al., 2012a), marketing (Hair et al., 2012b), and beyond. Its ability to model both factors and composites is appreciated by researchers across disciplines and makes it a

promising method particularly for new technology research and information systems research. Whereas factors can be used to model latent variables of behavioral research such as attitudes or personality traits, composites can be applied to model strong concepts (Höök and Löwgren, 2012), i.e. the abstraction of artifacts such as management instruments, innovations, or information systems. Consequently, PLS path modeling is a preferred statistical tool for success factor studies (Albers, 2010).

The first step in evaluating PLS-SEM results involves examining the measurement models. The relevant criteria differ for reflective and formative constructs. If the measurement models meet all the required criteria, researchers then need to assess the structural model (Hair et al.,2017). As with most statistical methods, PLS-SEM has rules of thumb that serve as guidelines to evaluate model results (Chin, 2010; Götz et al., 2010; Henseler et al.,2009; Chin, 1998; Tenenhaus et al.,2005; Roldán and Sánchez-Franco, 2012; Hair et al.,2017). Rules of thumb–by their very nature–are broad guidelines that suggest how to interpret the results, and they typically vary depending on the context. The final step in interpreting PLS-SEM results, therefore, involves running one or more robustness checks to support the stability of results. The relevance of these robustness checks depends on the research context, such as the aim of the analysis and the availability of data.

5.4 Developing First-Order and Second-Order Constructs

5.4.1 Developing First-Order Constructs

In PLS, indicators may be modelled as reflective or formative (Fornell, 1982). Reflective indicators are determined by the construct and, hence, covary the level of that construct (Chin and Gopal, 1995). On the other hand, a latent variable (LV) with formative indicators implies that the construct is expressed as a function of the manifest variables; the observed variables form, cause, or precede the construct. Because the LV is viewed as an effect rather than a cause of the indicator responses, these indicators are not necessarily correlated. Rather, each indicator may occur independently of the others (Chin and Gopal, 1995). Consequently, traditional reliability and validity assessment have been argued as inappropriate and illogical (Bollen , 2014).

According to Hair et al. (2014), the choice of using reflective or formative indicators depends on the theoretical and conceptual reasoning behind and the goal of the analysis. Therefore, and by

reviewing the literature, the researcher found that most of the past relevant studies have modelled the indicators as reflective (e.g., Calvo-Mora et al., 2005; Psomas and Antony, 2017; Al-Husseini and EL-beltagi, 2016). Accordingly, all first-order factors are constructs specified with reflective indicators in the current study.

5.4.2 Developing and Estimating Second-Order Constructs

Second-order constructs (also called hierarchical latent variable models, hierarchical component models, or higher-order constructs) are explicit representations of multidimensional constructs that exist at a higher level of abstraction and are related to other constructs at a similar level of abstraction completely mediating the influence from or to their underlying dimensions (Becker et al., 2012; Hair et al., 2014). As mentioned before, we have presented soft QM, hard QM, technical innovation, and organizational performance as second-order constructs. Following this approach, we have to make a choice about (1) The type of the hierarchical latent variable, and (2) The approach used to estimate the hierarchical latent variable model.

5.4.2.1 The Type of Hierarchical Latent Variable

Regarding the type of the hierarchical latent variable, Ringle et al. (2012) and Jarvis et al. (2003) distinguish between four types of models contingent on the relationship among (1) the first-order latent variables and their manifest variables, and (2) the second-order latent variable(s) and the first-order latent variables (Figure 5.1).

First, in the ***reflective-reflective type*** model, the lower-order constructs are reflectively measured constructs themselves that can be distinguished from each other but are correlated. Therefore, this type of hierarchical latent variable model is most appropriate if the objective of the study is to find the common factor of several related, yet distinct reflective constructs (Becker et al., 2012).

Second, in the ***formative-reflective type*** model, the higher-order construct is a common concept of several specific formative lower-order constructs. Examples in the empirical literature are rather scarce, but a meaningful application of such a model could be firm performance as a reflective higher-order construct measured by several different indices of firm performance as formative lower-order constructs.

Third, in the ***reflective-formative*** type model, the lower-order constructs are reflectively measured constructs that do not share a common cause but rather form a general concept that fully mediates the influence on subsequent endogenous variables (Chin, 1998). Fourth, in the ***formative-formative*** type model, the lower-order constructs are formative measured constructs that form a more abstract general concept. This is often done if several management-relevant concepts are subsumed under the general concept.

According to Becker et al. (2012) and Hair et al. (2016), the choice of operationalizing the higher-order constructs should be derived from theory and related literature. By reviewing the literature and theories related to our research topics, the researcher found that most of the previous studies have used the reflective-reflective approach when studying hard and soft practices as a second-order constructs (e.g., Zeng et al., 2015; Khan and Naeam, 2018), technical innovation (e.g., Perdomo-Ortiz et al., 2009), as well as organizational performance (e.g., Calvo-Mora, 2013; Khan and Naem, 2018). Therefore, and in line with the previous studies, this study employed the reflective-reflective approach in constructing the second-order constructs.

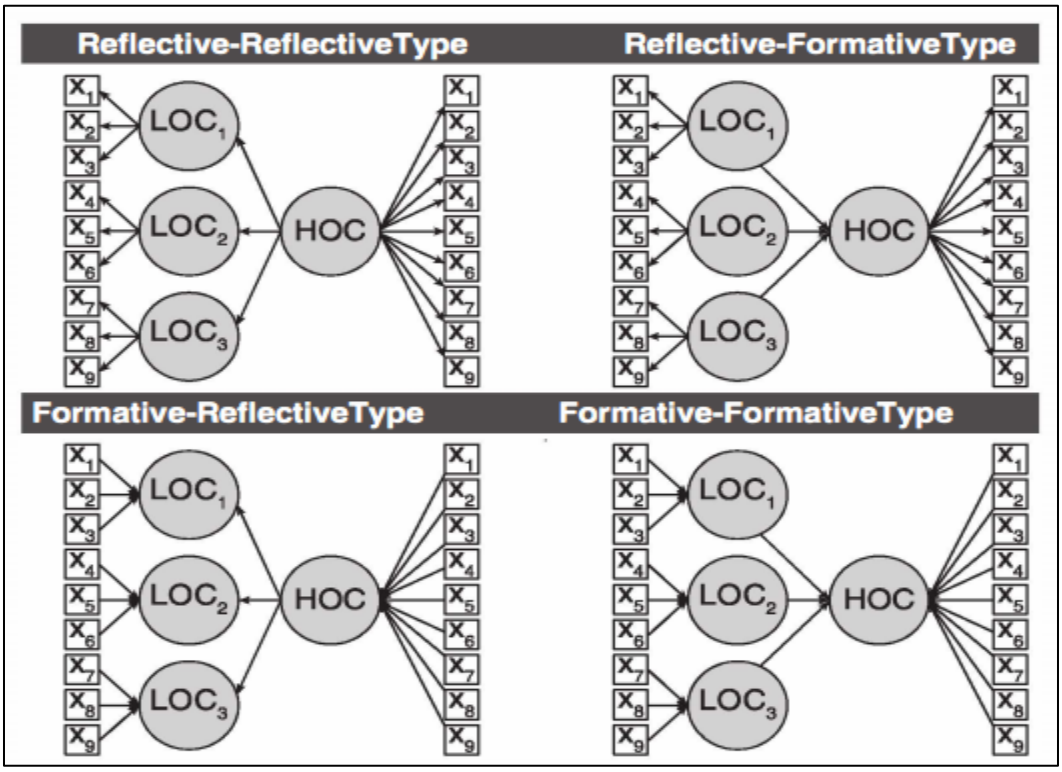

Figure 5. 1 Types of hierarchical component models (Ringle et al., 2012)
Note: LOC = lower-order component; HOC = higher-order component.

5.4.2.2 Estimation of Second-Order Model in PLS-SEM

PLS-SEM requires the computation of construct scores for each latent variable in the path model. As observed variables (or indicators) to estimate the construct scores of a higher-order construct do not exist, two basic approaches to model hierarchical latent variables in PLS-SEM have been proposed in the literature: (1) the repeated indicator approach, and (2) the two-stage approach or the sequential latent variable score method (Becker et al., 2012; Ringle et al., 2012).

For the *repeated indicator approach*, a higher-order latent variable can be constructed by specifying a latent variable that represents all the manifest variables of the underlying lower-order latent variables (Hair et al., 2013). For example, if a second-order latent variable consists of three underlying first-order latent variables, each with four manifest variables, the second-order latent variables can be specified using all (twelve) manifest variables of the underlying first-order latent variables (Becker et al., 2012).

On the other hand, the *two-stage approach* started with determining the latent variable scores first in the PLS-SEM, and thus latent variables scores for lower-order latent variables can be obtained (Chin, 1998; Hair et al., 2016). It estimates the construct scores of the first-order constructs in a first-stage model without the second-order construct present, and subsequently uses these first-stage construct scores as indicators for the higher-order latent variable in a separate second-stage analysis (e.g., Wetzels et al., 2009; Wilson and Henseler, 2007).

In the current study, we used the repeated indicator approach to establish the second-order constructs as this method provides the ability to estimate all constructs simultaneously instead of estimating lower-order and higher-order dimensions separately. Thus, it takes the whole nomological network, not only the lower level or the higher-level model into account, thereby avoiding interpretational confounding which is one of the major drawbacks of the two-stage approach (Becker et al., 2012).

Having developed the first-order and second-order constructs, the next step is to analyze the model using the PLS-SEM. As mentioned above, the PLS-SEM model is analyzed and interpreted in two stages: (1) the assessment of the reliability and validity of the measurement model, and (2) the assessment of the structural model. This sequence ensures that the constructs' measures are valid and reliable before attempting to draw conclusions regarding relationships among constructs

(Hair et al., 2011). The following sections will discuss in detail the results of the measurement and the structural model.

5.5 Measurement Model Assessment (PLS-SEM)

The first step in evaluating a model using the PLS-SEM is to present what is termed the measurement model results. Here, the focus on the reliability and validity of the measures used to represent each construct. Ideally, this portion provides an evaluation on how accurate (i.e reliable) the measures are and also their convergent and discriminant validity (Chin,2010). The relevant criteria for evaluating the measurement model differ for reflective and formative constructs. As with most statistical methods, PLS-SEM has rules of thumb that serves as guidelines in evaluating either the reflective or formative constructs (Chin, 2010; Götz et al.,2010; Henseler et al.,2009; Chin, 1998; Tenenhaus et al.,2005; Roldán and Sánchez-Franco, 2012; Hair et al.,2017).

The reflective measurement models are assessed on the basis of their internal consistency reliability and validity. The specific measures include composite reliability (to assess the internal consistency reliability), convergent validity, and discriminant validity. The criteria for reflective measurement models cannot be universally applied to formative measurement models (Hair et al., 2016). The rules of thumb and the criteria that will be used in assessing the reflective measurement model in this study are summarized in Table 5.6

Table 5. 6 Rules of thumb for evaluating reflective measurement models

Criteria	**Description (Rule)**
Indicator Reliability	- Indicator loading should be higher than 0.7 - Indicators with outer loadings between 0.40 and 0.70 should be considered for removal only if the deletion leads to an increase in composite reliability and AVE above the suggested threshold value
Internal Consistency Reliability	- Composite reliability should be higher than 0.70 (in exploratory research, 0.60 to 0.70 is considered acceptable) - Consider Cronbach's alpha as a conservative measure of internal consistency reliability
Convergent Validity	- The AVE should be higher than 0.5
Discriminant Validity	- An indicator's outer loadings on a construct should be higher than its cross-loadings with other constructs. - The square root of AVE of each construct should be higher than its highest correlation with any other construct (Fornell-Larcker Criterion)

Source: Hair et al. (2011; 2016)

5.5.1 Reliability Assessment Results:

The first step in assessing the reflective measurement model is to examine the reliability of the indicators and constructs. Two aspects of reliability were examined: Individual item reliability and internal consistency reliability.

5.5.1.1 Individual Item Reliability

Individual item reliability is considered adequate when an item has a factor loading that is greater than 0.6 on its respective construct, as they indicate that the construct explains more than 50 percent of the indicator's variance (Chin,1998; Henseler et al., 2009). As shown in table 5.7, all loadings for indicators that measure the same construct are statistically significant, and they are above 0.6 except AI3. Therefore, the researcher removes this item and then revises the loadings for the indicators of the relevant constructs and complete the other tests.

5.5.1.2 Internal Consistency Reliability

The researcher used both **Cronbach's alpha coefficient (α)** and **Composite Reliability (CR)** to assess internal consistency reliability. Cronbach's alpha and CR should be equal to or greater than 0.7 (Fornell and Larcker, 1981; Hair et al., 2014). As shown table 5.7, all measures are robust in terms of their reliability, since all Cronbach's alpha are higher than 0.70, except for supplier management with 0.623, but still above the acceptable threshold of 0.6 (Hair et al., 2010). Furthermore, the composite reliabilities that many researchers consider as more suitable measure for PLS-SEM than Cronbach's alpha (e.g. Hair et al., 2011; Hensler et al.,2009) range from 0.84 to 0.96, which exceed the recommended threshold value of 0.7.

In addition to the above results, Hair et al. (2019) recommend that researchers can use bootstrap confidence intervals to test if the construct reliability is significantly higher than the recommended minimum threshold using the percentile approach. Therefore, the researcher performed the bootstrapping with 5000 subsamples and the results showed that all indicators' loadings and t-values are significant at 0.001 level.

5.5.2 Validity Assessment Results

After assessing the reliability of indicators and constructs, the next step in assessing the reflective measurement model addresses the validity of the questionnaire statements in measuring what it was designed for, and confirm that the questionnaire statements give the sample unit the same concept that the researcher meant. In other words, it refers to the ability of the items to measure what it is intended to measure (Hair et al., 2013). Reflective measurement models' validity assessment focuses on two aspects: convergent validity and discriminant validity.

5.5.2.1 Convergent Validity

Convergent validity is the extent to which a measure correlates positively with alternative measures of the same construct. The metric used for evaluating a construct's convergent validity is the average variance extracted (AVE) for all items in each construct. An acceptable AVE is 0.5 or higher indicating that the construct explains at least 50 percent of the variance of its items (Hair et al., 2019). As shown in table 5.7, all construct's AVEs are greater than 0.5 meaning that the AVEs are adequate and each latent variable explains on average more than 50 percent of the variance of its indicators.

Table 5. 7 Measurement statistics of construct scales based on reflective indicators

Construct	Items	Mean	SD	Loading	t-value[a]	CR	Alpha	AVE
Top Management Support	TMS1	5.23	1.75	0.937	76.58	0.902	0.836	0.757
	TMS2	4.94	1.78	0.747	133.53			
	TMS3	5.53	1.52	0.913	19.32			
Student Focus	SF1	4.96	1.77	0.866	56.49	0.925	0.892	0.756
	SF2	5.40	1.52	0.872	49.46			
	SF3	4.88	1.59	0.835	39.61			
	SF4	5.10	1.74	0.903	82.19			
Supplier Management	SM1	4.47	1.76	0.662	12.43	0.803	0.633	0.578
	SM2	4.79	1.51	0.823	30.16			
	SM3	4.77	1.78	0.785	25.74			
People Management	PEM1b	5.28	1.70	0.744	26.82	0.948	0.935	0.722
	PEM1c	4.11	1.81	0.756	24.65			
	PEM2	4.32	1.92	0.88	52.83			
	PEM3	4.32	1.85	0.916	98.85			
	PEM4	4.12	1.83	0.912	80.76			
	PEM5	4.27	1.77	0.863	63.07			
	PEM6	3.94	1.87	0.858	54.27			

Construct	Items	Mean	SD	Loading	t-value[a]	CR	Alpha	AVE
Strategic Planning	SP1	5.06	1.75	0.876	64.96	0.965	0.956	0.820
	SP2	4.78	1.77	0.926	101.40			
	SP3	4.45	1.87	0.901	61.92			
	SP4	4.52	1.83	0.899	66.15			
	SP5	4.45	1.71	0.922	98.33			
	SP6	4.27	1.77	0.909	87.42			
Educational Process	EP1	5.14	1.51	0.941	102.74	0.942	0.876	0.890
	EP2	4.66	1.6	0.945	120.78			
Research Process	RP1	4.46	1.72	0.929	85.04	0.930	0.849	0.869
	RP2	4.61	1.7	0.935	112.53			
Administrative process	AP1	4.95	1.69	0.865	47.15	0.891	0.815	0.732
	AP2	4.57	1.77	0.896	64.78			
	AP3	5.10	1.77	0.802	36.86			
Information & Analysis	IA2	5.37	1.65	0.943	97.45	0.938	0.867	0.882
	IA3	4.98	1.76	0.936	82.87			
Continuous Improvement	CI1	4.96	1.66	0.894	72.51	0.909	0.850	0.769
	CI2	4.54	1.70	0.893	64.82			
	CI3	4.81	1.73	0.843	40.47			
Program Design	PD1	4.91	1.69	0.885	62.06	0.934	0.905	0.779
	PD2	4.93	1.69	0.854	39.78			
	PD3	5.32	1.66	0.902	63.68			
	PD4	5.05	1.63	0.889	62.12			
Administrative Innovation	AI1	3.90	1.77	0.868	63.95	0.913	0.858	0.778
	AI2	4.05	1.67	0.878	63.49			
	AI4	4.34	1.64	0.859	53.06			
Process Innovation	PRCI1	3.72	1.75	0.854	45.18	0.905	0.843	0.761
	PRCI2	4.13	1.85	0.900	68.03			
	PRCI3	4.52	1.74	0.862	53.03			
Product Innovation	PRDI1	5.06	1.80	0.873	54.40	0.928	0.883	0.811
	PRDI2	4.52	1.74	0.922	93.02			
	PRDI3	4.88	1.79	0.906	61.17			
Student Results	STR1	4.44	1.61	0.843	28.03	0.918	0.866	0.789
	STR2	4.53	1.49	0.924	90.23			
	STR3	4.57	1.55	0.895	65.57			
People Results	PER1	4.04	1.73	0.873	53.17	0.923	0.888	0.750
	PER2	4.15	1.75	0.770	23.10			
	PER3	4.62	1.58	0.913	90.06			
	PER4	4.51	1.72	0.901	65.44			
Society Results	SOR1	4.78	1.83	0.888	64.92	0.934	0.905	0.779
	SOR2	4.88	1.84	0.909	84.07			
	SOR3	4.89	1.74	0.921	85.06			
	SOR4	4.55	1.9	0.808	35.54			
Institute Results	IR1	5.32	1.54	0.853	45.59	0.904	0.840	0.758
	IR2	4.35	1.60	0.881	60.19			
	IR3	4.36	1.67	0.877	52.29			

[a] t-values were obtained with the bootstrapping procedure (5000 samples) and are significant at the 0.001 level.

* Values of composite reliability and AVE were computed after deleting indicators with low loadings.

5.5.2.2 Discriminant Validity

Discriminant validity is the extent to which a construct is truly distinct from other constructs by empirical standards. Thus, establishing discriminant validity implies that a construct is unique and captures phenomena not represented by other constructs in the model. Discriminant validity was tested based on two criteria; cross-loadings and the criterion of Fornell and Larcker (1981).

Cross loadings: According to these criteria, an indicator's outer loading on the associated construct should be greater than all of its loadings on other constructs (Hair et al., 2013). By testing the loadings and cross-loading, it was shown that two items (IA1 and PEM1a) have higher cross-loadings on other constructs. So, they are eliminated in order to improve the discriminant validity. Table 5.8 shows the cross-loadings of the indicators after eliminating those items with higher cross-loadings.

Table 5. 8 Loadings and cross-loadings for the measurement (outer) model

	AI	CI	IA	IR	PD	PEM	PER	PRCI	PRDI	EP	RP	AP	SF	SM	SOR	SP	STR	TMS
AI1	**0.88**	0.65	0.50	0.61	0.62	0.69	0.64	0.65	0.65	0.58	0.62	0.51	0.57	0.46	0.66	0.66	0.54	0.54
AI2	**0.90**	0.65	0.48	0.60	0.61	0.71	0.65	0.74	0.63	0.55	0.61	0.56	0.60	0.46	0.62	0.64	0.51	0.54
AI4	**0.87**	0.67	0.52	0.58	0.61	0.72	0.63	0.78	0.64	0.57	0.56	0.54	0.61	0.43	0.65	0.65	0.52	0.55
CI1	0.62	**0.89**	0.60	0.63	0.75	0.73	0.65	0.60	0.72	0.63	0.55	0.56	0.72	0.49	0.68	0.68	0.53	0.62
CI2	0.70	**0.89**	0.57	0.66	0.75	0.72	0.68	0.62	0.72	0.69	0.66	0.58	0.68	0.46	0.64	0.69	0.55	0.62
CI3	0.63	**0.84**	0.53	0.59	0.68	0.63	0.58	0.61	0.73	0.56	0.57	0.68	0.63	0.40	0.63	0.60	0.48	0.49
IA2	0.53	0.63	**0.94**	0.57	0.59	0.65	0.54	0.49	0.63	0.54	0.48	0.52	0.61	0.40	0.61	0.64	0.44	0.55
IA3	0.53	0.58	**0.94**	0.52	0.53	0.61	0.53	0.50	0.62	0.48	0.50	0.52	0.57	0.31	0.55	0.61	0.37	0.49
IR1	0.57	0.65	0.62	**0.85**	0.57	0.60	0.63	0.51	0.63	0.55	0.54	0.51	0.58	0.41	0.67	0.61	0.53	0.60
IR2	0.63	0.63	0.45	**0.88**	0.62	0.64	0.78	0.56	0.65	0.58	0.57	0.54	0.61	0.42	0.64	0.63	0.71	0.56
IR3	0.56	0.59	0.45	**0.88**	0.55	0.58	0.66	0.51	0.62	0.52	0.56	0.45	0.53	0.33	0.61	0.54	0.55	0.49
PD1	0.63	0.74	0.48	0.59	**0.89**	0.66	0.68	0.56	0.71	0.75	0.70	0.63	0.75	0.41	0.60	0.62	0.57	0.57
PD2	0.61	0.65	0.48	0.53	**0.85**	0.63	0.64	0.56	0.68	0.64	0.61	0.51	0.68	0.35	0.58	0.63	0.45	0.57
PD3	0.57	0.75	0.58	0.62	**0.90**	0.65	0.61	0.51	0.75	0.67	0.58	0.56	0.71	0.40	0.62	0.63	0.49	0.60
PD4	0.63	0.79	0.57	0.62	**0.89**	0.68	0.66	0.59	0.76	0.69	0.60	0.65	0.74	0.43	0.63	0.65	0.56	0.59
PEM1b	0.50	0.64	0.63	0.55	0.63	**0.74**	0.58	0.49	0.64	0.58	0.50	0.46	0.68	0.40	0.55	0.62	0.47	0.53
PEM1c	0.62	0.56	0.50	0.52	0.45	**0.76**	0.56	0.59	0.52	0.48	0.45	0.40	0.49	0.40	0.48	0.57	0.48	0.48
PEM2	0.69	0.72	0.57	0.60	0.65	**0.88**	0.65	0.64	0.66	0.63	0.57	0.54	0.63	0.47	0.63	0.71	0.54	0.61
PEM3	0.74	0.73	0.61	0.65	0.72	**0.92**	0.72	0.69	0.73	0.66	0.68	0.57	0.72	0.46	0.70	0.78	0.57	0.63
PEM4	0.74	0.71	0.59	0.64	0.68	**0.91**	0.73	0.71	0.70	0.64	0.66	0.55	0.67	0.52	0.67	0.80	0.59	0.69
PEM5	0.73	0.68	0.55	0.59	0.63	**0.86**	0.67	0.63	0.67	0.57	0.61	0.49	0.63	0.46	0.67	0.75	0.54	0.64
PEM6	0.72	0.67	0.53	0.57	0.61	**0.86**	0.67	0.66	0.62	0.55	0.63	0.50	0.60	0.45	0.59	0.71	0.53	0.54
PER1	0.64	0.64	0.49	0.69	0.61	0.68	**0.87**	0.58	0.66	0.58	0.61	0.60	0.62	0.43	0.65	0.64	0.70	0.54
PER2	0.51	0.50	0.30	0.55	0.50	0.52	**0.77**	0.46	0.50	0.47	0.51	0.43	0.50	0.30	0.45	0.45	0.53	0.41
PER3	0.63	0.66	0.54	0.74	0.71	0.70	**0.91**	0.56	0.70	0.69	0.65	0.60	0.67	0.46	0.70	0.68	0.69	0.61

	AI	CI	IA	IR	PD	PEM	PER	PRCI	PRDI	EP	RP	AP	SF	SM	SOR	SP	STR	TMS
PER4	0.72	0.71	0.61	0.75	0.70	0.75	**0.90**	0.65	0.73	0.64	0.63	0.57	0.69	0.47	0.74	0.74	0.64	0.68
PRCI1	0.66	0.52	0.39	0.46	0.46	0.61	0.54	**0.85**	0.54	0.44	0.49	0.40	0.44	0.43	0.48	0.55	0.45	0.44
PRCI2	0.79	0.65	0.45	0.53	0.61	0.71	0.63	**0.90**	0.65	0.54	0.59	0.52	0.60	0.43	0.63	0.65	0.53	0.54
PRCI3	0.69	0.65	0.53	0.59	0.56	0.63	0.55	**0.86**	0.68	0.47	0.50	0.54	0.58	0.38	0.60	0.61	0.40	0.52
PRDI1	0.64	0.71	0.68	0.67	0.68	0.69	0.63	0.64	**0.87**	0.60	0.57	0.56	0.69	0.41	0.69	0.71	0.44	0.59
PRDI2	0.68	0.75	0.56	0.64	0.73	0.70	0.71	0.69	**0.92**	0.62	0.62	0.68	0.69	0.41	0.67	0.69	0.54	0.56
PRDI3	0.64	0.76	0.56	0.66	0.81	0.68	0.70	0.60	**0.91**	0.74	0.63	0.65	0.69	0.40	0.65	0.69	0.59	0.57
EP1	0.55	0.66	0.51	0.59	0.73	0.63	0.63	0.48	0.65	**0.94**	0.65	0.60	0.66	0.41	0.59	0.62	0.56	0.58
EP2	0.66	0.69	0.52	0.61	0.74	0.68	0.68	0.57	0.71	**0.95**	0.75	0.59	0.66	0.48	0.61	0.66	0.59	0.60
RP1	0.61	0.62	0.47	0.58	0.62	0.67	0.64	0.57	0.60	0.66	**0.93**	0.53	0.61	0.44	0.55	0.62	0.51	0.55
RP2	0.64	0.64	0.50	0.61	0.69	0.63	0.66	0.55	0.65	0.72	**0.94**	0.55	0.62	0.42	0.59	0.63	0.52	0.56
AP1	0.41	0.51	0.41	0.43	0.50	0.42	0.49	0.39	0.54	0.47	0.45	**0.87**	0.45	0.32	0.42	0.42	0.41	0.32
AP2	0.52	0.54	0.38	0.46	0.52	0.48	0.53	0.48	0.56	0.50	0.47	**0.90**	0.48	0.40	0.45	0.46	0.45	0.35
AP3	0.61	0.70	0.61	0.58	0.69	0.62	0.62	0.56	0.69	0.63	0.55	**0.80**	0.66	0.44	0.64	0.59	0.48	0.54
SF1	0.58	0.70	0.60	0.61	0.77	0.70	0.66	0.56	0.71	0.61	0.55	0.54	**0.87**	0.41	0.64	0.65	0.53	0.60
SF2	0.53	0.62	0.56	0.51	0.68	0.59	0.58	0.50	0.63	0.59	0.55	0.51	**0.87**	0.42	0.60	0.54	0.48	0.48
SF3	0.62	0.64	0.49	0.59	0.63	0.60	0.59	0.51	0.62	0.59	0.58	0.55	**0.84**	0.41	0.63	0.55	0.54	0.47
SF4	0.61	0.72	0.54	0.59	0.73	0.69	0.66	0.58	0.69	0.63	0.61	0.57	**0.90**	0.45	0.67	0.65	0.54	0.61
SM1	0.37	0.33	0.18	0.22	0.26	0.38	0.27	0.35	0.26	0.25	0.26	0.30	0.26	**0.66**	0.26	0.35	0.27	0.28
SM2	0.37	0.38	0.33	0.32	0.35	0.39	0.35	0.36	0.34	0.38	0.36	0.39	0.39	**0.82**	0.43	0.43	0.35	0.43
SM3	0.42	0.46	0.34	0.46	0.40	0.45	0.46	0.37	0.40	0.42	0.40	0.35	0.44	**0.79**	0.44	0.47	0.38	0.50
SOR1	0.64	0.64	0.53	0.62	0.57	0.65	0.62	0.56	0.61	0.55	0.54	0.47	0.62	0.44	**0.89**	0.68	0.53	0.64
SOR2	0.66	0.67	0.59	0.70	0.63	0.68	0.71	0.58	0.70	0.59	0.57	0.56	0.64	0.48	**0.91**	0.73	0.58	0.66
SOR3	0.64	0.68	0.56	0.65	0.64	0.65	0.68	0.56	0.69	0.58	0.53	0.54	0.68	0.44	**0.92**	0.67	0.54	0.64
SOR4	0.63	0.63	0.49	0.62	0.59	0.58	0.61	0.61	0.64	0.53	0.53	0.54	0.64	0.41	**0.81**	0.60	0.52	0.57
SP1	0.63	0.68	0.58	0.64	0.65	0.73	0.67	0.60	0.69	0.61	0.59	0.50	0.63	0.47	0.70	**0.88**	0.54	0.73
SP2	0.66	0.69	0.64	0.66	0.67	0.76	0.67	0.63	0.72	0.63	0.60	0.53	0.65	0.47	0.70	**0.93**	0.58	0.72
SP3	0.65	0.65	0.59	0.59	0.62	0.76	0.64	0.61	0.67	0.59	0.60	0.50	0.58	0.48	0.65	**0.90**	0.53	0.69
SP4	0.64	0.66	0.61	0.58	0.62	0.75	0.66	0.63	0.69	0.58	0.59	0.54	0.61	0.47	0.69	**0.90**	0.54	0.67
SP5	0.71	0.70	0.61	0.62	0.68	0.77	0.69	0.65	0.72	0.67	0.64	0.53	0.65	0.55	0.71	**0.92**	0.57	0.70
SP6	0.71	0.69	0.59	0.61	0.65	0.78	0.67	0.66	0.70	0.61	0.62	0.55	0.62	0.54	0.67	**0.91**	0.55	0.71
STR1	0.50	0.50	0.33	0.56	0.48	0.51	0.58	0.44	0.45	0.47	0.42	0.39	0.46	0.35	0.48	0.52	**0.84**	0.45
STR2	0.53	0.51	0.36	0.61	0.52	0.58	0.67	0.48	0.51	0.56	0.52	0.46	0.53	0.41	0.54	0.53	**0.92**	0.46
STR3	0.55	0.56	0.45	0.66	0.56	0.58	0.72	0.49	0.57	0.59	0.53	0.55	0.60	0.41	0.60	0.57	**0.90**	0.48
TMS1	0.56	0.59	0.54	0.60	0.59	0.65	0.62	0.52	0.59	0.56	0.56	0.40	0.57	0.48	0.65	0.73	0.51	**0.91**
TMS2	0.60	0.61	0.53	0.59	0.62	0.67	0.62	0.58	0.60	0.59	0.56	0.44	0.60	0.51	0.66	0.75	0.49	**0.94**
TMS3	0.43	0.52	0.36	0.44	0.51	0.48	0.45	0.39	0.46	0.46	0.41	0.41	0.45	0.44	0.53	0.52	0.35	**0.75**

Note: loadings shown in bold represent items loading on their respective constructs.

A. **Fornell-Larcker Criterion**: According to this criterion, a latent construct should share more variance with its assigned indicator than with any other latent constructs. Statistically, the square root of AVE of each latent construct should be higher than the construct's highest correlation with any other latent construct (Fornell and Larcker, 1981). Table 5.9 presents the correlation matrix

of the constructs together with the square root of the AVEs. Because the square root of AVE is greater than the correlation between each of the pair factors, this criterion is satisfied.

The measurement model results indicate that the model has good internal consistency, indicator reliability, convergent validity, and discriminant validity. Hence, the constructs from our model are statistically distinct and can be used to test the structural model.

Table 5. 9 Discriminant validity of constructs

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
1. TMS	**0.87**																	
2. SF	0.63	**0.87**																
3. SM	0.54	0.49	**0.76**															
4. PEM	0.70	0.74	0.53	**0.85**														
5. SP	0.77	0.69	0.55	0.83	**0.91**													
6. CI	0.66	0.77	0.51	0.79	0.75	**0.88**												
7. PD	0.66	0.81	0.45	0.74	0.72	0.83	**0.88**											
8. EP	0.62	0.70	0.47	0.69	0.68	0.71	0.78	**0.94**										
9. RP	0.59	0.66	0.46	0.70	0.67	0.67	0.70	0.74	**0.93**									
10. AP	0.48	0.62	0.45	0.59	0.58	0.69	0.67	0.63	0.58	**0.86**								
11. IA	0.55	0.63	0.38	0.67	0.66	0.64	0.60	0.55	0.52	0.55	**0.94**							
12. AI	0.61	0.67	0.51	0.80	0.74	0.74	0.69	0.64	0.67	0.61	0.56	**0.88**						
13. PRCI	0.58	0.62	0.47	0.75	0.70	0.70	0.63	0.56	0.60	0.56	0.53	0.82	**0.87**					
14. PRDI	0.64	0.76	0.45	0.77	0.77	0.82	0.82	0.72	0.67	0.70	0.67	0.72	0.72	**0.90**				
15. STR	0.52	0.60	0.44	0.63	0.61	0.59	0.59	0.61	0.55	0.53	0.43	0.59	0.53	0.58	**0.89**			
16. PER	0.65	0.72	0.48	0.77	0.74	0.73	0.73	0.69	0.70	0.64	0.57	0.72	0.66	0.76	0.74	**0.87**		
17. SOR	0.71	0.73	0.50	0.73	0.76	0.74	0.69	0.64	0.61	0.60	0.62	0.73	0.65	0.75	0.61	0.74	**0.88**	
18. IR	0.63	0.66	0.45	0.70	0.68	0.72	0.67	0.63	0.64	0.58	0.58	0.67	0.61	0.73	0.69	0.79	0.73	**0.87**

Notes: **TMS*: Top Management Support; *SF*: Student Focus; *SM*: Supplier Management; *PEM*: People Management; *SP*: Strategic Planning; *CI*: Continuous Improvement; *PD*: Program Design; *EP*: Educational Process; *RP*: Research Process; *AP*: Administrative Process; *IA*: Information & Analysis; *AI*: Administrative Innovation; *PRCI*: Process Innovation; *PRDI*: Product Innovation; *STR*: Student Results; *PER*: People Results; *SOR*: Society Results; *IR*: Institute Results.

****** Diagonal elements (values in bold) are the square root of the variance shared between the constructs and their measures (AVE). Off-diagonal elements are the correlations among constructs. For discriminant validity, diagonal elements should be larger than off-diagonal elements.

5.6 Structural Model Assessment (PLS-SEM)

As the measurement model (outer model) assessment was satisfactory, the next step in evaluating the PLS-SEM results is assessing the structural model which covers the relationships among the hypothesized constructs. In contrast to covariance-based approaches, the PLS method does not allow statistical tests to measure the calibrated model's overall goodness, which is mainly due to the assumption of distribution-free variance. Alternatively, non-parametrical tests can be applied to evaluate the structural model's quality (Chin, 2010). The basic assessment criteria for the quality of the structural model includes the coefficient of determination (R^2), the blindfolding-based cross-validated redundancy measure Q^2, and the statistical significance and relevance of the path coefficients (Hair et al., 2019).

Before assessing the structural relationships, the R^2 values for the endogenous constructs should be examined as R^2 measures the variance, which is explained in each of the endogenous constructs and is, therefore, a measure of the model's explanatory power. The R^2 is also referred to as in-sample predictive power (Rigdon, 2012).

Another means to assess the PLS path model's predictive accuracy is by calculating the Q^2 value (Geisser, 1974; Stone, 1974). This metric is based on the blindfolding procedure that removes single points in the data matrix, imputes the removed points with the mean and estimates the model parameters (Hair et al., 2019). As such, the Q^2 is not a measure of out-of-sample prediction, but rather combines aspects of out-of-sample prediction and in-sample explanatory power (Hair et al., 2019).

Having substantiated the model's explanatory power and predictive power, the final step is to assess the statistical significance and relevance of the path coefficient. In this stage, researchers need to run bootstrapping to assess the path coefficients' significance and evaluate their values, which typically fall in the range of -1 and +1 (Hair et al., 2019).

Based on the above discussion, the structural model assessment in this study will be based on analyzing the coefficient of determination (R^2), the predictive relevance (Q^2), and path coefficients in order to test the direct hypothesized relationships. The rules of thumb and the criteria that will be used in assessing the structural model in this study are summarized in table 5.10.

Table 5. 10 Rules of thumb used for structural model evaluation

Criteria	Description (Rule)
R^2 Values	- R^2 values of 0.75, 0.50 and 0.25 are considered respectively as substantial, moderate, and weak. - R^2 values of 0.90 and higher are typical indicative of over fit.
Q^2 Values	- Values larger than zero are meaningful - Values higher than 0, 0.25 and 0.50 depict small, medium and large predictive accuracy of the PLS path mode
Path coefficients	- Use the bootstrapping to assess the significance with a recommended number of samples = 5000.

Source: Hair et al. (2019)

5.6.1 Coefficient of Determination (R^2)

The starting point for judging our structural (inner) model is the determination coefficient (R^2) of our latent endogenous constructs. Following the above rules of thumb, The R^2 value of administrative innovation (0.67) can be considered moderate, whereas the R^2 values of hard QM practices, technical innovation, and organizational performance are substantial (each latent's R^2 is more than 0.75) as shown in table 5.11. In this vein, the model has an appropriate predictive power as the dependent constructs have an average explained variance of 75%. According to Chin (2010), this average value is a practical representation of a substantial level of explanatory power for the entire model.

5.6.2 Predictive Relevance (Q^2)

The next step in assessing the structural model involves the model's capability to predict. The predominant measure of predictive relevance is the Stone–Geisser's Q^2 (Geisser,1974; Stone, 1974), which postulates that the model must be able to adequately predict each endogenous latent construct's indicators. The Q^2 values of the endogenous variables are obtained by using a blindfolding procedure with an omission distance of D=7. As shown in table 5.11, the findings support the predictive relevance of the structural model as all values of the endogenous variables are greater than zero.

Table 5. 11 R^2 and Q^2 Values of the Endogenous constructs

Endogenous Constructs	R^2	Q^2
Hard QM Practices	0.777	0.426
Administrative Innovation	0.666	0.492
Technical Innovation	0.778	0.488
Organizational Performance	0.779	0.439

5.6.3 The Relevance and Significance of Path Coefficients (Direct Hypothesized Relationships)

The individual path coefficients of the PLS structural model can be interpreted as standardized beta coefficients of ordinary least squares regressions. Just as with the indicators' weights and loadings, each path coefficient's significance can be assessed by means of a bootstrapping procedure. Paths that are nonsignificant or show signs contrary to the hypothesized direction do not support a prior hypothesis, whereas significant paths showing the hypothesized direction empirically support the proposed causal relationship (Hair et al., 2011).

Consistent with Roldán and Sánchez-Franco (2012), bootstrapping (5000 resamples) is used to generate standard errors and t-statistics. This allows the statistical significance of the path coefficients to be assessed. The bootstrapping confidence interval of standardized regression coefficients is also given. If a confidence interval for an estimated path coefficient *w* does not include zero, the hypothesis that *w* equals zero is rejected. Specifically, a percentile approach is applied, which has the advantage of being completely distribution-free (Chin, 2010).

According to the results for t-values and the percentile bootstrap of 95% confidence interval, seven of eight hypotheses that represent the direct effects were supported (Table 5.12). This shows that soft QM practices have a significant positive impact on hard practices (H_1), innovation (H_{2a-b}), and organizational performance (H_5). Moreover, the results support the hypotheses that hard QM practices have a significant positive impact on innovation (H_{3a-b}) and performance (H_6). Regarding hypotheses (H_{4a-b}) which investigates the relationship between innovation and performance, the results show that administrative innovation has a significant positive impact on performance (H4a), however, technical innovation was depicted to have no direct impact on performance, suggesting the rejection of H_{4b}.

Table 5. 12 The direct effects on endogenous constructs

Hypothesis & Relation		Direct effect	t-value (bootstrap)	Percentile 95% confidence interval
H1	Soft QM → Hard QM	0.882***	63.027	[0.858; 0.904] sig
H2a	Soft QM → Administrative innovation	0.555***	8.005	[0.440; 0.668] sig
H2b	Soft QM → Technical innovation	0.426***	7.157	[0.329;0.523] sig
H3a	Hard QM → Administrative innovation	0.285***	4.035	[0.169;0.400] sig
H3b	Hard QM → Technical innovation	0.484***	8.084	[0.386;0.582] sig
H4a	Administrative innovation → Performance	0.134**	2.496	[0.050; 0.224] sig
H4b	Technical innovation → Performance	0.091^{ns}	1.319	[-0.024;0.202] ns
H5	Soft QM → Performance	0.420***	7.246	[0.323;0.514] sig
H6	Hard QM→ Performance	0.288***	4.906	[0.193;0.383] sig

Notes: ***p< .001; **p< .01; ns: not significant (based on t(4999), one-tailed test: t(0.05, 4999) = 1.65, t(0.01. 4999) = 2.33, t(0.001, 4999) =3.09.

5.7 Analysis of Mediating and Indirect Effects

According to the research model, hypotheses 7, 8 and 9 represent mediation hypotheses, which posit by how, or by what means, an independent variable (soft QM practices) affects a dependent variable (organizational performance) through mediators (hard QM practices, administrative innovation, and technical innovation). An assessment is made of the total and direct effect of the soft practices construct on the dependent variable (organizational performance) and the indirect effects via the mediators (hard practices, administrative innovation, and technical innovation). Figure 6.2(a) describes the total effect of soft QM on performance. This total effect may be arrived via a variety of direct and indirect forces. Specifically, in Figure 6.2(b), the total effect of soft QM on performance can be expressed as the sum of the direct and indirect effects, the latter being estimated by the product of the path coefficients for each of the paths in the mediation chain.

Mediation testing has been traditionally done using the causal-step approach provided by Baron and Kenny (1986) with the analysis performed using the Sobel's test (Hayes, 2009). However, this approach has been challenged recently by several authors such as Shrout and Bolger (2002), Preacher and Hayes (2008) and Zhao et al.(2010), who call for a reconsideration of Baron and Kenny's (1986) method and suggest applying new procedures as the former approach requires that the direct effects be significant, or else mediation is not considered possible (Zhao et al., 2010). In complex SEMs, this can become critical because different types of mediation can occur in the same model at once. In such a case, it is possible that the direct effect is not significant even if mediation exists and is therefore misleading as a precondition for mediation analysis. Furthermore,

Sobel's test uses a parametric approach that provides biased results when used for comparing the indirect path. Thus, Preacher and Hayes (2008) theorize for testing the significance of indirect effects as the basis for determining mediation. To account for the non-parametric nature of coefficients, they recommend using the bootstrapping approach.

The indirect effects-based approach of Preacher and Hayes (2008) has been recommended by Nitzl et al., (2016) in the context of PLS-SEM. Hence, the analytical approach developed by Preacher and Hayes (2008) was applied to test the mediation hypotheses in this study. The advantage of this approach is that it can isolate the indirect effect of mediating variables. In addition, this approach allows the analysis of indirect effects passing through several mediators which is appropriate in our study as the model involves multiple mediators including hard QM, administrative innovation, and technical innovation.

According to Preacher and Hayes (2008), multiple mediation analysis should involve two parts: (1) investigating the total indirect effect or determining whether the mediators transmits the effect of X to Y, and (2) testing hypotheses regarding individual mediators in the context of a multiple mediator model. Amongst the four approaches for assessing total and specific indirect effects in multiple mediator models; causal step approach, product-of-coefficients approach, distribution of product strategy and bootstrapping; Preacher and Hayes (2008) suggest bootstrapping as the preferred method because it does not require symmetry of normality of the sampling distribution of the indirect effect. Consequently, and as mentioned above, the bootstrapping method was applied to test the significance of indirect effects because it provides the most powerful and reasonable method of obtaining confidence limits for specific indirect effects (Preacher and Hayes, 2008). A 95% percentile confidence interval is also computed for mediators. If the interval for a mediation hypothesis does not contain zero, it means that the indirect effect is significantly different from zero, with 95% confidence.

As depicted in figure 6.1(a) and table 5.13, soft QM practices have a significant total effect on organizational performance (β=0.86; t-value=59.13). When mediators are introduced (Figure 6.2b), the soft QM practices reduce their direct effect on organizational performance with a lower significance value (β=0.42; t-value=7.556). Moreover, the total indirect effect of soft QM practices on organizational performance is significant (β = 0.44; 95% CI [0.33,0.56]). These results indicate that hard QM practices and innovation partially mediate the influence of soft practices on

performance. Indeed, as previously mentioned H5 is supported. The specific indirect effect of soft practices on performance through hard practices (β=0.254,95% CI [0.16,0.36]) and administrative innovation (β=0.74, 95% CI [0.013,0.135]) are significant. These results show that hard practices and administrative innovation partially mediates the relationship between soft practices and performance which provides support to hypotheses (H7) and (H8a), respectively. However, the results didn't provide support for the mediating effect of technical innovation which leads to the rejection of (H8b), as the 95% confidence interval for the specific indirect effect contains zero (β=0.039, 95% CI [-0.0205, 0981])

Finally, for the joint mediating effect of hard practices and innovation. The results show that the specific indirect effect of soft practices on organizational performance through both hard QM practices and administrative innovation is significant (β=0.035, 95% CI [0.0013, 0.0677]). This result confirms that hard QM practices and administrative innovation sequentially mediate the relationship between soft practices and organizational performance providing support for H9a. However, the results didn't provide support for the indirect effect of hard and technical innovation on the soft and organizational performance relationship, as the 95% CI contains zero (β=0.039, 95% CI [-0.0201, 0.0979]) Therefore, H9b is rejected. These two results provide partial support for the main hypothesis (H9), meaning that the relationship between soft QM practices and organizational performance is mediated sequentially by hard QM practices and innovation. Table 5.14 summarizes the results of all hypothesis testing.

Table 5. 13 Results of mediation analysis (Hypotheses 7, 8, 9)

Total effect of: Soft QM → Perf.		Direct effect of: Soft QM.→Perf.		Indirect effects of soft QM on Performance.			
					Point estimate	Percentile bootstrap 95% confidence interval	
Coefficient	t-value	Coefficient	t-value			Lower	Upper
0.86***	59.131	0.42***	7.246	**Total Indirect effect**	0.440	0.3322	0.5478
				H7: via hard practices	0.254	0.1517	0.3569
				H8a: via AI	0.074	0.0134	0.1354
				H8b: via technical	0.039	-0.0205	0.0981
				H9a: via (Hard+AI)	0.035	0.0013	0.0677
				H9b: via (Hard + technical)	0.039	-0.0201	0.0979

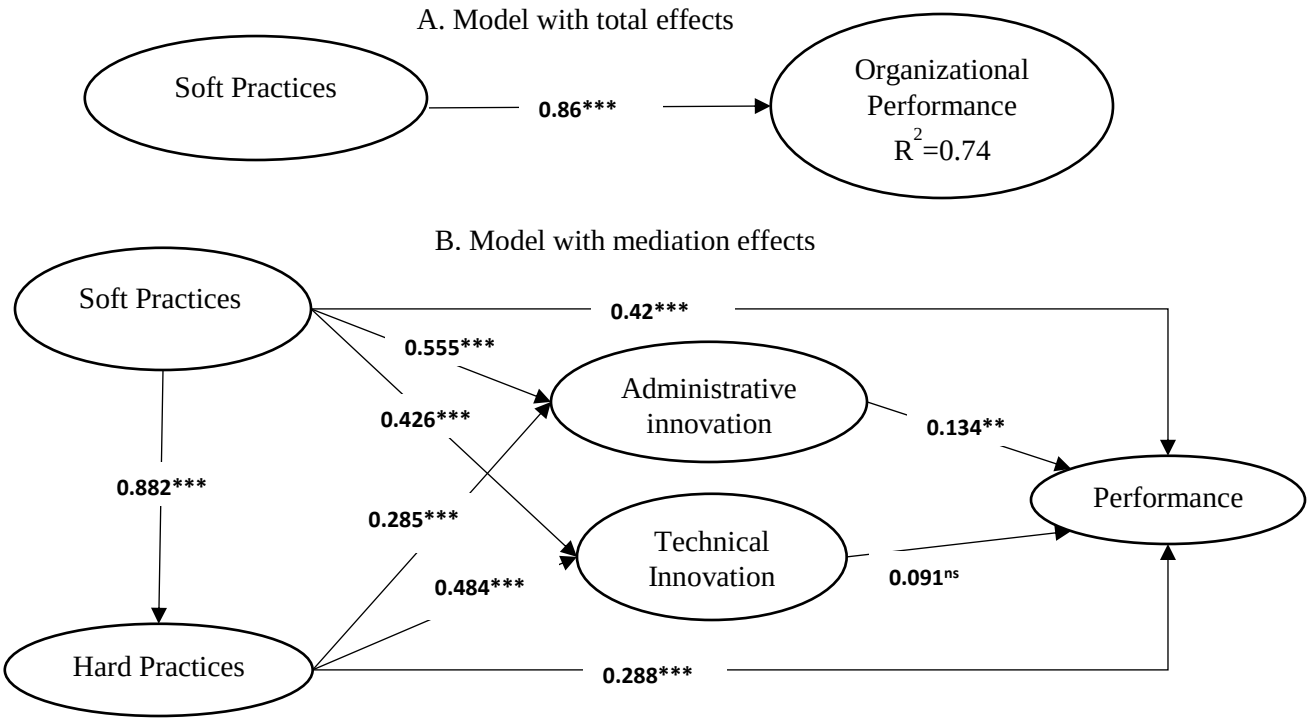

Figure 5. 2 The results of the structural model

***P<0.001; **P<0.01; ns: not significant

Table 5. 14 Summary of the results of hypothesis testing

Hypothesis Statement	Results
H1: Soft Quality Practices are positively associated with hard quality practices	**Fully Supported**
H2: Soft quality practices have a positive impact on innovation	**Fully Supported**
H2a: Soft quality practices have a positive impact on administrative innovation	**Supported**
H2b: Soft quality practices have a positive impact on technical innovation	**Supported**
H3: Hard quality practices have a positive impact on innovation	**Fully Supported**
H3a: Soft quality practices are positively associated with administrative innovation	**supported**
H3b: Soft quality practices are positively associated with administrative innovation	**supported**
H4: Innovation has a positive impact on organizational performance.	**Partially Supported**
H4a: Administrative innovation has a positive impact on organizational performance.	**Supported**
H4b: Technical innovation has a positive impact on organizational performance	**Rejected**
H5: Soft quality practices have a positive impact on organizational performance	**Fully Supported**
H6: Hard quality practices have a positive impact on organizational performance.	**Fully Supported**
H7: The relationship between soft QM practices and organizational performance is mediated by hard QM practices.	**Fully supported**
H8: The relationship between soft QM practices and performance is mediated by innovation	**Partially Supported**
H8a: The relationship between soft QM practices and organizational performance is mediated by administrative innovation	**Supported**
H8b: The relationship between soft QM practices and organizational performance is mediated by technical innovation	**Rejected**
H9: The relationship between soft QM practices and organizational performance is mediated sequentially by Hard QM practices and innovation.	**Partially Supported**
H9a: The relationship between soft QM practices and organizational performance is mediated sequentially by Hard QM practices and administrative innovation.	**Supported**
H9b: The relationship between soft QM practices and organizational performance is mediated sequentially by Hard QM practices and technical innovation.	**Rejected**

Chapter 6 Discussion, Implications, and Conclusion

Chapter Outline

6.1 Discussion of findings; **6.1.1** Soft QM and Hard QM; **6.1.2** Quality management practices and innovation; **6.1.3** Quality management practices and organizational performance; **6.1.4** Innovation and organizational performance; **6.1.5** The mediating effect of hard QM and innovation on soft QM-organizational performance relationships; **6.2** Theoretical implications; **6.3** Practical / Managerial implications; **6.4** limitations and future research; **6.5** Conclusion.

Introduction

After analyzing and presenting the statistical results in the previous chapter, this chapter aims to discuss the study results and hypotheses considering the relevant literature. Additionally, the implications and conclusions drawn from this study are presented. The first section of this chapter will discuss the results and link them with the related hypotheses and literature. Then, the theoretical implications will be discussed with putting more focus on the research gaps identified earlier and how the current results contribute to filling these gaps. The subsequent section will discuss the managerial implications in order to provide guidelines that could help policymakers and directors in higher education in implementing quality management in a systematic way which in turn could improve innovation and organizational performance. The chapter ends with conclusion and also with presenting the study limitations in order to give directions to the future research.

6.1 Discussion of Findings

6.1.1 Soft QM and Hard QM

The results of the study indicate that soft quality practices are positively related to hard quality practices. This result is in line with the findings of several authors (Kaynack,2003; Rahman and Bullock, 2005; Zu et al., 2009; Wu, 2015), although they are conducted in other fields than education. In education, Calvo-Mora et al. (2005; 2006) used the EFQM model and reached a similar result by confirming that certain social factors (such as leadership and people management) have a direct influence on process management which is considered hard QM practice. It also confirms the study developed by Ali et al. (2010) who found that the soft practices of quality management are critical elements for the proper implementation of quality management at universities.

The findings also substantiate the STS theory which suggests that organizations must effectively implement soft and hard practices in order to realize the maximum benefit from quality management practices. According to this theory, the social subsystem (soft QM) and the technical subsystem (hard QM) are interdependent on each other (Ho et al., 2001). How well the social and technical subsystems are designed with respect to one another and with respect to the demands of the external environment greatly determines organizational effectiveness (Pasmore, 1988). Thus, to be effective, both subsystems must integrate and be jointly optimized (Ho et al., 2001).

6.1.2 Quality Management Practices and Innovation

The results of the study confirmed that soft quality practices have a significant impact on innovation types providing support to hypotheses ($H2_{a-b}$). The result is consistent with the studies that confirmed the positive relationship between soft QM and innovation (Martinez and Martinez, 2008; Perdomo et al., 2009; Kim et al., 2010). These finidngs assert that soft QM could nurture a fertile environment and supportive culture for innovation by enabling the efficient detection of customer needs, promoting knowledge sharing among the staff members and suppliers, as well as enhancing employees' capabilities, commitment, and participation, which in turn could lead to continuous improvement of work activities and functions as well as effective translation ideas into new services and products that customers value (Silva et al., 2014; Escrig-Tena et al., 2018).

Regarding hard QM, the results also showed that hard quality practices are positively related to innovation types providing support to hypotheses ($H3_{a-b}$). While this result contradicts with some studies that contend only soft QM can foster innovation (e.g., Prajogo and Sohal, 2003; Feng et al., 2006), it is consistent with other stream of studies (Hoang et al., 2006; Kim et al., 2012; Zeng et al., 2015, Song and Su, 2015; Esrig- Tena et al., 2018, Khan and Naem, 2018) which also adopt a multidimensional view of QM in studying innovation and found that both soft and hard QM significantly impact innovation. This result suggests that hard QM practices could improve innovation as quality tools and techniques could help to introduce order and create routine based organizations, and the established routine will encourage workforce to pay attention to and understand vital processes and to search for new and innovative ideas (Silva et al., 2014; Zeng et al., 2015; Escrig-Tena et al., 2018).

In addition to the above results, and regarding the controversy of the relationship between TQM and innovation, this study supports the results of the findings of the 'school of thought' which adheres to a positive relation between TQM and innovation (Hung et al., 2010; Prajogo and Sohal, 2008; Honarpour, 2018). The results show inconsistency with the findings of the other stream of studies that didn't find a significant and positive relationship between QM and innovation (e.g Singh and Smith, 2004).

In the higher education field, studies conducted on the relationship between quality management and innovation are few. However, the outcome of this study confirms the findings of the available and related studies conducted in HE (Antunes et al., 2018; Aminbeidokhli et al., 2016; Liao et al., 2010). For instance, Antunes et al. (2018) contended that TQM practices are a powerful tool for enhancing innovation in HEIs which will lead to providing better services, not only for internal customers but for the society as a whole. Similarly, Aminbeidokhtiet al. (2016), found that top management support play an influential role in the fulfillment of the organizational innovation through providing the conditions of professional cooperation between faculty members, designing instructional courses based on the learning of the up-to-date topics, having proper cooperation between university and other governmental and non-governmental organizations, providing new instructional facilities, changing the organizational structure of the university, amending the professors' selection methods and accepting the suggestions and criticisms in the universities. They also found that people management positively can promote

innovation as knowledge transfer and share between staff members could provide an opportunity for the staff members to learn and participate and also motivate them to apply the new knowledge for innovation. In addition, Liao et al. (2010) suggest that HEIs should realize the relationship between QM and innovation which will help them to adjust their courses to meet the needs of various customers and markets in contrast to the traditional closed systems.

6.1.3 Quality Management Practices and Organizational Performance

The results of this study confirm the positive direct effect of soft and hard quality practices on organizational performance supporting hypotheses (H5-6). These findings are consistent with the previous studies that adopted the multidimensional approach of QM and confirm the positive impact of both soft and hard quality practices on performance (Flynn et al., 1995; Rahman and Bullock,2005; Kaynack, 2003). These findings assert that both soft and hard QM are important in improving performance because they have different roles as soft practices help to create an organizational culture and climate that improve organizational performance, while hard practices provide the tools and techniques that help in improving the different processes and activities of the organization which consequently could improve the overall performance. It is also interesting to note that the impact of soft QM is slightly more than the impact of hard QM on organizational performance. This can be associated with the findings of (Reed et al., 2000; Khan and Naeem, 2018) that unlike hard quality practices which can be easily deployed in an organization, soft quality practices include tastiness and intricacy which are not easy to imitate and help organizations to achieve improved performance.

In addition to the direct influence of soft quality elements on organizational performance, the results showed that soft QM elements indirectly influence organizational performance through hard QM practices providing support to hypothesis 7. These findings are consistent with several studies that modeled the relationships between quality management and organizational performance from soft to hard then to organizational performance (e.g., Ho et al., 2001; Kaynack, 2003; Zeng et al., 2015). For instance, Ho et al. (2001) argued that each TQM practice contribute to quality improvement in a different way and focusing on either soft or hard QM can’t ensure TQM success. If the contribution of soft practices to quality performance is to be realized, the importance of hard practices should not be undermined because these practices are expected to

bring out the effect of soft practices. In the higher education field, and using EFQM model, Calvo-Mora et al. (2005) support our findings by concluding that not only process management has a direct impact on organizational results but also it can have an indirect impact through leadership, people management and suppliers which are social (or infrastructure) elements of QM.

6.1.4 Innovation and Organizational Performance

Generally, the current study found that innovation is positively related to organizational performance, which is in line with the findings of several studies in different fields such as (Calantone et al., 2002; Gunday et al., 2011; Kafetzopoulos and Psomas, 2015; Khan and Naeem, 2018). Innovation is seen in the literature as one of the most important drivers of other aspects of organizational performance thanks to the formation of an organizational learning climate and/or orientation with continuous efforts for improvements, renewals, exploration, and learning from failures and adaptation to rapidly changing competitive environment. Ruiz-Jiménez and Fuentes-Fuentes (2013) consider innovation as a critical enabler for the superior OP and sustained competitive advantage in rapidly changing and complex business environment. According to Sadikoglu and Zehir (2010), innovativeness can facilitate organizations to enhance their managerial capabilities that result in efficient and prompt response to environmental changes leading to increased OP. Likewise, Alipour and Karimi (2011) argue that innovative organizations are in a better position to fulfill the changing demands of their customers that result in higher business efficiency.

In higher education, this finding is in line with several contributions (Jaskyte, 2004; Chen and Chen, 2012; Iqbal et al., 2018) indicating that innovation can enable universities to improve their educational performance. For instance, Chen and Chen (2012) argued that innovation can enable universities to achieve competitive advantage and increase their chance of being alive in the future. Similarly, Iqbal et al. (2018) found that innovation is significantly instrumental to the performance of research universities as it can lead to increased research productivity, student satisfaction, curriculum development and responsiveness to the environmental challenges.

Despite the existence of a positive relationship between administrative innovation and organizational performance, the study didn't find support for the technical innovation-organizational performance relationship which leads to rejecting (H4b). This result is compatible

with (Lin and Chen, 2007; Gunday, 2011) who found that only administrative innovation plays a key role in improving the organization's performance. Despite the weak links that found, Lin and Chen (2007) associated innovation with performance and they argued that administrative innovations rather than technical innovation appeared to be the most vital factor for organizational performance. This result support the idea that the improvement in organizational performance requires the involvement of everyone inside the organization, continuous improvement, leadership, cooperation and teamwork all of which are inherent in the administrative innovation as the focus on technical innovation and advanced technologies alone will not guarantee improvement in performance (Lin and Chen, 2007; Abdallah et al., 2016).

6.1.5 The Mediating Effect of Hard QM and Innovation on Soft QM-Organizational Performance Relationship

The results reveal that hard QM practices partially mediate the relationship between soft QM and organizational performance. This result is consistent with many empirical studies (Flynn, 1995; Kaynack, 2003, Ho et al., 2001) that modeled the relationship between QM practices and organizational performance on the sequence from soft QM to hard QM then to organizational performance indicating that successful implementation of hard QM, in turn, is achieved through well-established soft QM.

In reference to the mediating impact of innovation between the relationship of hard quality practices and organizational performance, the findings of the study provide sufficient evidence to establish that innovation positively mediates the said relationships. This suggests that innovation enhances the direct impact of soft/hard quality practices on organizational performance. These findings can be substantiated by the findings of (Autunes,2017; Khan and Neam, 2018) in which they concluded that the impact of QM practices on organizational performance is mediated by innovation.

In general, the results support the sequential mediating effect of hard practices and innovation in the relationship between soft quality practices and organizational performance. When we considered the model with the total effect (as shown in Figure 6.2a), our results indicate that the greater the level of soft QM practices, the higher the organizational performance; however, the importance of the direct effect (Figure 6.2a) of the soft QM dimension decreases considerably when we analyze the full model (Figure 6.2b). Nevertheless, the percentage of explained variance

of organizational performance increases (ΔR^2=4%) after introducing Hard QM practices and innovation into the model.

The previous result is in line with the findings of (Zeng et al., 2015;2017; Khan and Naem, 2018; Escrig-Tena et al., 2018). According to Esrcig-Tena et al. (2018), soft QM provides the way to create the environment necessary for the other QM practices to influence innovation and organizational performance as it gives the staff the opportunity to channel their initiatives into creating and developing new ideas. Practices related to empowerment or teamwork will enable the staff to use other QM tools necessary to develop new ideas. Khan and Neam (2018) reach a similar conclusion by finding that hard QM mediates the relationship between soft QM and innovation and between soft QM and organizational performance indicating that the adoption and implementation of hard QM enhance the direct impact of soft QM on innovation and organizational performance, respectively. Zeng et al. (2015) established that when supported by the soft QM, hard QM can have a positive impact on innovation not only directly but also indirectly through an accumulative effect derived from soft QM. Similarly, Rahman and Bullock (2005) concluded that soft QM has an indirect effect on organizational performance through its direct impact on hard QM.

This result provides support for the notion that quality must be attained first as a sequential precedent to other organizational outcomes (such as innovation and organizational performance in the current study) (Ferdows and De Meyer, 1990) as the improvement in quality would lead to the achievement of other competitive priorities in a cumulative manner. They also argued that quality and innovation are not a matter of tradeoffs, but they coexist in a cumulative model with quality as a foundation.

6.2 Theoretical Implications

The current study has several theoretical implications, which can provide and advance several contributions to the literature.

First, this research contributes to the debate in the literature regarding QM-Innovation-performance relationships by providing information about the different impacts of soft and hard QM practices on innovation and organizational performance, applying it to a new setting (HE sector), which allow for more generalizability to the findings proved previously in the manufacturing sector. The multidimensional view of QM is proven to be important and useful in higher education as there are different paths going through either soft or hard practices respectively leading to different influences on innovation types and performance.

Second, although recent studies have looked at the different effects of soft and hard on innovation, they concentrated more on studying technical innovation with focusing more on product and process innovation causing a limited understanding to the contribution of QM to other innovation types such as administrative innovation. Unlike previous studies undertaken in higher education that focus only on one innovation type such as product innovation (e.g., Du Plessis, 2007) or process innovation (Iqbal et al., 2018), this study focuses on examining administrative innovation as well as technical innovation. By breaking down innovation into administrative and technical and demonstrating different paths leading to each type, this study could provide more detailed information for the higher education institutions which could help them to efficiently allocate their resources according to a particular innovation type.

Third, the most significant contribution of this study related to the sequential mediating effect of hard QM and innovation on the relationship between soft QM and organizational performance. This support previous studies (Autunes,2017; Khan and Naem, 2017) that asserted that QM and innovation are key factors to success and improving performance in organizations. This means that performance improvement will emerge if HEIs effectively foster innovation through the holistic and systematic implementation of QM by utilizing the interdependencies between soft and hard QM elements. Hence the results contribute significantly to the literature on innovation support for the relationship between QM and performance providing a better understanding of these relationships in the educational environment.

6.3 Managerial Implications

Based on the results of the current study, some suggestions are made for academics and policymakers in HEIs.

The empirical findings generally indicate that soft QM practices have a significant impact on hard quality practices, administrative innovation, technical innovation, and organizational performance. This means that directors should give importance to different soft QM practices related to staff commitment and training, share quality vision among staff, focus on students' and stakeholders' needs, and encourage mutual supplier relationships in order to have an effective QM implementation, better innovation, and improved organizational performance.

The high significant impact of soft quality practices on hard quality practices highlights the interdependency of QM practices and the importance of a systematic approach for managing them. Therefore, and for the proper implementation of any quality improvement initiative, directors must first set the foundations for quality by focusing on soft practices, mainly, top management support, strategic planning, people management, student focus, and supplier management. First, for successfully implementing any quality improvement initiative, it is necessary to have the leadership and support of the senior management in HEIs. They should create and disseminate the values of this management philosophy, set goals and objectives that are consistent with these values, and create an appropriate organizational system to achieve them. This definite management commitment must go hand in hand with a well-defined strategic planning process, implemented and communicated at all levels of the institution. The absence of this prevents measurement of the effectiveness and efficiency of universities or any of their subsystems. Moreover, strategic plans must be based on the needs and expectations of the stakeholders and supported by the mission, vision, and values established by the institution. People management is also a basic pillar for successfully implementing the soft elements of quality management. Improvement is a process of organizational learning, which is largely based on people. Therefore, the participation of the entire staff in improvement activities of the institution should be encouraged, and the efforts should be rewarded and recognized. Moreover, HEIs, as with any other institutions, must try to optimize the scarce resources they have (e.g., monetary, information, or technological) and execute adequate control and management of suppliers of specific inputs that represent a significant budgetary cost. In this way, the appropriate management of these soft quality practices will have a positive impact

on the development of hard quality practices and will indirectly affect innovation and organizational performance.

Having implemented and improved the soft components of quality management, directors should turn their focus to the hard quality practices, mainly, information and analysis, process management, program design, and continuous improvement. HEIs should establish an effective system for gathering and managing information related to both the academic (such as teaching and learning, research, student satisfaction, etc.) and non-academic aspects of quality (such as administration, facilities, technology used, etc.) in order to guide these institutions in the design and development of academic programs as well as in determining the areas that should be improved in general. In addition to establishing an effective information system, HEIs should focus on continuous improvement in their hard processes, namely teaching/learning. This will enable HEIs to be aware of the changing customer needs and react immediately to their needs as well as making improvements in a systematic and continuous way.

This study also revealed that soft and hard quality practices have a positive impact on innovation types meaning that the directors should focus on exploiting the synergies between them in order to foster innovation. They should be aware of the different roles that soft and hard practices can have on innovation. Soft QM should be developed as a way to create the necessary infrastructure allowing the staff to take the initiative to handle new ideas, which in turn will help in creating the atmosphere for implementing other more technical practices such as process management and information and analysis, which will help to generate new ideas for administrative and technical innovations. It is also important to note that since the direct impact of soft QM practices on administrative innovation is stronger than hard QM practices, directors should focus more on the social aspects of QM (e.g people management, strategic planning) when introducing administrative innovation such as new recruitment systems or new organizational structure. On the other hand, directors should focus more on the technical or hard aspects of QM when introducing technical innovations (such as new courses, research projects, or new technology) as hard QM practices have a stronger impact on technical innovation than soft ones.

The impact of administrative innovation on organizational performance supports the emphasis of various scholars that innovation requires system-wide involvement of all departments as well as hard, focused, and purposeful work. System-wide dedication through administrative

innovation will play a key role in reaping the ultimate benefits of innovation. Therefore, directors should put more emphasis on the social or administrative aspects of innovation such as structural changes, introducing new recruitment systems, developing new teamwork.

In general, it is important to note that innovation and improved organizational performance can be achieved by the implementation of a framework which is based on QM practices and has its foundation on soft elements of quality (such as quality philosophy, shared vision, and commitment). Therefore, directors should focus on both quality practices and innovation as per the sequence of relationships in the proposed model to ascertain organizational framework, is in line with the modern view (Zeng et al., 2015; Khan and Naeem, 2018), suggesting that both quality and innovation can coexist side by side in a joint improvement model.

6.4 Limitations and Future Research

Despite significant contributions to the body of knowledge on determining the direct and indirect relationships between quality management practices, innovation and organizational performance in HEIs, limitations of this study should be recognized that could provide researchers with some opportunities for future research.

First, the sample of this study was limited to six universities located in Naples and therefore the results can't be generalized to wider context across cultures of other countries or other industries. Therefore, future studies should adopt a broader perspective by surveying faculty form other cities and countries.

In addition, data was collected from the teaching staff as a key respondent for the assumption that those respondents have sufficient knowledge to answer the questions. Future studies can study the proposed model among other stakeholders (such as employees and students) and compare the results.

This study was limited to focusing on QM as antecedent and enabler to innovation. However, other scholars support the opposite argument that innovation can have an impact on quality management. Future studies could examine this argument in higher education. Moreover, Future studies can examine the impact of other factors on the proposed model. For instance, they can examine the potential effect of contingency factors (such as environmental uncertainty,

organizational culture, and organization's strategy) as moderators which could generate more interesting results complementing ours.

Another limitation is the use of cross-sectional data made at one particular point in time. Although the research focused on examining the association between QM, innovation, and organizational performance, it would be valuable to conduct a longitudinal study. This attempt would verify the findings of the research and improve understanding of the relationship between QM, innovation and organizational performance.

Finally, using a straightforward survey analysis, we focused more on investigating the association between variables without providing clear answers to questions such as how and why QM practices result in organizational outcomes such as innovation and performance. Future studies could focus on answering these questions by using case studies as they could offer an in-depth insight on how QM-driven institutions create and support innovation as well as organizational performance.

6.5 Conclusion

This study aimed to examine the direct and indirect relationship between quality management practices, innovation and organizational performance. The study developed a model consisting of three main constructs: QM (Soft and Hard QM), Innovation (administrative and technical innovation), and organizational performance. QM within academic environments is considered to be a building block of efficient performance and it plays a key role in enhancing innovation in universities. Data was collected from 356 academic staff from different public universities in Naples (Italy).

The proposed model and hypotheses were examined using the structural equation modelling. Employing the PLS-SEM, the study found that soft QM practices are associated directly with hard QM. It was also found that soft QM practices have direct and indirect impact on innovation types and organizational performance. Moreover, the analysis showed that both hard QM and administrative innovation has a sequential mediating effect on Infrastructure-Organizational Performance relationships.

Based on a multidimensional view of QM, this study has provided empirical evidence to resolve some of the key controversies that appear in the literature concerning QM-Innovation-

Performance relationships. The findings support the notion that QM provides a foundation to achieve a competitive position in innovation and performance and suggest the importance of continued efforts with QM practices. Innovation can be achieved through quality in a cumulative fashion supporting the modern view which states that both quality and innovation can be achieved simultaneously.

By looking at QM from two dimensions (Soft and Hard), this study further contributes to the understanding of the different roles played by different QM in determining innovation and organizational performance. It highlights the significance of systematic approach through emphasis on the implementation of hard QM to provide the learning base to innovation and organizational performance, while Soft QM practices play a supporting role behind to enable this effect to work.

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Appendices

Appendix (A) Questionnaire (Italian Version)

La gestione della qualità nei dipartimenti universitari

Salve,

Il presente questionario è parte delle indagini che sto portando avanti nella mia tesi di Dottorato in Management presso il Dipartimento di Economia, Management, Istituzioni dell'Università degli Studi di Napoli Federico II.

In particolare il questionario indaga la relazione fra Attività di Gestione della Qualità, Innovazione e Performance nei Dipartimenti delle Università Italiane.

Per ognuno di questi ambiti sono state sviluppate alcune domande traendo spunto dalla letteratura accademica sulla Gestione della Qualità, con specifico riferimento ai contributi che indagano queste tematiche nella formazione universitaria.

Le ricordo che tutte le analisi relative a questo questionario sono anonime.

Se vuole avere più informazioni La prego di contattarmi e sarò lieto di fornirle più informazioni sul mio progetto di ricerca.

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Section 1: Respondent Background

1. **Qual è il suo dipartimento di afferenza? …….**

2. **E' il Direttore del Dipartimento, il vice direttore o uno dei membri della Giunta?**
   A. Si ( )
   B. No ( )

3. **Qual è la sua posizione accademica?**
   A. Professore Ordinario ( )
   B. Professore Associato ( )
   C. Ricercatore a tempo determinate ( )
   D. Ricercatore a tempo indeterminato ( )

4. **Nel suo dipartimento, ha un ruolo attivo nello svolgimento delle attivitá relative alla gestione della qualitá?**
   A. Si ( )
   B. No ( )

Section 2 Quality Management Practices

Quanto è d'accordo con le seguenti affermazioni sulle pratiche di gestione della qualità nel suo dipartimento?

(1 = completamente in disaccordo; 7 = completamente d'accordo)

No.	Statement	Scale						
		1	2	3	4	5	6	7
Top Management Support								
1	Ritengo che il Direttore del Dipartimento partecipi attivamente al processo di gestione della qualità e che lo supporti attivamente							
2	Ritengo che il Direttore del Dipartimento incoraggi gli studenti e il personale TA a partecipare attivamente alle attività di gestione della qualità							
3	Il Direttore del Dipartimento delega alcuni professori, o parte del personale TA, per la gestione della qualità							
Strategic Planning								
4	Le politiche e le strategie del Dipartimento sono pienamente congrue alla sua missione, alla sua visione strategica e ai suoi valori							
5	Le politiche e le strategie del Dipartimento sono chiaramente formulate e ben documentate							
6	Nel Dipartimento vi è un processo formalizzato per revisionare e aggiornare le politiche e le strategie							
7	Le politiche e le strategie del Dipartimento sono diffuse a Professori, Ricercatori, e personale TA							
8	Lo sviluppo delle nuove politiche e delle strategie tiene conto dei bisogni e delle attese dei diversi stakeholder							
9	Gli obiettivi da raggiungere sono specificati in indicatori chiari e misurabili							
Supplier Management								
10	Il Dipartimento non deve gestire un numero eccessivo di fornitori							
11	Il Dipartimento ha rapporti duraturi con i suoi fornitori							
12	Ritengo che, oltre al criterio del "minor costo", i fattori legati alla qualità (tempo di fornitura, qualità dei prodotti e servizi) siano utilizzati per i processi di valutazione e di selezione dei fornitori del Dipartimento.							
People Management								
13	La performance accademica di Professori e Ricercatori viene valutata regolarmente							
14	La performance didattica di Professori e Ricercatori viene valutata regolarmente							
15	La performance del Personale TA viene valutata regolarmente							
16	Professori, Ricercatori e Personale TA partecipano a riunioni volte a migliorare la qualità dei servizi							
17	Professori, Ricercatori e Personale TA, in geneale, si sentono motivati ad intraprendere iniziative per migliorare la performance complessiva del Dipartimento							
18	Nel Dipartimento vi sono delle procedure condivise per la diffusione delle "buone pratiche" e delle relative esperienze							

No.	Statement	Scale						
		1	2	3	4	5	6	7
19	Nel Dipartimento vi sono task-force interfunzionali e le loro attività sono pienamente supportate							
20	Professori, Ricercatori e Personale TA ricevono la formazione specialistica necessaria a svolgere correttamente le loro funzioni							
Information and Analysis								
21	I dati sulla qualità sono utilizzati dal personale docente, ricercatore e TA, nel portare avanti le loro attività							
22	Gli indicatori di performance del Dipartimento nel suo complesso (come il numero complessivo di pubblicazioni scientifiche, la valutazione dei corsi) viene registrata ed analizzata periodicamente							
23	Nel Dipartimento la performance viene comparata con quella di altri Dipartimenti similari (talvolta anche di altri atenei)							
Student Focus								
24	Le opinioni degli studenti e i loro suggerimenti per migliorare la qualità dei servizi erogati sono ascoltati attentamente							
25	Il personale, sia Docente che TA, è in stretto contatto con gli student							
26	Gli studenti possono accedere a molteplici attività extra-curriculari							
27	Il personale del Dipartimento incoraggia attivamente gli studenti nel manifestare le loro problematiche ed a fare proposte per migliorare i servizi erogati							
Process Management								
28	La definizione dei programmi degli insegnamenti tiene conto delle attese e dei bisogni formativi degli student							
29	La definizione dei programmi degli insegnamenti tiene conto dei bisogni delle imprese, della comunità e della società in generale							
30	L'attività di ricerca tiene conto delle attese e dei bisogni formativi degli studenti							
31	L'attività di ricerca tiene conto dei bisogni delle imprese, della comunità e della società in generale							
32	Il Dipartimento ha infrastrutture moderne (laboratori, biblioteche, computer, accesso ad internet, schermi di proiezione) per permettere una formazione efficace							
33	Le strutture del Dipartimento (aule, laboratori …) sono in buono stato grazie ad interventi di manutenzione regolari							
34	Il Dipartimento raccoglie ed analizza dati (come il tempo di immatricolazione, il numero di studenti iscritti, il placement) in modo da migliorare i processi							
Program design								
35	Le richieste degli studenti sono attentamente considerati nella definizione dei Corsi di Studio							
36	I suggerimenti dei Professori con più esperienza sono attentamente considerati nella definizione dei Corsi di Studio							
37	I Corsi di Studio sono soggetti ad un processo di valutazione per migliorare l'offerta didattica							

No.	Statement	Scale						
		1	2	3	4	5	6	7
38	La definizione dei Corsi di Studio tiene conto sia delle infrastrutture (laboratori, macchinari) che delle risorse, sia finanziarie che umane, a disposizione del dipartimento							
Continuous Improvement								
39	Nel Dipartimento si conoscono le aree, e le procedure, che devono essere migliorate							
40	L'istituzione tiene traccia delle richieste delle imprese e cerca di essere proattiva nei loro confronti (Revisione dei corsi, e dei programmi in modo da rispondere ai trend più recenti)							
41	Nel Dipartimento si cerca di mantenere la dotazione della biblioteca e/o le strutture dei laboratori aggiornate con gli ultimi ritrovati della scienza e della tecnica							

Part 2 Innovation

Quanto è d'accordo con le seguenti affermazioni sull'innovazione nel suo Dipartimento?

(1 = completamente in disaccordo ; 7 = completamente d'accordo)

No.	Statement	Scale						
		1	2	3	4	5	6	7
Administrative Innovation								
1	Nel Dipartimento sono state implementate strutture organizzative innovative (ed es. i project team, o i gruppi inter-dipartimentali)							
2	Il personale TA del Dipartimento può scegliere le modalità con cui portare avanti le loro attività, nei limiti derivanti dalle procedure decise dall'Ateneo							
3	Il personale TA si adegua lentamente alle nuove procedure decise dall'ateneo							
4	Si cerca di incoraggiare il personale TA a lavorare insieme (cooperando in gruppi di lavoro o condividendo le best-practice) quando necessario per essere più efficaci nel gestire I nuovi processi amministrativi							
Process Innovation								
5	Il Dipartimento sta attivando nuovi corsi di formazione per il personale tecnico-amministrativo							
6	Il Dipartimento incoraggia il lavoro di gruppo e la creazione di relazioni amicali fra il personale TA							
7	Il Dipartimento sta cercando di utilizzare nuovi strumenti (p.e. computer) per aiutare le attività del perosnale TA							
Product Innovation								
8	Si cerca continuamente di valorizzare pienamente le attività di ricerca del Dipartimento, e la partecipazione in progetti di ricerca, nazionali e internazionali							
9	Nel Dipartimento i materiali di supporto alla didattica sono aggiornati frequentemente per tener conto delle nuove metodologie didattiche.							
10	I Corsi di Studio ed i programmi di supporto per gli studenti sono aggiornati frequentemente							

Part 3 Organizational Performace

Quanto è d'accordo con le seguenti affermazioni sulla performance del suo dipartimento?

(1 = completamente in disaccordo; 7 = completamente d'accordo)

No.	Statement	Scale						
		1	2	3	4	5	6	7
Student Results								
1	Vi è stata una significativa riduzione del tasso di abbandono degli studenti negli ultimi tre anni							
2	Vi è stato un significativo aumento nel tasso di laureati negli ultimi tre anni							
3	Le statistiche di placement dei laureati sono migliorate negli ultimi tre anni							
People Results								
4	Penso che la soddisfazione del personale (Docenti, Ricercatori e personale TA) sia aumentata negli ultimi tre anni							
5	Mi sembra che il numero di studenti per ogni docente sia diventato più facilmente gestibile negli ultimi tre anni							
6	Mi sembra che la performance relativa alla docenza del personale docente e ricercatore sia significativamente migliorata negli ultimi tre anni							
7	Il personale docente ricercatore e tecnico amministrativo ha partecipato più attivamente alle attività del Dipartimento nell'ultimo triennio							
Institue Results								
8	Il numero di articoli scientifici pubblicati dal personale Docente e Ricercatore, o dai Dottorandi del Dipartimento è aumentato significativamente negli ultimi tre anni							
9	Negli ultimi tre anni il numero di studenti meritevoli iscritti nei nostri Corsi di Studio è aumentato significativamente							
10	Il numero di progetti di ricerca finanziati da istituzioni pubbliche nell'arco degli ultimi tre anni è aumentato significativamente							
Society Results								
11	Il Dipartimento partecipa attivamente in diversi eventi sociali							
12	Mi sembra che, nel corso degli ultimi tre anni, la reputazione e l'immagine del Dipartimento nella società sia significativamente migliorata							
13	Mi sembra che vi sia stato un significativo aumento al supporto di attività culturali (terza missione) da parte del Dipartimento negli ultimi tre anni							
14	Il Dipartimento è attivamente coinvolto in attività per la tutela e la preservazione dell'ambiente (come riciclaggio dei rifiuti, raccolta differenziata)							

Appendix (B) Questionnaire (English Version)

Quality management in university departments

Dear Participant,

This questionnaire is part of the investigations that I am carrying out in my PhD thesis in Management at the Department of Economics, Management, Institutions at the University of Naples Federico II.

In particular, the questionnaire investigates the relationship between Quality Management Pctivities, Innovation and Organizational Performance in the Departments of Italian Universities In Naples.

For each of these topics, the questions were developed from the academic academic literature on Quality Management, with specific reference to the contributions that investigate these issues in Higher Education.

I remind you that all analyzes relating to this questionnaire are anonymous.

If you want more information, please contact me and I will be happy to provide you with more information about my research project.

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Section 1: Respondent Background

1. **What is your department? …….**

2. **Are you the Department director, Vice director, or Council member?**

   A. Yes ( )

   B. No ( )

3. **What is you academic rank/profession?**

   A. Full Professor ( )

   B. Associate Professor ( )

   C. Fixed-Time Researcher ( )

   D. Permanent Researcher ( )

4. **In your department, do you have an active role related to quality management activities?**

   A. Yes ( )

   B. No ( )

Section 2 Quality Management Practices

To What extent do you agree with the following statements that can reflect the level of quality management practices in your department or Institute/University?)

(1 = Strongly Disagree; 7 = Strongly Agree)

No.	Statement	Scale						
		1	2	3	4	5	6	7
Top Management Support								
1	Directors (Head of Department) actively participate in quality improvements efforts and support the improvement process.							
2	Directors encourage students' and staff involvement in the improvement actions.							
3	Directors empower faculty members and staff to manage and solve quality problems.							
Strategic Planning								
4	The departments' policies and strategies are in line with its mission, vision, and values.							
5	The departments' policies and strategies are clearly formulated and documented							
6	There is a formal process of reviewing and updating policies and strategies							
7	Policies and strategies are communicated at all levels of the department.							
8	The formulation and revision of policies and strategies include the needs and expectations various stakeholders.							
9	Goals are set out in writing and in a clear and quantifiable manner.							
Supplier Management								
10	The suppliers of the institution are not many.							
11	The institution has close and long-lasting relationships with the suppliers.							
12	I think that beyond the lower price criteria other factors of the quality as time, quality of products and services are used in evaluating and selecting suppliers.							
People Management								
13	The academic performance of faculty members (professors and researchers) is appraised regularly.							
14	The pedagogical performance of faculty members is appraised regularly.							
15	The performance of employees is appraised regularly.							
16	Teaching staff and employees participate in meetings, the agenda of which is related to quality improvement planning							
17	Teaching staff and employees feel that they are motivated to improve their performance							
18	There are suitable channels for sharing and communicating, "better practices", knowledge, and experience.							
19	Our department has cross-functional teams and supports teamwork							
20	Special training for job-related skills is provided to faculty members and staff							

No.	Statement	Scale						
		1	2	3	4	5	6	7
Information and Analysis								
21	Quality data are taken into consideration by the teaching staff and employees during their daily tasks							
22	Quality data (e.g. errors, nonconformities) and the performance indexes of the institution are recorded and analyzed							
23	Our department benchmarks the academic and administrative processes with other departments.							
Student Focus								
24	Students' opinions and suggestions for quality improvement are determined and analyzed carefully.							
25	The teaching staff are in close contact with the students and have close relationships with them							
26	We provide a variety of extracurricular activities for students.							
27	Students are encouraged to submit complaints and proposals for quality improvement							
Process Management								
28	The teaching activity envisages the students' needs and expectations							
29	The teaching activity envisages the needs and expectations of the companies, community or the society in general							
30	The research activity envisages the students' needs and expectations							
31	The research activity envisages the needs and expectations of the companies, community or the society as a whole							
32	Our institution has modern facilities (e.g. laboratories, library, computers, internet, video players) to enhance the effectiveness of education							
33	Facilities (e.g. classrooms, laboratories, computers, heating systems and air conditioners) are maintained in good condition according to periodic maintenance plans.							
34	Our department collects statistical data (e.g. error rates on student records, course attendances, employee turnover rates) and evaluates them to control and improve the processes							
Program design								
35	Students' requirements are thoroughly considered in the design of curriculum							
36	The experienced academicians' suggestions are thoroughly considered in the design of curriculum.							
37	Curriculum and academic programs are evaluated and updated every year.							
38	University facilities (e.g. laboratories and hardware) and resources (e.g. Finance and human resources) are considered in the development and improvement of the curriculum and programs.							
Continuous Improvement								
39	The areas in the department and the procedures that need improvement are determined							
40	The institution keeps track of the changes/demands of industry and proactively responds accordingly (e.g. revision of courses and syllabus to address the emerging and recent trends and technology).							

No.	Statement	Scale						
		1	2	3	4	5	6	7
41	Efforts are being taken by the department to update the library, laboratory facilities and courses following the recent updates/advances in science and technology.							

Part 2 Innovation

To what extent do you agree with the following statements that can assess developing and implementing innovation in your department or institute/University?

(1 = Strongly Disagree ; 7 = Strongly Agree)

No.	Statement	Scale						
		1	2	3	4	5	6	7
Administrative Innovation								
1	Our department implemented new or improved existing structures such as project team or departmental structures, within or in-between existing structures							
2	Our department staff members can try new ways of doing things while still respecting the university`s procedures							
3	When the university changes the administrative procedures, our staff is slow to adapt							
4	We encourage the staff to work together (cooperation in teams or best practices sharing) when needed to be more effective in handling new administrative issues.							
Process Innovation								
5	Our institution is developing new training programs for staff members							
6	Our institution encourages teamwork and relationships between staff members							
7	Our institution is trying to bring in new equipment (i.e. computers) to facilitate educational operations and work procedures							
Product Innovation								
8	Our institution constantly emphasizes development and doing research project							
9	Our institution often develops teaching materials and methodologies							
10	Our institution often develops new programs/services for members of staff and students							

Part 3 Organizational Performance

To what extent do you agree with the following statements related to the performance inside your department?

(1 = Strongly Disagree; 7 = Strongly Agree)

No.	Statement	Scale						
		1	2	3	4	5	6	7
Student Results								
1	There is a significant decrease in student dropout rate over the past three years							
2	There is an improvement in graduation rate over the past three years.							
3	I feel that there is a significant increase in number of high merit students opting to our institute							
People Results								
4	I feel that faculty and staff members satisfaction has increased over the past three years.							
5	I feel that the number of students for each teacher in the last three years has become easier to manage							
6	I feel that the scientific performance of the teaching and research staff has significantly improved over the last three years.							
7	I feel that the performance of teaching and teaching staff has significantly improved over the last three years							
Institue Results								
8	Number of research papers published by PhD students and faculty have increased over the past three years.							
9	I think that more and more high ranked students are have enrolled in programs in the last three years.							
10	The number of research projects obtained from public institutions has increased over the past three years							
Society Results								
11	There is an active involvement of the department in social events.							
12	I feel that the department's reputation and image has increased in the civil society, over the past three years.							
13	I feel that there is a significant increase in support of cultural or support activities.							
14	The department is actively involved in the protection and preservation of the environment (rational processing of solid and liquid waste, recycling etc.)							