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The influence of soft and hard quality management practices on quality improvement and performance in UAE higher education

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A B S T R A C T

The present research examines the debated relationship between quality management and innovation using a multidimensional quality management perspective. The quality performance that is supposed to result from the adoption of quality management is investigated further as a possible mediator between quality management and innovation in the higher education sector. The data needed to test the hypotheses was gathered by sending a survey via the internet to the faculty members at universities in the United Arab Emirates. Applying the approach of structural equation modelling with partial least squares, the hypothesised associations between 175 respondents are evaluated. According to the findings, implementing rigorous quality management has a direct as well as indirect impact on innovation performance via its impact on quality performance. The impacts of soft quality management on hard quality management have indirect consequences on innovation performance. The association between rigorous quality management and innovation performance is moderated in part by quality performance. This study provides one of the initial studies to apply the multidimensional method of quality management in higher education and has the potential to assist directors in better comprehending the interdependencies between soft and hard quality practices.

1. Introduction

Higher education institutions are confronted with a number of obstacles stemming from global rivalry, fast technological advancements in education, and mounting cost management and funding pressures (Iqbal et al., 2018; Nasution & Absah, 2022). These organizations must satisfy the demands of their stakeholders while enhancing their efficiency, compelling them to embrace numerous tactics (quality management, knowledge management, and innovation) that have proven useful in other industries, such as the deployment of Quality Management Practices (QMP) (Laurett & Mendes, 2019). Innovation is additionally essential to institutions since it may facilitate the revision of programs, the improvement of the universities' problem-solving skills, and the enhancement of applied studies (Sciarelli et al., 2020). A number of studies have examined the connections between QMP, organizational performance, and innovation in industries such as manufacturing (Sahoo, 2019; Mbatha & Garad, 2022); nevertheless, little research has examined these connections in service organizations (Tar & Dick, 2016; Al-Husseini & Elbeltagi, 2016), and still lesser amounts have examined these factors in higher education (Zeng et al., 2015). A real-world management problem surfaced: Does QMP support or stifle innovation? Nevertheless, since there are diverse viewpoints on how QMP and innovation are related, the literature on this topic is unable to offer a definitive response to this topic (Prajogo & Sohal, 2003; Hussaina et al., 2023). Additionally, there have only been a few efforts to investigate this association empirically. A number of researchers utilise a comprehensive method to examine QMP as one component driving innovation (Abrunhosa & SáP, 2008; Sadikoglu & Zehir, 2010), and they experimentally discover a favorable association

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between them. Certain investigations examine this topic in further detail by examining the multidimensional features of QMP, although their focus is often limited to a particular area, such as Australia or Singapore. According to Costa and Lorente (2008), further research is required to determine which QMP characteristics have the greatest impact on innovation and if one or more of them may act as impediments. Scholars (e.g., Sadikoglu & Zehir, 2010; Zeng et al., 2017) have emphasized the significance of researching QMP as a multidimensional phenomenon, showing that its impact adoption depends on a balanced combination of hard and soft QMP components, since both variables are necessary for successful QMP adoption. Depending on the previous discussion, this research involves a multidimensional perspective on quality in order to comprehend the effect of hard and soft QMP on innovation and quality performance in higher education and to determine whether or not they might pursue both QMP and innovation concurrently. This research reveals numerous contributions. Firstly, it aids comprehension of the dichotomous perspective of QMP and its influence on quality and innovation performance. Consequently, we present a combined model of quality and innovation practices for predicting QMP quality performance. Lastly, the emphasis on higher education will aid management in selecting the appropriate QMP to apply in accordance with their objectives. The contradictory claims relate to the connection between innovation performance and quality performance. Unanswered is the basic issue of whether organizations can thrive in both forms of performance or must choose between them. Rarely has empirical research studied the influence of quality performance as a mediator between QMP and innovation performance. To examine the direct and indirect relationship between quality and innovation, the relationship between quality performance and innovation performance is investigated. The main goal of this study is to find out how hard and soft QMP, as well as quality and innovation performance, are related to each other.

The structure of the article is as follows: In the following part, we give an overview of the literature on QMP and their link with quality and innovation performance. In the next section, we build our study framework and the associated hypotheses. Following the description of the study method involves data analysis. This section concludes with a discussion of the key results, implications, limitations, and recommendations for further study.

2. Theoretical background

2.1 Quality management practices

Many research investigations identify QMP as a management strategy that, when implemented properly, can facilitate constant performance enhancement. QMP concepts have been successfully utilized in the manufacturing industry for a number of decades; nevertheless, using them in service businesses and, especially, in institutions of higher learning is a new concept defined by new circumstances that came to recognize higher education as profitable organizations (Antunes et al., 2018; Kalogiannidis, 2021). The majority of QMP scales designed for higher education have evolved from constructs originally designed to examine these subjects in industry and other service sectors. QMP is pertinent to higher education because, according to some academics, the types of activities conducted in the manufacturing sector are almost similar to those conducted in the education sector (Kulenović et al., 2021). Furthermore, a number of scholars have suggested that the initial stage in successfully employing QMP in higher education is to embrace a total QMP framework that aligns with its objectives and missions (Liao et al., 2010; Psomas & Antony, 2017; Alzoubi et al, 2033). According to Venkatraman (2007), this framework needs to be built on a set of basic ideas and procedures that can be used to connect and combine the most important performance standards that are part of the quality framework. Consequently, a number of researchers have investigated the quality practices that comprise the QMP construct in higher education (Psomas & Antony, 2017), resulting in the development of a vast array of QMP factors due to the different methods, frameworks, and perspectives employed by the researchers. To determine the prevalent practices in higher education, we conducted a comprehensive review of a number of research studies conducted specifically in higher education. Table 1 presents some of the most influential empirical research investigations in the QMP literature that have been carried out in higher education, with a focus on the most frequently researched practices.

2.2 hard and Soft quality practices

Hard and Soft QMP have been designated as the two major components of total QMP by researchers (Ahire & Ravichandran, 2001; Aminbeidokhti et al. 2016; Zeng et al., 2017). Soft practices focus on the behavioral characteristics of QMP relating to individuals, the social dimension, and the organizational culture, whereas hard practices concentrate on the technical elements utilizing scientific approaches and statistical instruments. This categorization is implemented by Manz and Stewart's (1997) socio-technical systems theory, which views organizations as composed of two interdependent subsystems: social and technical. Sociotechnical systems are supportive of the identification of soft QMP as those affecting the hard and social subsystem QMP as those affecting the technical subsystem, as well as the notion that optimizing both of them is more advantageous than concentrating on a single one. In accordance with prior research that categorizes and differentiates hard and soft QMP, we have separated the QMP into hard and soft practices, as demonstrated in Table 1. As stated by a number of researchers (e.g., Aminbeidokhti et al. 2016; Psomas & Antony 2017; Hussaina et al. 2023), the most important processes in higher education are support services and administrative, research, and teaching. Consequently, we categorized procedures into those groups that represent the different procedures employed in the field of higher education.

Table 1
Hard and Soft QMP in this research

Variable	Supporting references in HE field
Soft QM practices	
Top management support: Directors' commitment to QM philosophy over the extended haul	Venkatraman (2007); Mehta et al., (2014); Psomas and Antony (2017); Hussaina et al., (2023)
Strategic planning is the formulation and revision of the organization's vision, mission, policies, and objectives, taking into account the requirements and expectations of various stakeholders	Burli et al.,2012; Hussaina et al., (2023); Kalogiannidis, (2021)
Education and training: Managers have another responsibility, which is to guarantee that personnel in the organization are regularly improved and get an appropriate amount of education and training on prescriptions	Calvo-Mora et al. (2005); Venkatraman (2007); Mehta et al. (2014); Psomas and Antony (2017
Management of people: acknowledge employee performance on quality measures; promote collaboration in teams; make training available; include employees in quality decision making	Venkatraman (2007); Burli et al. (2012); Psomas and Antony (2017)
The management of suppliers involves maintaining tight relationships and working together with them	Venkatraman (2007); Aminbeidokhti et al. (2016); Psomas and Antony (2017)
Student focus: identifying the requirements and expectations of students and then meeting them	Venkatraman (2007); Mehta et al., (2014); Psomas and Antony (2017)
Hard QM practices	
Management of process: the educational, administrative, and scholarly processes are involved	Venkatraman (2007); Mehta et al., (2014); Psomas and Antony (2017); Hussaina et al., (2023)
Analysis and information: obtaining current data on quality concerns to be utilized by directors and personnel in the enhancement of quality	Venkatraman (2007); Mehta et al., (2014); Psomas and Antony (2017); Hussaina et al., (2023)
Continuous improvement is the periodic measuring, assessment, and enhancement of managerial and educational procedures and resources	Sadeh and Garkaz (2015); Aminbeidokhti et al. (2016); Psomas and Antony (2017); Hussaina et al., (2023)
Program design: frequent assessment and modification of academic programs in light of the requirements of stakeholders and technological advancements	Sadeh and Garkaz (2015); Aminbeidokhti et al. (2016); Psomas and Antony (2017); Hussaina et al., (2023)

2.3 QM–innovation relationship

Disputes exist regarding the link between QMP and innovation (Imai, 1986). A particular category of arguments asserts that the QMP's guiding philosophy and principles are incompatible with innovation. QMP promotes an ongoing enhancement philosophy that seeks to improve or streamline a procedure. Continuous development emphasizes incremental change and necessitates formalization or standardization to achieve stability and control (Prajogo & Sohal, 2003; Babu & Thomas, 2021). This could result in rigidity and stifle innovation since it would force individuals to concentrate on the specifics of the existing quality assurance procedure rather than on developing novel approaches to altering the existing work system. The fundamental goal of a process QMP is to eliminate waste while simultaneously increasing efficiency (Morgan, 1993; Akanmu & Mohamad, 2021). Sadikoglu and Zehir (2010) argue that increasing efficiency might be harmful to innovation since it decreases the availability of resources that are required for cultivating it. Slater and Narver (1998) and Bennett and Cooper (1981) have both voiced their disagreement with the notion that focusing on the user in and of itself generates innovative ideas. These writers argue that focusing on users might make organizations "narrow-minded" towards the items and services they already provide instead of making revolutionary advancements to investigate users' unmet requirements. On the other hand, the cumulative model, often known as the "sandcone" model, contends that businesses are able to enhance various aspects of performance concurrently because the enhancements reinforce each other in a cumulative manner (Ferdows and De Meyer, 1990). This model was developed by Ferdows and De Meyer. Scholars that include Noble (1995) and Corbett and Van Wassenhove (1993) have argued that the success of innovation depends upon the cumulative impact of enhancements on various kinds of industry performance, such as quality performance. They have defined innovation performance as the ultimate apex of the pyramid in the sand cone model. This misunderstanding has to be cleared up as soon as possible since increasing quality performance is the primary motivation for businesses to employ QMP. Additionally, recognizing the link between innovation performance and quality performance could enable us to investigate the rarely considered mediating impact of quality performance on the connections between innovation performance and QMP, which is facilitated by comprehending the connection between quality performance and innovation performance. Sadikoglu and Zehir (2010) emphasize that only a few empirical investigations have examined the different impacts of one category of performance on the correlation between QMP and a different kind of performance in higher education. In the present study, we investigate the link between quality performance and innovation performance to shed light on the ambiguous nature of the QMP and innovation relationship in higher education.

3. Literature Review and Hypotheses Development

3.1 Soft and hard quality management practices

Prior research (Babu & Thomas, 2021; Mbatha & Garad, 2022; Hussaina et al., 2023) found that soft QMP supports the adoption of hard QMP. They argued that a good soft QMP system could encourage both collaboration and independence, making it more likely that QMP methods and tools will be used successfully. Regardless of the absence of empirical research examining explicitly soft-hard QMP links in higher education, there are a few studies that support the study's hypothesis.

Specifically, Calvo-Mora et al. (2005) discovered that managers, strategies, and policies (soft QMP) have a direct effect on process management (hard QMP). Nasution and Absah (2022) investigated the effect of HR-QMP variables or soft variables on effective QMP adoption and found that teamwork, customer focus, and leadership are crucial variables in adopting an effective QMP and achieving outstanding performance in higher education. Consequently, an additional hypothesis is proposed:

H_1: Soft QMP has a positive impact on hard QMP.

3.2 Quality management practices and quality performance

Numerous studies indicate a correlation between QMP and performance in higher education (Psomas and Antony, 2017; Sciarelli et al., 2020; Kulenović, Folta, & Veselinović, 2021). For example, Akanmu & Mohamad (2021) and Sayeda et al. (2010) discovered that the QMP factors have an important effect on all metrics of performance in higher education that have a significant bearing on the effectiveness of institutions. Al-Husseini & Elbeltagi (2016) discovered that QMP is strongly linked to performance outcomes, suggesting that higher education institutions could develop a robust QMP framework that will assist them in achieving success in business, applying for competitive quality awards, and reaping significant advantages. An additional hypothesis is therefore suggested:

H_2: Soft QMP has a positive effect on quality performance.
H_3: Hard QMP has a positive effect on quality performance.

3.3 Quality management practices and innovation performance

Several researchers have demonstrated that a rigorous QMP can foster innovation (Forza & Filippini, 1998; Kaynak, 2003; Kim et al., 2012). Babu and Thomas (2021) believe that by adopting QMP instruments, an organization may recognize regions with innovation potential, develop innovation strategies, and create innovative items and procedures. Successful process management motivates businesses to develop protocols based on a collection of best practices that might be employed to create an education platform and encourage innovative activities (Sahoo, 2019; Nasution & Absah, 2022). The efficient utilization of high-quality data allows for the identification of non-value-added procedures and assists people with modifying and enhancing procedures (Kaynak, 2003; Zeng et al., 2017). Flynn's (1994) discussion about how important it is to get immediate and useful feedback from the organizational process if you want to get new products on the market faster In a similar vein, Miller (1995) discovered that managing quality information is the most crucial QMP that is able to be implemented in innovation activities. The beneficial impact is supported by empirical evidence presented by Prajogo and Sohal (2004). They assume that managers and staff management are associated with increased product innovation. Al-Husseini & Elbeltagi (2016) and Sciarelli et al. (2020) also emphasize the significance of soft QMP in fostering collaboration, encouraging creative ideas from people, and fostering an environment conducive to communication in order to achieve rapid success in higher education. This gives rise to the subsequent hypotheses:

H_4: Hard QMP has a positive effect on innovation performance.
H_5: Soft QMP has a positive effect on innovation performance.

3.4 Quality performance and innovation performance

According to the theory of cumulative capabilities, talents build upon one another and mutually support and strengthen one another (Schmenner & Swink, 1998). Numerous academics have put up efforts to create a sequential framework for cumulative capacities, and they have been successful in doing so (Schmenner and Swink, 1998; Boyer and Lewis, 2002). One of the things that these sequential frameworks have in common is the concept that quality serves as the basis for the building of cumulative capabilities. The growth of additional strategic thrusts is contingent upon having quality performance as a prerequisite. According to Flynn (1994), organizations that employ product innovation as a competitive weapon are unlikely to achieve their potential market performance if the quality of their products is low. In addition to this, quality performance is a reflection of the accumulated attempts organizations have made in previous years to enhance quality. Even though organizations may experience increased innovation performance as a consequence of introducing QMP as a quick solution, in order to further enhance innovation performance, it will be necessary to keep adopting QMP until extraordinary outcomes (superior quality performance) are reached. Al-Husseini & Elbeltagi (2016) and Sciarelli et al. (2020) provide empirical evidence to support the hypothesis that there is a robust correlation between quality performance and innovation performance in higher education, specifically with regard to new production TQM innovation as well as process innovation. Therefore, we postulate that:

H_6: Quality performance has a positive effect on innovation performance.

Fig. 1 depicts a model that incorporates all of the hypothesized correlations between the variables.

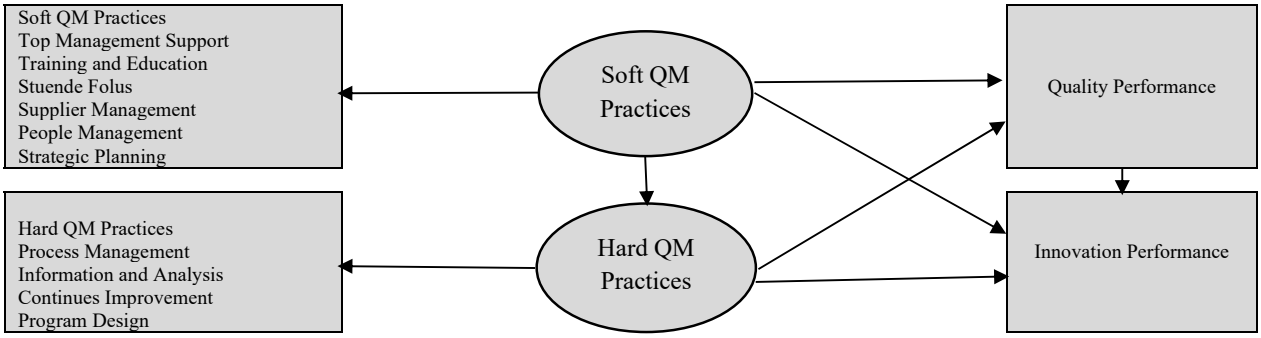

Fig. 1. The research model

4. Research Methodology

4.1 Population and Sample

Using measures that had been used in the relevant literature before, a questionnaire was made to collect data. The population under study comprises all faculty members (professors and lecturers) employed by public universities in the United Arab Emirates. The questionnaire was distributed via an online survey platform between December 2022 and February 2023, yielding a total of 175 usable responses. The data set contains 126 absent values that make up less than 2% of the overall amount of values. The study conducted the MCAR test and found that these values were missing entirely at random (Little and Rubin, 2002), indicating that we do not have a concealed systematic pattern. Among the numerous imputation methods, we chose substitution with the variable mean (Hair, 2017). The sample's characteristics are listed in Table 2.

Table 2
Demographic Profile

Personal background	Category	Frequency	Percentage
Gender	Male	143	81.71
	Female	32	18.28
Age	25–35	27	15.42
	36–46	83	47.42
	47 or Above	65	37.14
Academic position	Professor	17	9.71
	Associate professor	39	22.28
	Assistant professor	89	50.85
	Senior lecturer	16	9.14
	Lecturer	14	8
Experience	Less than 2 years	13	7.42
	2-5 years	28	16
	6 to 10 years	91	52
	11 years or above	43	24.57

4.2 Instrument Development and Measures

All of the factors have been assessed employing a Likert scale with five points. The QMP were evaluated employing 39 variables that were previously established for higher education (Sadeh & Garkaz, 2015; Al-Husseini & Elbeltagi, 2016; Psomas & Antony, 2017; Sciarelli et al., 2020), and the QMP were separated into two higher-order concepts, soft QMP and hard QMP, as shown in Table 1.

Table 3
Research constructs and Items source

Variable	No. of items	Cronbach's alpha (α)	Construct reliability
Soft quality management practices			
Top Management Support	3	0.884	0.776
Training and education	4	0.891	0.874
Student Focus	4	0.911	0.765
Supplier Management	3	0.793	0.885
People Management	6	0.852	0.914
Strategic Planning	5	0.887	0.915
Hard quality management practices			
Process Management	4	0.761	0.854
Information and Analysis	3	0.901	0.935
Continuous Improvement	3	0.877	0.943
Program Design	4	0.896	0.896
Performance			
Innovation performance	7	0.941	0.912
Quality performance	7	0.932	0.921

Additionally, prior research on organizational innovation demonstrates that there are differences in evaluating innovation performance in organizations. The typologies developed from previous research on higher education and received the most interest, each focusing on a pair of administrative and technical categories of innovation. Based on prior studies in higher education, innovation performance was evaluated utilizing seven elements (Kaynak, 2003; Zeng et al., 2017). Based on prior studies in higher education (Psomas and Antony, 2017; Babu & Thomas, 2021), the quality of performance was assessed utilizing seven variables. The validity of the scales was debated with a panel of experts (faculty and staff engaged in quality management activities in their department) to evaluate the clarity of the queries and their applicability to the environment of universities in the United Arab Emirates. In addition, Cronbach's alpha and composite reliability (CR) for all constructs were greater than 0.70 (Hair, 2017), supporting the internal consistency of all constructs (Table 3).

4.3 Measurement model

The validity of parallel and discriminant indicators (Hair, 2017) is used to judge the measurement framework for indicators of reflection in PLS. In addition, the average variance extracted (AVE) values for every single construct were greater than 0.50, confirming convergent validity (Hair et al., 1998) (Table 4). The discriminant validity was evaluated using two criteria: Firstly, the outer loading of an indicator must be greater than its cross loadings on other constructs (Hair et al., 1998). Secondly, the square root of the AVE for every factor must exceed its relationship with any additional factors (Fornell & Larcker, 1981). In accordance with this criterion, discriminant validity is verified, as demonstrated in Table 5.

Table 4
Validity Analysis

Constructs	Items	Factor loadings	Average variance extracted
Top Management Support	Top1	0.735	0.768
	Top1	0.722	
	Top1	0.745	
Training and education	T&E1	0.752	0.854
	T&E2	0.787	
	T&E3	0.773	
	T&E4	0.768	
Student Focus	Stud1	0.825	0.795
	Stud2	0.817	
	Stud3	0.814	
	Stud4	0.833	
Supplier Management	Lier1	0.784	0.788
	Lier2	0.786	
	Lier 3	0.789	
People Management	Peo1	0.855	0.753
	Peo2	0.809	
	Peo3	0.805	
	Peo4	0.824	
	Peo5	0.835	
	Peo6	0.846	
Strategic Planning	Stra1	0.742	0.795
	Stra2	0.711	
	Stra3	0.790	
	Stra4	0.753	
	Stra5	0.814	
Process Management	Pro1	0.815	.881
	Pro2	0.789	
	Pro3	0.808	
	Pro4	0.831	
Information and Analysis	Inf1	0.877	0.818
	Inf2	0.876	
	Inf3	0.869	
Continuous Improvement	Con1	0.869	0.719
	Con2	0.858	
	Con3	0.845	
Program Design	Prog1	0.761	0.810
	Prog2	0.768	
	Prog3	0.774	
	Prog4	0.741	
Innovation performance	Inno1	0.745	0.751
	Inno2	0.719	
	Inno3	0.725	
	Inno4	0.734	
	Inno5	0.745	
	Inno6	0.756	
	Inno7	0.770	
Quality performance	Qual1	0.838	0.859
	Qual2	0.862	
	Qual3	0.812	
	Qual4	0.842	
	Qual5	0.755	
	Qual6	0.710	
	Qual7	0.799	

Table 5
Discriminant validity of constructs

	Top	T&E	Stud	Lier	Peo	Stra	Pro	Inf	Con	Prog	Inno	Qual
Top	0.626											
T&E	0.837	0.745										
Stud	0.789	0.674	0.725									
Lier	0.711	0.535	0.857	0.852								
Peo	0.818	0.832	0.647	0.862	0.774							
Stra	0.655	0.740	0.742	0.755	0.724	0.778						
Pro	0.742	0.657	0.745	0.718	0.857	0.743	0.720					
Inf	0.665	0.678	0.757	0.755	0.878	0.733	0.734	0.855				
Con	0.725	0.745	0.768	0.642	0.845	0.741	0.765	0.867	0.717			
Prog	0.658	0.769	0.655	0.765	0.869	0.756	0.760	0.858	0.642	0.825		
Inno	0.642	0.765	0.709	0.625	0.865	0.776	0.821	0.845	0.665	0.758	0.741	
Qual	0.823	0.732	0.735	0.858	0.832	0.644	0.808	0.819	0.667	0.742	0.719	0.833

4. Hypothesis testing

The PLS program is utilized to evaluate hypotheses. Various indices (e.g., χ^2/df, CFI, RMSEA, and PNFI) are employed to evaluate the agreement of the data with the framework. The framework's overall fitting statistics are χ^2=22.110, df=10, χ^2/df=1.945, p=0.051, CFI=0.897, PNFI=0.501, and RMSEA=0.033. If the index χ^2/df ratio is less than the threshold level of 3 and the p value is greater than 0.05, a framework fits the data well. Our CFI value of 0.897 is most effective, as it must be above 0.8 for the framework to be regarded as excellent. (Bentler, 1990). PNFI must be above 0.5 for the framework to be regarded as excellent, and our findings (PNFI = 0.501) surpass this requirement. RMSEA is an additional fit statistic that modifies the sample discrepancy function based on the degree of freedom. The RMSEA has been recognized as one of the most informative criteria in SEM (Byrne, 2001), and values of 0.05 or less indicate acceptable fit; our model (RMSEA = 0.033) fits well according to this criterion. Based on these fit statistics, it can be concluded that the model as a whole exhibits a reasonable fit. Both a good fit of the model's structure and an excellent measuring model are required for a good structural equation model. Table 6 below displays the assumed values of the standardized path coefficients for every assessment construct and their corresponding latent constructs, as well as their corresponding p-values. As recommended by the SEM hypothesis, some constructs lack p-values because the relative path coefficient is preset at 1. Rest constructs of hard QMP and those of soft QMP have substantial approximations of the standardized coefficients ranging from 0.698% to 0.870%, indicating that hard QMP and soft QMP models of measurement are accurate. The structural model findings from the analysis are presented in Table 7. Three of the six hypotheses are supported, while three are rejected. The findings indicate that H2, H4, and H6 have a positive effect on quality and innovation performance. In addition, the findings demonstrate that quality performance has a substantial effect on innovation performance, supporting Hypothesis 6. Surprisingly, soft QMP has no direct effect on either hard QMP, indicating H1 should be rejected; hard QMP has no direct effect on either quality performance, indicating H3 should be rejected; and soft QMP has no direct effect on either innovation performance, suggesting H5 should be rejected. The finding may be attributable to the scope of our research, especially its emphasis on plant operations, as will be explained in the following section. It is also discovered that quality performance has a direct effect on innovation performance, providing support for Hypothesis 6. Figure 2 provides an overview of the preceding results.

Table 6
Results for the measurement model

Construct name	Measure variable	Standardized coefficient	p-Value
Soft QM	Top Management Support	0.745	0.000
	Training and education	0.784	0.000
	Student Focus	0.852	0.000
	Supplier Management	0.698	-
	People Management	0.711	0.000
	Strategic Planning	0.765	0.000
Hard QM	Process Management	0.846	0.000
	Information and Analysis	0.870	0.000
	Continuous Improvement	0.789	0.000
	Program Design	0.851	-

Table 7
Results for the structural model.

Causing construct	Caused construct	Hypothesis	Standardized coefficient	p-Value
Soft quality practices	Hard quality practices	H1	Not supported	0.074
Soft quality practices	Quality performance	H2	0.478	0.000
Hard quality practices	Quality performance	H3	Not supported	0.142
Hard QM	Innovation performance	H4	0.568	0.000
Soft QM	Innovation performance	H5	Not supported	0.085
Quality performance	Innovation performance	H6	0.753	0.000

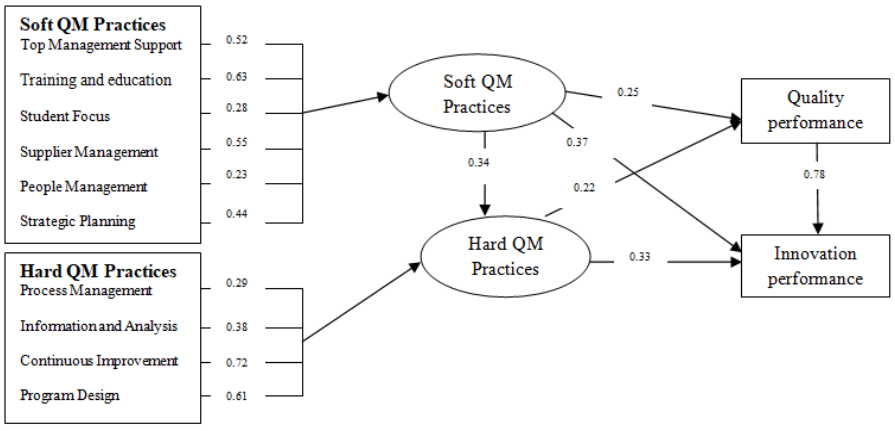

Fig. 2. The structural model

5. Discussion

In this part, we will go through the most important results and analyze the managerial ramifications of those findings. To begin, the findings of this research indicate that hard QMP acts as a full and complete mediator of the connection between soft QMP and quality performance (support for H2 and rejection against H1 and H3). Even while other researchers discovered that soft QMP had an impact on performance (Sciarelli et al., 2020; Akanmu & Mohamad, 2021), our results correspond with the analysis provided by Ho et al. Our results imply that soft QMP has an immediate impact on performance. Although Zeng et al. (2017) discuss the potential that hard QMP partly mediates the association between soft QMP and performance, our results give strong evidence for the assumption that these investigations are based on full mediation. Hence, hard QMP completely mediates between soft QMP and performance quality. In turn, effective adoption of hard QMP is attained through accepting soft QMP. Our research revealed that there is no correlation between gentle and rigorous practices. This is consistent with the results of Sciarelli et al. (2020) in a distinct discipline other than education. Our findings demonstrated that both hard and soft practices have a substantial effect on innovation. The outcome lines up with the findings of Ahire & Ravichandran (2001), Boyer & Lewis (2002), Aminbeidokhti et al. (2016), and Hussaina et al. (2023), who analyse innovation using the multidimensional QMP method. It is additionally noteworthy to observe that the influence of soft QMP on administrative innovation is greater than that of hard QMP, whereas the influence of hard QMP on technical innovation is marginally greater. The outcome contradicts the research results of Iqbal et al. (2018), who found that TQM has no significant positive impact on innovation in higher education. A possible explanation for this could be the researchers' comprehensive method for QMP research, which viewed QMP as a singular element without examining the various relationships between QMP dimensions and innovation. In accordance with the findings of Abrunhosa and SáP (2008) and Antunes et al. (2018), our study affirms the positive impact of gentle and rigorous practices on performance. The findings also demonstrate that soft QM indirectly affects performance via hard QM, which is in line with numerous research investigations that model the connections between quality management and performance from soft to hard QMP (Venkatraman, 2007; Tar & Dick, 2016). In accordance with the results of Mehta et al. (2014) and Kulenović et al. (2021), our research demonstrated that innovation positively correlates with performance, suggesting that innovation can help universities enhance their educational performance.

6. Limitations, future research and conclusions

The current study's limitations suggest the following areas for further study. In future studies, it might be beneficial to look at a broader point of view, examining academics from other cities and countries, in addition to recognizing that various environments may result in various organizations. Initially, we gathered data from the faculty of six universities in the United Arab Emirates. It is additionally recommended to evaluate the examined model with additional stakeholders (such as employees and students) to evaluate their results. Future research may also investigate the potential impact of contingency variables (e.g., environmental uncertainty, organizational culture, and organization's strategy) on the suggested model. All of these variables might be examined as moderators, which could produce more intriguing results that supplement ours. Implementing a multidimensional perspective of QMP, the present research offered empirical support to address a number of the issues in the literature regarding the link between QMP and innovation. The results of this study confirm the idea that QMP offers a basis for achieving a competitive position in innovation and highlight the significance of maintaining QMP initiatives. Corresponding with the well-known sand cone paradigm, innovation is able to be accomplished through quality in an accumulative approach. The present research contributes to the comprehension of the roles that various QMP factors play in deciding innovation by examining QMP from two perspectives, hard and soft QMP. It emphasizes the importance of the routine-based method by emphasizing the adoption of hard QMP to cultivate an education foundation that results in innovation, with soft QMP performing a supporting part in helping this impact to take place.

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