

PARTIAL LEAST SQUARE STRUCTURAL EQUATION MODEL “PLS-SEM” TO PREDICT TOTAL QUALITY MANAGEMENT IN UAE HIGHER EDUCATION: A COMPREHENSIVE FRAMEWORK FOR ORGANIZATIONAL PERFORMANCE ENHANCEMENT

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Abstract: The effectiveness of organizations and the satisfaction of customers are both significantly improved by providing outstanding quality. To better meet the needs of their consumers, an increasing number of firms are implementing quality improvement programs such as total quality management (TQM). The major objective of this research paper is to examine the effects of TQM components on the efficiency and effectiveness of UAE higher education institutions (HEIs). The association between TQM components and organization performance was investigated using a quantitative research technique based on a survey study design. The partial least square structural equation model (PLS-SEM) was used to quantify the reflectiveness of 99 data. The study found that TQM has a positive impact on employee satisfaction and service quality in HEIs. It was revealed that TQM has a significant impact on organizational performance, with service quality serving as a mediator. Furthermore, the results revealed that service quality and students' satisfaction are fully mediating the relationship between TQM and organizational performance. The current study concludes that HEIs are implementing TQM to enhance market performance and comprehend the evolving business trends. The study has added to the body of information about the relationship between TQM elements and organization performance.

Keywords: total quality management; organizational performance; service quality; student satisfaction; employee satisfaction; partial least square analysis; structural equation model.

JEL Classification: C290, C390, C830, M0, M10.

1 Introduction

The 1950s witnessed the development of the strategic instrument known as total quality management (TQM), which has gained prominence since the early 1990s. The concept of "quality" was defined in different ways by different researchers. Deming (1986) stated that TQM is characterized by a strategy and a methodical process for assuring quality and continuous improvement, with an ongoing cycle of development that results in improved product performance and quality criteria. TQM is an amalgamation of three concepts: "total," which means that everyone is engaged, containing customers and suppliers; "quality," which indicates that consumers' expectations are encountered correctly; and "management," which signifies that top management is committed to anticipated outcome (Oakland, 2014). Goetsch and Davis (1994) mentioned

that TQM is a continual improvement process that incorporates everybody in the company in a unified effort to increase effectiveness and productivity. Schargel (1994) mentioned that TQM promotes for people development expressly as business excellence is mainly determined by the degree to which an organization's workers are proficient. TQM is a strategy that encompasses the entire organization to comprehend each person's behavior at each management stage according to Oakland (2003). According to Escrig (2004), TQM is a strategic activity that focuses on running the entire company to provide products or services that fulfill the demands of their customers by utilizing all available resources. According to Kumar, et al. (2009), TQM is a holistic management strategy that incorporates all organizational processes to satisfy customer needs while achieving corporate objectives. Furthermore, Kumar, et al. (2009) indicated that TQM

is a holistic management strategy that incorporates all organizational processes to satisfy customer needs while achieving corporate objectives. According to Vinni (2011), TQM develops an environment in which all assets are used efficiently and creatively to provide exceptional service, and the institution must adjust to this fast-paced environment. Finally, Alves, et al. (2015) mentioned that TQM is a strategy to make sure that organized business processes happen as intended. TQM was described by Soheli-Uz-Zaman and Anjalin (2016) as a proactive technique for assuring quality in the design of the product, service, and process and then continually improving it. Things may change quickly and in strange ways in today's business environment. Companies must adapt to the rapidly changing business context and produce high-quality products or services. TQM is now critical for every business since it establishes the foundation for the quality strategy that fulfills business objectives and gains a competitive advantage (Taggar and Gupta, 2020; Toke and Kalpande, 2020). Companies that execute a quality strategy are attempting to meet consumers' demand for high-quality, dependable products or services, while remaining competitive (Antunes, et al., 2021; Beraki, et al., 2022). Companies are also spending extensively in formulating and delivering TQM-based quality strategies in their operations and processes (Aletaiby, et al., 2021; Benzaquen and Narro, 2022). To put this into context, TQM is now considered as a business method that seeks to continuously boost the quality of both products and processes (Dihardjo and Ellitan, 2021), which defines growth (Fuentes, et al., 2020; Islami, et al., 2020).

The fundamental tenacity of the current research is to assess TQM compatibility with higher educational institutions (HEIs) based on its adaptability in HEIs. The study proposes a framework for implementation of TQM in HEIs, which will be a unique contribution to the field of study of TQM implementation. Concurrently, this study will strive to identify the barriers to TQM implementation at HEIs. To achieve these purposes, this research article will lay a distinctive attention on adoption of TQM in HEIs by understanding the characteristics and potential benefits of applying TQM at HEIs. An intensive literature search and survey were carried out to compile the data and material for this study. The components of the research are as follows:

Section 2 presents a literature review and recognized the investigation gap and goal. The third component of the research looks at the hypothetical framework presented for the article and outlines the variables. Part 4 of the paper mentions the research methodology and discusses the findings. Section 5 discusses the conclusions.

2 Literature review

According to Kay Michael, et al. (1997), TQM is a comprehensive managerial strategy and a collection of instruments that allow HEIs to follow a quality definition and a strategy for accomplishing quality via continuous improvement. The authors state that HEIs might practice TQM to build their aspects of quality, standards, and excellence development processes based on customer needs. In essence, Meirovich and Romar (2006) indicated that the conclusions of the current literature on the efficacy of TQM in HEIs contradict each other. Numerous scientists are positive about the application of TQM in HEIs. TQM principles are adaptable in HEIs and may be used to raise the caliber of HEIs' services and claims (Sirvanci, 2004). Furthermore, the concepts of TQM are congruent to those of HEIs. The assumption made by Koch and Fisher (1998) is prominent; they argue that TQM is inherently applicable to HEIs since it is a practice-oriented strategy meant to boost productivity while cutting costs and enhancing quality. Ali and Shastri (2010) further noted that TQM may help HEIs in a range of means, comprising improving scholastic progression, creating more motivating instructive atmosphere, strengthening the scholastic program, increasing the pace of training services, and lowering expenses. According to Rabah (2015), applying TQM will help HEIs retain their effectiveness, get rid of inadequacies, concentrate on marketplace demands, achieve extraordinary performance across the board, and address the requirements of all shareholders. Baig, et al. (2015) reported that TQM can be used effectively in HEIs with a proactive approach. Sahney (2016) stated that HEIs should adopt TQM to be competitive, profitable, and customer focused. TQM is the most crucial method for HEIs to increase efficiency in delivering better services and making continual improvements, according to Khan, et al. (2017). Antunes, et al. (2018) gave a conceptual

framework based on TQM ideas to improve HEIs' financial, operational, and market performance. According to the research, TQM may increase HEIs' organizational performance and customer satisfaction, resulting in higher quality and constant development. Cudney, et al. (2020) demonstrated the systematic use of Lean and Six Sigma continuous improvement methods in increasing the quality of HEIs. According to the findings, Lean and Six Sigma may be implemented at HEIs to enhance teaching methods, administrative procedures, and other aspects of HEIs. Sciarelli, et al. (2020) stated that HEIs are now adopting TQM to enhance the quality of educational programs, services, and facilities, and the system. Cabacang (2021) outlined the four phases of TQM adoption and processes at HEIs. Based on the findings, HEIs must increase intentional design and data controlling to realize TQM benefits. Second, interactions between HEIs may make it easier to understand management commitment and strategy framework. Third, HEIs must become more adaptable to address the problems. Fourth, HEIs must be more innovative in terms of leadership, training distribution modalities, campus facilities, structure and procedure supervision, customer experience, and relationships. According to Arokiasamy and Krishnaswamy (2021), HEIs face rising pressure from their constituents because of their inability to adapt to ever-changing business dynamics and sociopolitical realities. As a contrary, HEIs are implementing TQM to enhance market performance and comprehend the evolving business trends. Jamalludin, et al., (2021) employed TQM as a method to investigate its influence on quality improvement, which affects many elements of educational processes at HEIs. The aspects that contribute to the applicability and efficacy of TQM HEIs are explored, with the ideology stating that TQM calls for a focus on the customer, a process-centered strategy, ongoing improvement, stakeholder involvement, and fact-based decision-making. TQM, according to the authors, is an excellent method for HEIs to ensure high-quality education. Girmanová, et al., (2022) investigated how HEIs might elucidate and increase the performance of both educational and commercial operations by using TQM. The authors claimed that the use of TQM has benefited in the development of work organization and documentation, management practices, and customer experience. Teixeira-Quiros, et al., (2022) reported that HEIs are currently using TQM-

provided internationalization solutions to boost organizational performance.

According to the literature review, TQM is used effectively in HEIs. Understandably, none of the research presented an adequate conceptual framework for HEIs to implement TQM in an effective and efficient way. As a consequence, the drive of this work is to first construct the theoretical outline and undertake an analysis of TQM adoption by HEIs from the UAE's perspective. Table 1 details the research gap, question, and aim that are addressed in the study.

We established the conceptual framework utilizing the independent variables TQM, service quality, student satisfaction, and employee satisfaction and a dependent variable, organizational performance, based on the identified research gap and specified research goals. The section describes how these factors were included into the conceptual framework's development.

2.1 Total quality management

The philosophies of quality gurus like Deming, Juran, Fiegenbaum, and Crosby serve as the foundation for overall quality management strategies. These practitioners discussed the significance of quality as a means to make consumers satisfied and enhance the effectiveness of the business. They claimed that the entire company needs to focus on quality, and that quality should be considered a strategic issue. As an indication of comprehensive quality management, several studies have utilized a variety of distinct parameters. At HEIs, customer focus, leadership, staff engagement, and process approach are acknowledged as vital influences of comprehensive quality management (Manatos, et al., 2017). Execution of these wide-ranging quality management criteria results in increased employee satisfaction and service quality (Antunes, et al., 2018).

The concept of job satisfaction is characterized as “the satisfaction or dissatisfaction of employees with the work they do, and it is indicated that if the employees are satisfied with their jobs, their job satisfaction is high, otherwise it is low” (Özkalp, et al., 2013). Job satisfaction is an attitude rather than a behavior and interacts with performance factors (Robbins and Judge, 2012).

Table 1. Research gap and objective for the study
(Source: Authors' own research)

Research group	Research objectives
RG1: There appears to be a paucity of research on the conceptual framework for HEIs TQM implementation, particularly from the aspect of the UAE	RO1: Create a theoretical framework for HEIs employing TQM principles
	RO2: Conduct a detailed analysis and offer adaption methods

Table 2. Factors adopted for variables of proposed theoretical framework
(Source: Authors' own research)

Variable	Factors' classification	Factors' description
TQM	TQM 1	Process approach
	TQM 2	Commitment and leadership
	TQM 3	Customer focus
	TQM 4	Staff competence
SQ	SQ1	Academic procedures
	SQ2	Nonacademic procedures
SS	SS1	Staff competence
	SS2	Faculty competence
ES	ES1	Work atmosphere
	ES2	Employee happiness
OP	OP1	Research output
	OP2	Teaching efficacy
	OP3	Community involvement

When the literature is examined, it is understood that factors leading to job satisfaction are generally grouped under the main headings as individual and organizational factors. Organizational factors that are effective in job satisfaction are stated as wage, the job itself, promotion opportunities, working conditions, counseling, colleagues, perception of justice, perceived organizational support, availability of social support, stress level of the job, presence of work–family balance, and management style (Özkalp, et al., 2013). In addition to organizational factors, there are also individual factors such as personality, age, gender, education level, marital status, time spent in the profession, title, suitability of the individual for the job, ability, and intelligence level of the individual (Eğinli, 2009; Kantar, 2010).

2.2 Service quality and student satisfaction

The quality of the program and the quality of life are the two main facets of the theoretical model of service quality at HEIs, which were presented by Jain, et al.

(2011). Business contacts, input quality, academic resources, and curriculum make up the first dimension. The second component involves nonacademic practices, assistance resources, interaction quality, and the campus. The quality of HEIs may be significantly improved by excellent teachers, colleges, and universities, as well as by a strong knowledge infrastructure (Mohamed, et al., 2016). Student satisfaction will increase as a consequence of better service quality arising from the performance of contented staff with the appropriate attitude (Jia-Haur Goh, et al., 2017). Students are regarded as the key clients for HEIs (Marimon, et al., 2019). Customer satisfaction is one of the most imperative outcomes of an effective adoption of comprehensive quality management methods, and better service quality plays a crucial part in this connection. According to Singh and Jasial (2021), HEIs must hire and educate competent staff in addition to talented academics since these factors, together with reputation, access, and staff competency, have a significant impact on students' satisfaction.

2.3 Employee satisfaction

Employee satisfaction in the workplace is the notion that has garnered the most focus among studies on organizational behavior because it is a vital corporate behavior which is related to the eminence of effort in each organization. Employee happiness is connected to imperative organizational characteristics like staff attendance, turnover, and effectiveness. It is found that there is a considerable association between professional happiness and the quality of work life (Yunus and Dilou, 2022). There are studies that provide critical perspectives on the genuine worth of QM implementation, validating the notion that its practices are the key to boosting employee workplace happiness (Addis, et al., 2019). The research further states that quality management variables like process management, quality strategy and planning, and leadership increase worker gratification and are critical for achieving outcomes from employees via the other model parts (Oluwafemi and Okon, 2018). People who work in an atmosphere in which they feel appreciated, respected, and at ease are more content with their jobs (Marič, et al., 2021). Wages, promotions, leadership, working conditions, the job itself, coworkers, and communication are all significant factors in employee satisfaction (Serinkan and Kiziloglu, 2021).

2.4 Organizational performance

Due to the increasing demand to be more competitive, efficient, effective, and responsible, evaluating and improving organizational performance for HEIs has become crucial. HEIs have developed performance management systems, and institutions are increasingly measuring and reporting on the quality of their research and teaching. It is commonly believed that an HEI's success may be evaluated based on its research output, teaching efficacy, and community involvement (Sciarelli, et al., 2020; Tiron-Tudor, et al., 2022). They may be operationalized via metrics like the number of publications, research funding allocations, graduation rates, employment rates, and the number of community service activities (Rutherford, 2016).

As a result, it is reasonable to expect that organizational performance will increase when teacher and student performance improves. The suggested model hypothesizes a link between TQM principles, service quality, staff satisfaction, and student satisfaction and organizational success. Following an analysis of the volume of research pertaining to the variables that were taken up by a number of scholars in regard to the implementation of TQM for HEIs, the first research objective, which was to propose the theoretical framework used in this investigation, is demonstrated in Figure 1.

In addition to the theoretical framework, it is essential to determine which factors are associated with each of the variables that have actually been stated. This is an essential component of the research approach. Table 2 presents the results of an in-depth assessment of the variables that were considered for each variable (which is based on the factors adopted by previous researchers).

Numerous studies examining how TQM affects organizational performance have revealed that its presence promotes improved performance and better levels of productivity. In this connection, the following research hypotheses were characterized:

H1: Employee satisfaction has a significant association with the organization performance of HEIs.

H2: Employee satisfaction has a significant association with the service quality of HEIs.

H3: Employee satisfaction has a significant association with the student satisfaction at HEIs. H4: Service quality has a significant association with the organization performance of HEIs.

H5: Service quality has a significant association with the student satisfaction of HEIs.

H6: Student satisfaction has a significant association with the organization performance of HEIs.

H7: TQM has a significant association with the employee satisfaction at HEIs.

H8: TQM has a significant association with the organization performance of HEIs.

H9: TQM has a significant association with the service quality at HEIs.

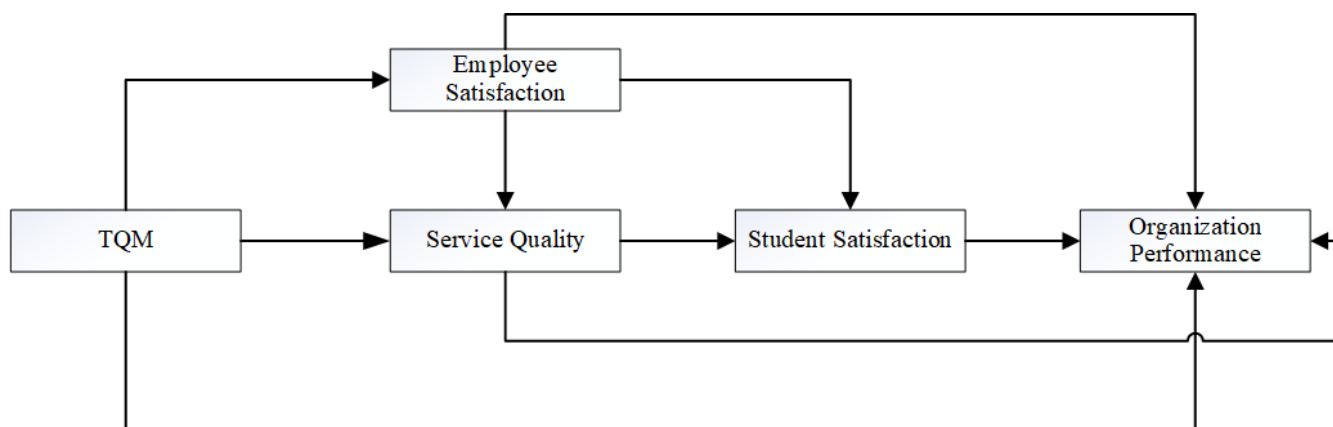


Figure 1. Proposed theoretical framework for the research
(Source: Authors' own research)

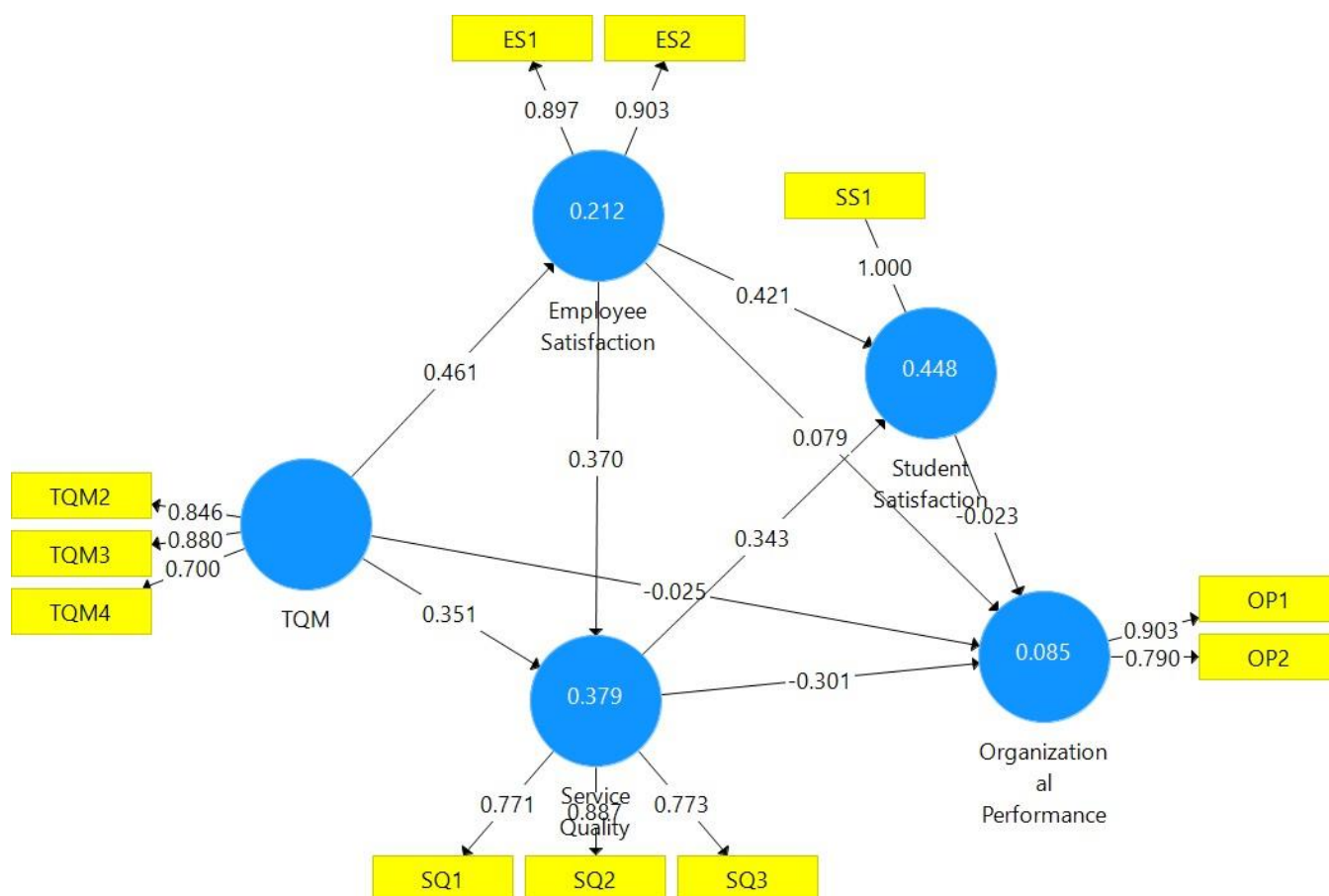


Figure 2. Factor loading values for the proposed theoretical framework
(Source: Authors' own research)

2.5 Research Methodology and Data Analysis

The current study selected a distinctive paradigm consistent with positivism, conceived a theoretical model based on a thorough investigation of the TQM literature using secondary research, and then moved from evaluating hypotheses with secondary data to testing them with primary data, thereby shifting the focus of this research article from theory to facts. The initial step in research methodology is to determine the sample collection. Ninety-nine respondents completed the online questionnaire, which included seven research questions. Respondents were officials from several HEIs in the UAE. Since our respondents were aware of the application of TQM procedures, we employed stratified random sampling. The data analysis is based on the collection of data obtained. Data analysis is the focus of the second portion of the study approach. Based on the theoretical framework, the partial least square structural equation model (PLS-SEM) with SmartPLS was used to quantify the reflectiveness of 99 data. The suggested model (Fig. 1) was evaluated using reflected measuring standards. The factor loading of the model using SmartPLS was determined. Where the factor loading was less than 0.70, the constructs were eliminated. *TQM1* (-0.107), *SS2* (-0.658), and *OP3* (0.243) were less than the acceptable 0.70 and are so redacted. When the constructions *TQM1*, *SS2*, and *OP3* were removed, the factor loadings for both the variables improved significantly. Figure 2 shows the updated factor loading. Indeed, the study's constructs were analyzed using principal component analysis (PCA) after eliminating the three items utilizing the rotated solution of varimax. In PCA, the factors which have eigenvalues greater than 1 are considered significant. In this study, all factors with eigenvalues less than 1 are considered insignificant and should be disregarded. The factor analysis revealed that all items of each scale formed a single factor, according to the rule that the eigenvalues are greater than 1.

2.6 Convergent validity

When every question in a test agrees on disclosing the underlying notion, this is known as convergent validity. The average variance extracted (AVE) value is

more than 0.5 for all variables, and the composite reliability (CR) value is greater than 0.70. Table 3 displays the CR and AVE for each variable from the proposed conceptual framework. The findings show that all of the analyzed constructs are credible and may be leveraged for analysis.

2.7 Discriminant validity

To evaluate discriminant validity, the HTMT criteria are applied. Discriminant validity between two reflective conceptions is confirmed if HTMT is 0.90. Table 4 displays the discriminant validity scores for the five variables used in the suggested conceptual framework. The discriminant validity for all HTMT constructs is less than 0.90, indicating that they are justified.

2.8 Hypothesis testing

The findings of the inner model, including the r-squared output, parameter coefficient, and t-statistic, are employed to evaluate hypotheses. In the test, the t-statistic >1.96 was adopted, with a P-value of 0.05 (5%) significant level and a positive beta coefficient. The findings are shown in Table 5.

3 Discussion and conclusion

The main objective of the current work is to examine the effects of implementing TQM on organization performance in HEIs. The study found that TQM has a positive impact on employee satisfaction and service quality in HEIs in the UAE. In addition, it was discovered that TQM had a significant impact on organizational performance, with service quality serving as a moderator in this regard. These findings add to the current TQM literature, particularly in terms of the association among TQM principles and organizational performance in the higher education division. In essence, several studies in TQM literature, particularly in HEIs, match the current study results. Applying TQM will help HEIs retain their effectiveness, get rid of inadequacies, concentrate on marketplace demands, achieve extraordinary performance across the board, and address the requirements of all shareholders.

Table 3. Convergent validity using CR and AVE
(Source: Authors' own research)

Variable	Composite reliability	Average variance extracted (AVE)
Employee satisfaction	0.895	0.810
Organizational performance	0.836	0.719
Service quality	0.853	0.659
Student satisfaction	1.000	1.000
TQM	0.852	0.660

Table 4. Discriminant validity using HTMT
(Source: Authors' own research)

Variable	Employee satisfaction	Organizational performance	Service quality	Student satisfaction	TQM
Employee satisfaction	-	-	-	-	-
Organizational performance	0.153	-	-	-	-
Service quality	0.678	0.410	-	-	-
Student satisfaction	0.689	0.202	0.647	-	-
TQM	0.592	0.208	0.683	0.460	-

Furthermore, Baig, et al. (2015) supported the study findings that TQM can be used effectively in HEIs with a proactive approach. Sahney (2016) stated that HEIs should adopt TQM to be competitive, profitable, and customer focused. Khan, et al. (2017) further supported the study results; they indicated that TQM is the most crucial method for HEIs to increase efficiency in delivering better services and making continual improvements. Antunes, et al. (2018) additionally gave a conceptual framework based on TQM ideas to improve HEIs' financial, operational, and market performance. Surprisingly, the outcomes of the research analysis show that there is no direct impact of employee satisfaction, student satisfaction, and TQM on organizational performance for HEIs in the UAE. However, it was observed through detailed data analysis that the employee satisfaction helps to improve the organizational performance through an indirect approach using service quality as a mediating factor, which follows the research by Gorla, et al. (2010), Fernandes and Adji Achmad Rinaldo (2018), and Adhy Kurniawan, et al. (2018). Notably, it was observed that there is no direct impact of student satisfaction on organizational performance as there can be other mediating factors (such as curriculum quality and HEIs' reputation) that play

a crucial role in influencing organizational performance. Surprisingly, it was also observed from the proposed conceptual framework that TQM does not directly impact the organizational performance. However, there is significant effect using service quality as the mediating variable, which follows the research of Permana, et al. (2021), Magd, et al. (2021), and Alfalah (2017).

According to the research, TQM may increase HEIs' organizational performance and customer satisfaction, resulting in higher quality and constant development. Cudney et al. (2020) demonstrate the systematic use of Lean and Six Sigma continuous improvement methods in increasing the quality of HEIs. According to the findings, Lean and Six Sigma may be implemented at HEIs to enhance teaching methods, administrative procedures, and other aspects of HEIs. Sciarrelli, et al. (2020) stated that HEIs are now adopting TQM to enhance the quality of educational programs, services, and facilities, and the system. Cabacang (2021) outlined the four phases of TQM adoption and processes at HEIs. Based on the findings, HEIs must increase intentional design and data controlling to realize TQM benefits. Second, interactions between HEIs may make it easier to understand management commitment and strategy framework. Third, HEIs must become more

adaptable to address the problems. Fourth, HEIs must be more innovative in terms of leadership, training distribution modalities, campus facilities, structure and procedure supervision, customer experience, and relationships.

The current study indicates that HEIs are implementing TQM to enhance market performance and comprehend the evolving business trends, which was supported by Jamalludin, et al. (2021). They employed TQM as a method to investigate its influence on quality improvement, which affects many elements of educational processes at HEIs. The aspects that contribute to the applicability and efficacy of TQM HEIs are explored, with the ideology stating that TQM calls for a focus on the customer, a process-centered strategy, ongoing improvement, stakeholder involvement, and fact-based decision-making. TQM, according to the authors, is an excellent method for HEIs to ensure high-quality education. Moreover, this study claims that the use of TQM has benefited in the development of work organization and documentation, management practices, and customer experience. In essence, this was supported by several studies such as Girmanová, et al. (2022) and Teixeira-Quiros, et al. (2022). Based on the outcomes of the data analysis and study findings, a set of recommendations could be implemented, which are as follows: (a) Improve TQM implementation: HEIs in the UAE should prioritize successful TQM implementation. Fostering a culture of continuous improvement, including all stakeholders, and adhering to customer-centric initiatives are all part of this. (b) Invest in employee satisfaction: Institutions should prioritize worker fulfillment by offering prospects for training and enhancement, recognizing and rewarding workforces, and establishing a good work atmosphere. Employees who are happy are more likely to contribute to the overall quality of services. (c) Improve service quality: HEIs should make investments to improve service quality in both academic and nonacademic areas. This involves improving academic procedures, support services, and the entire campus experience to meet and exceed student expectations. (d) Address student contentment: Institutions should prioritize student contentment by providing high-quality instructors, competent staff, and effective teaching and learning techniques. Engaging with students and reacting to their input may dramatically increase their levels

of satisfaction. (e) Focus on organizational performance: HEIs should continue to analyze their organizational performance using appropriate measures such as research output, teaching efficacy, and community participation. Regular reviews and benchmarking against industry standards can aid in performance improvement. (f) Continuous improvement: TQM principles should not be considered as a one-time project, but rather as a continual commitment to quality. HEIs should constantly examine and change their TQM initiatives in response to changing market needs and student expectations.

Finally, implementing these recommendations would allow UAE HEIs to improve their quality management procedures, allowing them to deliver better services, fulfill stakeholder expectations, and improve overall organizational performance. This study investigated one vital topic in the UAE-TQM implementation in HEIs-that has received little empirical consideration by local scholars. Like other studies, this research study has several limitations which should be considered to determine possible future research opportunities. This section acknowledges the study's limitations. The limitations identified below may limit the generalizability of the research results. Indeed, the sample size of 99 respondents might be considered small for robust statistical analysis, particularly when using PLS-SEM. The UAE was the sole focus of this investigation. Further empirical analysis would thus be necessary to replicate findings in other situations and environments. In addition, because it was a cross-sectional study, it was carried out all at once. Therefore, using a longitudinal research design might get over this constraint by showing evidence of causality between factors, but especially over time. Also, the data for this study was exclusively collected from senior personnel and was mostly acquired through a survey form. It is advised that future studies employ data triangulation techniques, such as observations and interviews with HEI management, to overcome the subjectivity of this data collecting method.

4 Conflict of interest

The authors declare that they have no conflicts of interest.

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