

# Mediating Role of Quality Assurance on The Relationship Between TQM Practices and Education Performance in Higher Education Institutions of Pakistan

Baqir Nadeem Hashmi<sup>1,2\*</sup>, and MD Fauzi Bin Ahmed<sup>2</sup>

<sup>1</sup>Tahseen Ahmad Cheema Institute, Bahawalpur 63100, Pakistan.

<sup>2</sup>University Tun Hussein Onn Malaysia, Malaysia.

\*Corresponding Author: Baqir Nadeem Hashmi. Email: [baqirhashmi@gmail.com](mailto:baqirhashmi@gmail.com)

Received: April 11, 2026 Accepted: July 19, 2026

**Abstract:** Educational performance is a critical element that helps to assess how well a university is performing in terms of education, developing skills in her students, and bringing about significant societal changes. Prior literature reveals that quality assurance despite considered an integral component, has been neglected to examine between Total Quality Management (TQM) and education performance. The main objective of this research was to analyze the impact of TQM practices on educational performance, and to understand the role of quality assurance as a mediating factor between TQM practices and educational performance. To achieve this, a structured questionnaire was designed and distributed among the top management of universities of Pakistan to gather relevant information using convenience sampling technique. A total of 500 questionnaires were distributed, among them 264 were fully completed and returned, resulting in a response rate of 53%. The data was evaluated using the Partial Least Squares Structural Equation Modelling (PLS-SEM) approach. The results of the data analysis reveal that TQM practices are significantly related to educational performance, as well as to quality assurance. Furthermore, quality assurance was found to have a significant and positive impact on education performance. This research ultimately demonstrates that quality assurance serves as a significant mediator between TQM practices and education performance in the context of higher education institutions. The study implicates for the theory and practitioners that both TQM and quality assurance are pivotal antecedents to enhance education performance in Pakistani universities. Moreover, quality assurance plays a crucial role in developing an underlying mechanism with TQM practices to harness education performance in Pakistani universities.

**Keywords:** TQM; quality assurance; education performance; higher education; Pakistan.

## 1. Introduction

Education plays a key role in the progress and prosperity of any country or nation. The importance of education cannot be denied, whether a country is developed or developing [1]. For less developed countries like Pakistan, education holds particular significance [2]. It is through education that Pakistan is advancing in fields such as science, technology, economics, and finance. Although this progress and prosperity are moving at a slower pace, Pakistan's education institutions are still producing educated and skilled students to meet fundamental needs [3]. Through education, Pakistan is not only producing skilled doctors, engineers, lawyer and scientists but also nurturing exceptional writers, poets, historians, and artists who are working to bring positive change to Pakistani society. This positive transformation is

gradually fostering intellectual growth within Pakistani society.

Likewise, Pakistan's higher education industry has witnessed exceptional growth in the past decades. However, it faced numerous issues and challenges, such as effective planning, poor structure, limited financial resources for research and development, and incapable human resources [4]. Furthermore, this alarming situation is also validated by the Global Competitiveness Report, which reveals Pakistan's lowest (less than 120th out of 141) rankings, including higher education institutions (HEIs), compared to their counterpart [5]. Furthermore, the QS ranking system has only included six institutions from Pakistan on its list of the top 800 universities in the world [3]. Pakistani HEIs reveal the worrying scenario of the poor quality and performance nexus, making this research relevant. Consequently, 75 percent of passing out students from public universities possess merely fundamental skills in performing tasks [5] [1]. It is therefore, universities need to improve at addressing these alarming shortcomings, which indicates the alarming situation of quality standards being adopted and executed by the HEIs of Pakistan.

The high success and failure rate in adopting total quality management (TQM) has been the subject of several researches, which have presented their findings [6]. The findings of specific research have demonstrated that the use of TQM in institutions did not produce any result, while the findings of other studies about the effectiveness of TQM methods are divided [3]. Similarly, TQM and education performance have been critical concepts in business and academic settings. As a result, they have been the subject of extensive research in many countries around the world, including Pakistan [7-10]. However, contrasting results have been reported as few studies indicate a strong link, whereas other studies found the weak or a medium association between TQM practices and organizational performance [11-12]. In addition, it has also been noticed that the strength of this link is dependent on several other elements, such as the socio-economic, cultural, and quality factors prevalent in and around the company [13]. Providing quality education is the primary goal of educational institutions of higher learning [14]. Therefore, several academics have thrown light on the nexus between TQM and quality assurance [15] and the crucial role of the accreditation system [16], which may lead to improve better education performance [17]. Quality assurance and adherence to educational standards through accreditation majorly reflect the expertise and professionalism of an organization's employees, enabling the service organization to build trust and confidence among its customers.

The quality of knowledge delivery and the application of educational standards are key factors in achieving high levels of student satisfaction. Moreover, employee engagement in courteous practices guarantees students that their issues will be attended by the relevant service organisation. The high degree of confidence among customers regarding organisational offerings significantly impacts satisfaction levels, which subsequently affects the notion of educational quality. However, prior literature provides less empirical evidence on the evaluation of quality component and accreditation systems in higher education [18], especially in the relationship of TQM and quality education in Pakistan [19]. Thus, this study aims to analyze the mediating role of quality assurance on the relationship between TQM practices and education performance in the HEIs of Pakistan.

## **2. Literature Review and Hypothesis Development**

### **2.1. Education Performance**

Because of this high significance, the university's performance in education has become a key variable among researchers and practitioners [20]. Thus, different ways, dimensions and perspectives are being discussed to measure this performance. The performance measurement will involve its missionary activities including teaching-learning, research, and extension [21]. This will also include the processes that support these activities, such as institutional operation [22] or satisfaction and perceptions of customers and stakeholders [21]. Quality and the environment in which the university operates have an impact on its performance, which means that quality management is a key aspect of any university. The university consists of two subsystems – the academic and the administrative [23], and each of these subsystems has its own stakeholders. Literature indicates that both subsystems are responsible for certification of quality, but they do it in a complementary way since the administrative subsystem serves the academics [21]. In most cases, administrative processes

involve the application of organizational quality assurance measures and mechanisms to enhance efficiency and acquire quality certification [24]. However, the academic subsystem involves the application for academic and institutional accreditations, which aim at assessing the quality of education, research, extension services, and resource management [25]. This is achieved through measurements and controls using criteria and indicators.

## 2.2. Total Quality Management

[26] described TQM as a "management strategy with interrelated components, such as core values, processes, and tools." TQM is often referred to as "total quality management." On the other hand, [27] think that "TQM should be treated as TQE" (Total Quality Education). This idea has repercussions for customers, society, and the corporate world. [28] proposes that total quality management (TQM) should be examined holistically by analyzing management factors such as institutional goal statements, long-range objectives, and evaluation procedures. "complete and continuous quality improvement is considered a journey rather than a goal, and as a result, has neither a genuine beginning nor an actual finish. Several studies believe quality management to be a method of management that, when used appropriately, has the potential to allow continual performance enhancement [29]. However, the use of QM principles in service organisations, particularly in HEIs, is a relatively new concept, shaped by new realities that began to consider HEIs as viable organisations. Quality management principles have been used in the industrial sector for decades [30]. Most quality management scales developed for HEIs are adaptations of constructs initially developed to study these topics in the manufacturing and other service sectors. This is because several researchers have stated that the types of activities carried out in the manufacturing sector are somewhat comparable to those carried out in the education sector, which makes TQM also applicable to HEIs [31]. In addition, several studies suggested that the first thing that needs to be done in order to implement quality management in higher education effectively is to adopt a pertinent TQM framework that is capable of meeting its missions and goals [32]. This framework must be constructed on a collection of fundamental principles and practices, which should be the basis for connecting and integrating the essential performance standards in the quality framework.

## 2.3. Quality Assurance

The topic of quality assurance in higher education has been the subject of a significant number of publications that have been published. There have been several studies that have dealt with quality assurance as a concept, as well as studies that have dealt with its dimension [33] and the approaches to it [34]. In addition, several studies examined the developments that have taken place in the procedures and practices of national quality assurance standards [35]. The overarching goal has been understanding the nature of education quality assurance and how it may be accomplished. The term "quality assurance" has been conceptualized and defined in various ways throughout scholarly research. Following the effective fulfilment of the quality criteria and requirements implemented in the evaluation, some have termed it a method to guarantee trust in educational institutions and ensure confidence in them [36].

## 2.4. TQM Practices and Education Performance

The term "total quality management" (TQM) refers to a concept that aims to "attain corporate excellence via the use of methodologies and technology" [37]. By emphasizing measurement, continuous improvement, and control, it seeks to satisfy the client's specified needs. Based on the analysis of the relevant literature, this project has identified success characteristics for TQM, and their research has been reproduced several times [38]. Following a comprehensive analysis of the relevant published material, it has been discovered that 76 studies conducted in a variety of nations have identified 18 universally relevant success criteria for the adoption of TQM [37-38]. Many studies have shown that there is a substantial correlation between TQM practices and the performance of businesses. However, only a small number of research demonstrated that TQM did not increase performance [39]. Therefore, one of the goals of this research is to conduct an empirical investigation of the relationship between TQM and educational achievement. Therefore, below is the pertinent hypothesis hereafter will be referred as H1

that:

**H1:** TQM practices are positively correlated with educational performance.

## 2.5. TQM Practices and Quality Assurance

The concept of quality assurance is relatively new in TQM, and it has only recently emerged as a way of finding solutions to the ways of enhancing and improving the overall performance of their workforce. TQ entails the application of a set of standards and procedures to continuously improve educational products. It includes technical requirements and desired characteristics of educational products, processes, and operations that enable compliance with these standards. TQ becomes a key element of TQM [40]. TQM entails the application of standards and procedures to continuously improve educational products in the field of education. In relation to the process of implementation, quality assurance covers all the activities associated with the evaluation and enhancement of the value of one (or more) standards, and it is about providing assurance that the organization ensures that its products and services comply with quality standards that are generally accepted in this field [41]. TQM is a component of quality management which ensures that individuals, communities, and societies get the confidence that they will be able to meet all the quality standards (Kayyali, 2023). Thus, we hypothesize that:

**H2:** TQM practices are positively correlated with quality assurance

## 2.6. Quality Assurance and Education Performance

The whole organisational community is accountable for the cultivation of a positive working environment that results in organisational brilliance [42] through the continuous improvement process of quality assurance. In the same vein, quality assurance is defined as a collection of procedures that are intended to ensure that organisations comply with quality standards and deliver the highest quality products that surpass those of their competitors [43]. In the context of higher education, quality assurance is the institution's comprehensive approach to the concept of quality and its application to all aspects of its operations [44]. Quality assurance is frequently implemented to enhance the quality of organisational products and services. Researchers assessed quality assurance as a predictor variable for organisational performance and identified a favourable correlation between the two. In the same vein, researchers conducted a study to assess the influence of quality assurance on the performance of Kenyan institutions. The findings indicated a significant correlation between quality and university performance. Nevertheless, the investigation was restricted to a solitary research institution in Kenya. In a separate investigation, researchers discovered that quality assurance has a substantial and advantageous impact on the performance of universities in Nigeria. The analysis was restricted to Nigerian universities since quality culture only anticipated 30.4% of the total difference in university performance. Consequently, the authors recommend that future researchers conduct a more thorough investigation and incorporate a greater number of predictor variables [45].

**H3:** Quality assurance is positively related to education performance

## 2.7. Quality Assurance as mediator between TQM Practices and Education Performance

According to a review of the existing literature, the majority of studies on quality assurance are qualitative in nature [46-47]. In quantitative research, quality assurance has been primarily analyzed as a predictor variable with relation to organisational performance, with results suggesting a positive impact. Quality assurance was also investigated as a DV in a few studies, and the findings indicated a positive correlation with IVs, including visionary leadership and TQM procedures [48]. Although quality assurance has been the focus of limited research as a mediator, existing studies indicate its mediating role in various variables, such as talent management (one of the three dimensions) and university performance, the competitiveness of Saudi contractors and TQM practices, and partially between QMP and innovation performance (Ahmed and Hilman, 2017). Considering the ambiguity surrounding the actual function of quality assurance and the criteria established by previous studies. Following is the relevant hypothesis:

**H4:** Quality assurance mediates the relationship between TQM practices and education performance

Based on the above discussion, gaps highlighted in the introduction section and hypothesis derivation in the literature review section, following is the conceptual framework of this study:

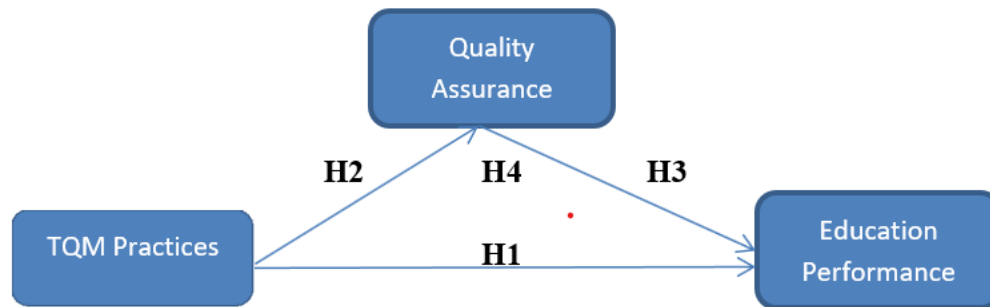


Figure 1. Conceptual Framework

### 3. Methodology

The core objective of this research is to examine the mediating role of quality assurance on the relationship between TQM practices and education performance in the higher education institutions of Pakistan. To attain this objective, the structured close-ended questionnaire was design to take information from the top management of the university such as Vice Chancellors, Deans, Registrars, Professors and Directors QEC. They are key personnel of any university involved in the crucial decision making related to quality and performance dimensions of any university in Pakistan [49]. The questionnaire was sent through an online link to email addresses of the potential respondents. The email addresses were obtained from the university website of each university. As Pakistan is one of the countries with the lowest response rate [50], 500 potential respondents out of total 1235 (HEC, 2024) were contacted and provided the questionnaire. To increase the response rate, the cover letter was also attached with the questionnaire explaining the objectives of the research and ensuring that obtained data will be kept secret and utilized for the research purpose, only. This approach allows researcher to increase the response rate in the social science research [51]. Total 267 stakeholders responded and hence the response rate of 53% thereby used for the final analysis.

#### 3.1. Measurements

The measurements of the current study were utilized in line with the previously developed studies. Three latent constructs were used in this study where TQM practices employed as independent variable, quality assurance as mediator and education performance as a dependent variable. The scale used in this research developed by [52], which measures TQM practices in higher education institutions, comprising 11 practices. The rationale to choose 11 practices is that TQM is deemed to be the multifaceted construct that cannot be measured through a single determinant as several models have been presented in the prior literature [53]. Performance was assessed using 25 questions derived from prior studies for three first-order teaching performance [56] and research performance (RP) [54], and social performance (SP). Similarly, quality assurance was measured through 5 items scale derived as described by [55]. It is also ensured that all scales were pre-tested from the five experts from academic and administration sides of universities. These experts suggested a few corrections to make questionnaire suitable and clear for the data collection. All items measured through 7point Likert scale ranging from 1 to 7 where 1 denoted strongly disagree and 7 denoted strongly agree.

### 4. Results and Findings

In this research, PLS-SEM was employed for several reasons. Firstly, PLS performs exceptionally well with small datasets, delivering reliable results. Secondly, PLS effectively handles non-normal data due to its bootstrapping technique, providing accurate outcomes. Thirdly, PLS-SEM is extensively used in the TQM (Total Quality Management) field, which further validates its application. For all these reasons, PLS-SEM stands out as a robust tool in this study. In this research, the analysis was divided into two stages: the first is called the measurement model, and the second is known as the structural model. Two

stage approach is prominent in the PLS-SEM literature [57]. Results indicate that majority of the respondents are male (73%), most of the respondent belong to the public sector universities (66%), while mostly respondents in the age bracket of 41-50 (31%), similarly, mostly respondent directors QEC (29%).

**Table 1.** Demographic of Respondents

| Demographic Category | Group           | Percentage (%) |
|----------------------|-----------------|----------------|
| Gender               | Male            | 73%            |
|                      | Female          | 27%            |
| University Sector    | Public          | 66%            |
|                      | Private         | 34%            |
| Age                  | 20–30           | 10.30%         |
|                      | 31–40           | 32.7%          |
|                      | 41–50           | 38.6%          |
|                      | 51+             | 18.4%          |
| Position             | Director QEC    | 29%            |
|                      | Other Positions | 71%            |

#### 4.1. Measurement Model

Table 2 depicts the results of the measurement model, which demonstrate that the reliability of all items is above 0.7, while the composite reliability also exceeds 0.7 for all latent constructs [57]. This confirms that both inter-item reliability and composite reliability are present in the measurement model which in turn established item and construct internal consistency. Additionally, convergent validity was measured using Average Variance Extracted (AVE), with a threshold value of 0.5.

**Table 2.** Factor loadings, Composite reliability, Convergent validity

| First Order Construct              | Second Order Construct | Items | Factor Loading | CR    | AVE   |
|------------------------------------|------------------------|-------|----------------|-------|-------|
| Total Quality Management Practices | Employee Involvement   | EI1   | 0.794          | 0.984 | 0.500 |
|                                    |                        | EI2   | 0.829          |       |       |
|                                    |                        | EI3   | 0.852          |       |       |
|                                    |                        | EI4   | 0.866          |       |       |
|                                    |                        | EI5   | 0.835          |       |       |
|                                    |                        | EI6   | 0.795          |       |       |
|                                    | Education & Training   | EaT1  | 0.814          |       |       |
|                                    |                        | EaT2  | 0.882          |       |       |
|                                    |                        | EaT3  | 0.840          |       |       |
|                                    |                        | EaT4  | 0.836          |       |       |
|                                    |                        | EaT5  | 0.776          |       |       |
|                                    |                        | LEAD1 | 0.786          |       |       |
|                                    | Leadership             | LEAD2 | 0.765          |       |       |
|                                    |                        | LEAD3 | 0.765          |       |       |
|                                    |                        | LEAD4 | 0.787          |       |       |
|                                    |                        | LEAD5 | 0.795          |       |       |
|                                    |                        | LEAD6 | 0.782          |       |       |
|                                    |                        | LEAD7 | 0.789          |       |       |
|                                    | Vision                 | LEAD8 | 0.762          |       |       |
|                                    |                        | LEAD9 | 0.753          |       |       |
|                                    |                        | VIS1  | 0.757          |       |       |

|                   |                                 |           |       |       |       |
|-------------------|---------------------------------|-----------|-------|-------|-------|
| Quality Assurance | Management and Evaluation       | VIS2      | 0.847 | 0.923 | 0.617 |
|                   |                                 | VIS3      | 0.844 |       |       |
|                   |                                 | VIS4      | 0.841 |       |       |
|                   |                                 | VIS5      | 0.755 |       |       |
|                   |                                 | M&A2      | 0.755 |       |       |
|                   |                                 | M&A4      | 0.773 |       |       |
|                   |                                 | M&A5      | 0.801 |       |       |
|                   |                                 | M&A6      | 0.786 |       |       |
|                   |                                 | M&A6      | 0.705 |       |       |
|                   |                                 | M&A7      | 0.743 |       |       |
|                   | Other Stakeholder Focus         | OSF1      | 0.817 |       |       |
|                   |                                 | OSF3      | 0.842 |       |       |
|                   |                                 | OSF4      | 0.821 |       |       |
|                   |                                 | OSF5      | 0.806 |       |       |
|                   | Process Control and Improvement | PCaI1     | 0.808 |       |       |
|                   |                                 | PCaI2     | 0.784 |       |       |
|                   |                                 | PCaI3     | 0.810 |       |       |
|                   |                                 | PCaI4     | 0.852 |       |       |
|                   |                                 | PCaI5     | 0.802 |       |       |
|                   | Program Design                  | PD1       | 0.788 |       |       |
|                   |                                 | PD2       | 0.775 |       |       |
|                   |                                 | PD3       | 0.793 |       |       |
|                   |                                 | PD4       | 0.794 |       |       |
|                   | Recognition and Reward          | RaREW1    | 0.844 |       |       |
|                   |                                 | RaREW2    | 0.860 |       |       |
|                   |                                 | RaREW3    | 0.859 |       |       |
|                   |                                 | RaREW4    | 0.818 |       |       |
|                   | Student Focus                   | SF1       | 0.844 |       |       |
|                   |                                 | SF2       | 0.801 |       |       |
|                   |                                 | SF4       | 0.815 |       |       |
|                   | Quality System Improvement      | QSI1      | 0.864 |       |       |
|                   |                                 | QSI2      | 0.863 |       |       |
|                   |                                 | QSI3      | 0.866 |       |       |
|                   | Education & Training            | Edu&Trai1 | 0.814 |       |       |
|                   |                                 | Edu&Trai2 | 0.822 |       |       |
|                   |                                 | Edu&Trai3 | 0.840 |       |       |
|                   |                                 | Edu&Trai4 | 0.836 |       |       |
|                   |                                 | Edu&Trai5 | 0.776 |       |       |
|                   | Quality Assurance               | QA1       | 0.778 |       |       |
|                   |                                 | QA2       | 0.798 |       |       |
|                   |                                 | QA3       | 0.810 |       |       |
|                   |                                 | QA4       | 0.809 |       |       |
|                   |                                 | QA5       | 0.793 |       |       |
|                   |                                 | QA6       | 0.768 |       |       |
|                   |                                 | QA7       | 0.790 |       |       |

|                              |                      |     |       |              |              |
|------------------------------|----------------------|-----|-------|--------------|--------------|
| <b>Education Performance</b> | Research Performance | QA8 | 0.756 | <b>0.951</b> | <b>0.573</b> |
|                              |                      | QA9 | 0.768 |              |              |
|                              |                      | RP1 | 0.826 |              |              |
|                              |                      | RP2 | 0.855 |              |              |
|                              |                      | RP3 | 0.839 |              |              |
|                              |                      | RP4 | 0.826 |              |              |
|                              |                      | RP5 | 0.689 |              |              |
|                              |                      | SP1 | 0.812 |              |              |
|                              |                      | SP2 | 0.806 |              |              |
|                              | Social Performance   | SP3 | 0.805 |              |              |
|                              |                      | SP4 | 0.815 |              |              |
|                              |                      | SP5 | 0.805 |              |              |
|                              |                      | SP6 | 0.815 |              |              |
|                              |                      | TP1 | 0.820 |              |              |
|                              |                      | TP2 | 0.822 |              |              |
|                              | Teaching Performance | TP3 | 0.813 |              |              |
|                              |                      | TP4 | 0.836 |              |              |
|                              |                      | TP5 | 0.735 |              |              |

Table 2 also shows that the AVE values for all variables are above 0.5, confirming the presence of convergent validity in the measurement model. Furthermore, Table 3 shows that the discriminant validity of all latent constructs was assessed using the HTMT (Heterotrait-Monotrait) ratio, and the values of all latent constructs are below 0.9, which confirms that all latent constructs are empirically distinct from each other according to standard benchmarks [58-59].

|                          | EI    | Edu&Trai | Leadership | M&EVA | OSF   | PC&I  | PD    | QSI   | Quality Assurance | RP    | Rec&Rew | SP    | Stu Foc | TP    | Vision |
|--------------------------|-------|----------|------------|-------|-------|-------|-------|-------|-------------------|-------|---------|-------|---------|-------|--------|
| <b>EI</b>                |       |          |            |       |       |       |       |       |                   |       |         |       |         |       |        |
| <b>Edu&amp;Trai</b>      | 0.859 |          |            |       |       |       |       |       |                   |       |         |       |         |       |        |
| <b>Leadership</b>        | 0.791 | 0.824    |            |       |       |       |       |       |                   |       |         |       |         |       |        |
| <b>M&amp;EVA</b>         | 0.873 | 0.847    | 0.871      |       |       |       |       |       |                   |       |         |       |         |       |        |
| <b>OSF</b>               | 0.883 | 0.948    | 0.847      | 0.857 |       |       |       |       |                   |       |         |       |         |       |        |
| <b>PC&amp;I</b>          | 0.842 | 0.857    | 0.831      | 0.864 | 0.711 |       |       |       |                   |       |         |       |         |       |        |
| <b>PD</b>                | 0.899 | 0.911    | 0.814      | 0.887 | 0.752 | 0.793 |       |       |                   |       |         |       |         |       |        |
| <b>QSI</b>               | 0.721 | 0.805    | 0.816      | 0.833 | 0.862 | 0.812 | 0.709 |       |                   |       |         |       |         |       |        |
| <b>Quality Assurance</b> | 0.826 | 0.842    | 0.793      | 0.805 | 0.703 | 0.864 | 0.797 | 0.811 |                   |       |         |       |         |       |        |
| <b>RP</b>                | 0.800 | 0.837    | 0.823      | 0.854 | 0.885 | 0.850 | 0.880 | 0.849 | 0.712             |       |         |       |         |       |        |
| <b>Rec&amp;Rew</b>       | 0.875 | 0.701    | 0.792      | 0.818 | 0.716 | 0.837 | 0.883 | 0.823 | 0.811             | 0.799 |         |       |         |       |        |
| <b>SP</b>                | 0.811 | 0.852    | 0.764      | 0.799 | 0.889 | 0.872 | 0.858 | 0.809 | 0.740             | 0.726 | 0.818   |       |         |       |        |
| <b>Stu Foc</b>           | 0.789 | 0.858    | 0.778      | 0.816 | 0.795 | 0.860 | 0.870 | 0.794 | 0.789             | 0.871 | 0.846   | 0.798 |         |       |        |
| <b>TP</b>                | 0.731 | 0.778    | 0.732      | 0.789 | 0.795 | 0.822 | 0.820 | 0.767 | 0.739             | 0.736 | 0.708   | 0.714 | 0.819   |       |        |
| <b>Vision</b>            | 0.884 | 0.839    | 0.882      | 0.795 | 0.886 | 0.872 | 0.861 | 0.855 | 0.837             | 0.867 | 0.805   | 0.879 | 0.857   | 0.819 |        |

**Figure 2.** HTMT Ratio

#### 4.2. Structural Model

In the second stage, R-squared ( $R^2$ ), F-squared ( $f^2$ ), and hypothesis testing were performed in the measurement model. Table 4 shows that the  $R^2$  value is 0.84 for education performance and 0.74 for the quality assurance, which are considered high for both constructs (Hair et al., 2019).

**Table 4.** Coefficient of Determination

|                       | <b>R- Square</b> | <b>R-Square Adjusted</b> |
|-----------------------|------------------|--------------------------|
| Education Performance | 0.846            | 0.845                    |
| Quality Assurance     | 0.740            | 0.739                    |

Similarly, Table 5 provides the  $f^2$  values, where it can be observed that the values for both Quality Assurance and TQM practices are medium to high. After assessing the  $R^2$  and  $f^2$  values, the research moved on to hypothesis testing, where the bootstrapping technique was used on a subsample set of 5,000.

**Table 5.**  $f^2$ 

|                   | <b>Education Performance</b> | <b>Quality Assurance</b> |
|-------------------|------------------------------|--------------------------|
| Quality Assurance | 0.508                        |                          |
| TQM practices     | 0.277                        | 0.850                    |

**Table 6.** Hypothesis Testing

| <b>Hyp No.</b>       | <b>Hypothesized Path</b>                                  | <b>B</b> | <b>S.D</b> | <b>T-statistics</b> | <b>P-Values</b> | <b>Decision</b> |
|----------------------|-----------------------------------------------------------|----------|------------|---------------------|-----------------|-----------------|
| <b>Direct Path</b>   |                                                           |          |            |                     |                 |                 |
| H1                   | TQM Practices → Education Performance                     | 0.405    | 0.954      | 7.499               | 0.000           | Accepted        |
| H2                   | TQM Practices → Quality Assurance                         | 0.860    | 0.023      | 37.529              | 0.000           | Accepted        |
| H3                   | Quality Assurance → Education Performance                 | 0.548    | 0.054      | 9.661               | 0.000           | Accepted        |
| <b>Indirect Path</b> |                                                           |          |            |                     |                 |                 |
| H4                   | TQM Practices → Quality Assurance → Education Performance | 0.42     | 0.049      | 9.661               | 0.000           | Accepted        |

Table 6 indicates that TQM practices are positively and significantly related to Educational Performance. Likewise, a significant and positive relationship was found between TQM practices and Quality Assurance, leading to the acceptance of Hypothesis 2. Furthermore, Hypothesis 3 reveals that there is a significant and positive relationship between Quality Assurance and Educational Performance. Furthermore, Hypothesis 4b establishes that Quality Assurance significantly mediates the relationship between TQM practices and Educational Performance in higher education institutions in Pakistan.

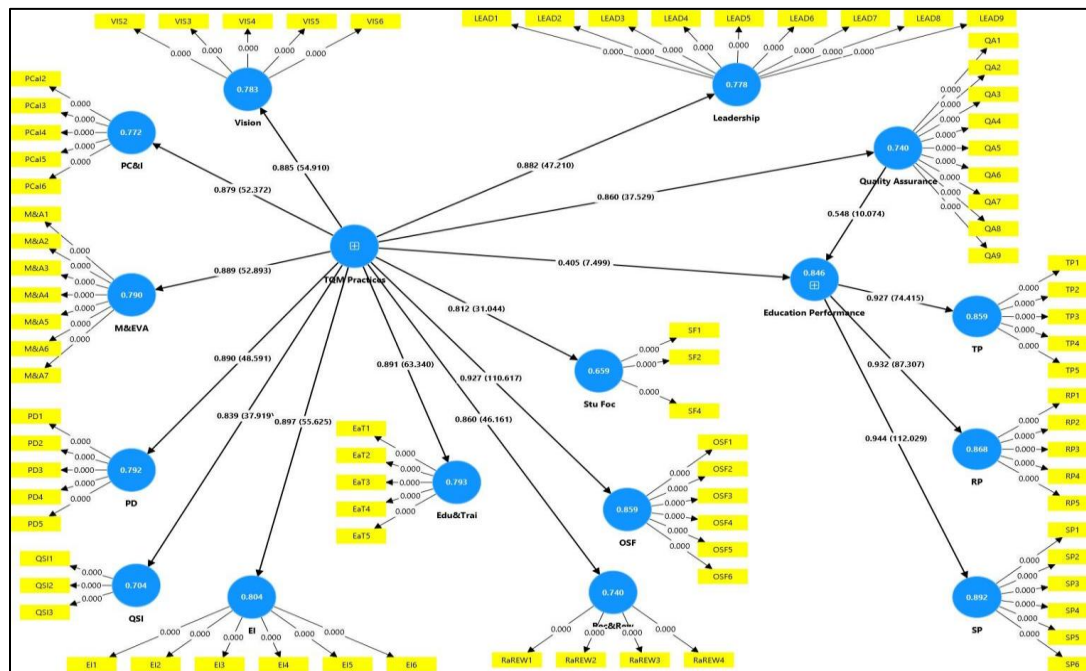


Figure 3. Hypothesis testing through Bootstrapping technique

## 5. Discussion

The primary objective of this research report was to examine the mediating effect of quality assurance between TQM practices and higher education performance. The results on this study indicate that TQM practices hold significant importance, especially if the education performance of any university is to be improved. This research indicates that TQM practices create an environment within the university that ensures quality. This quality operates across various domains, bringing improvements in both student outcomes and other university affairs. As a result of these improvements, there is a positive and substantial transformation in the educational and extracurricular activities of the students, which is a highly favourable outcome. The findings of this research are consistent with previous studies undertaken in other regions of the globe, which also highlight that TQM practices are crucial for enhancing the educational performance of universities. Similarly, this research also reiterates that TQM practices play a vital role in enhancing quality assurance. Whether this quality pertains to products, services, or the operations of any organization, the impact of TQM practices remains significant in improving standards across the board. Moreover, quality assurance also established as a significant predictor of education performance in the higher education institutions of Pakistan. This result is in line with the prior literature that postulates the quality as an integral component in terms of curriculum, programs courses and operation to enhance education performance in universities (Hilman et al., 2017). Therefore, H3 is also accepted. Furthermore, the research empirically verified the role of quality assurance as a mediator between TQM practices and the education performance of higher education institutions in Pakistan. Although some academics have previously examined quality aspect of universities as a mediator (Iqbal et al., 2024), no empirical study has yet determined that quality assurance is a mediator in relation to TQM practices and education performance, particularly developing countries like Pakistan. Therefore, it argued that TQM driven quality assurance in Pakistani universities contributes to attain high standards of academic and extracurricular activities. Furthermore, quality assurance has a key role to make university acclimatize with the requirements of employers as it develops skills that significantly valuable for the industry. Consequently, this investigation contributes to the current body of knowledge by empirically illustrating the mediating influence of quality assurance in higher education institutions.

## 6. Implications of the Study

This study provides both theoretical and practical implications to extend existing literature and to guide practitioners serving in higher education institutions. This research is amongst the few studies that examine TQM practices in relation to education performance, particularly in the context of a developing country like Pakistan. Additionally, it is one of the first studies of its kind to examine quality assurance as a mediating variable between TQM practices and education performance within the context of Pakistani universities. Although prior literature indicates that quality as a dimension is the key for universities, however, quality assurance remained unexplored until this study, which is a major contribution of this study. In addition, this research contributes to the TQM and quality literature by demonstrating that if universities adopt TQM practices, their quality standards improve. These enhanced quality standards enable universities to compete with others on the globe. As the quality standards of a university improve, so does the capability and experience of its students. These quality standards equip students and faculty to compete with other universities and students on a global level in terms of knowledge. Furthermore, this research has practical contributions. It highlights that if universities, not only in Pakistan but also globally, aim to improve their education performance, adopting TQM practices are essential. When practitioners adopt these practices and make quality their primary objective, it ingrains quality within the organization's culture and structure, which ultimately improves the university's overall performance.

## 7. Conclusion

This research confirms all hypotheses as envisaged; such as the indirect influence of TQM practices on education performance and quality assurance, the impact of quality assurance on education performance. Furthermore, the mediating role of quality assurance on the relationship between TQM practices and education performance. Numerous investigations have underscored the significance of TQM practices as a significant component of the literature; however, it may not be sufficient to enhance it. In terms of university performance, Pakistan is no exception. Nevertheless, if TQM practices are inextricably linked to a quality assurance within universities, which is certain to be enhanced their performance. In other words, TQM practices and the quality assurance can both be regarded as valuable resources for colleges to enhance education performance within university. In this study the results indicate that institutions worldwide must foster a quality assurance mechanism that facilitates the successful completion of TQM practices that enhance the education performance of university students across the globe.

## References

1. Akram, K., Raza, S., Fazal, H., & Suhardi, M. (2022). Knowledge Acquisition and Product Development Capability Magnify Competitive Advantage: Insight into Higher Education Institutions of Pakistan. *Jurnal Pengurusan*, 64.
2. Rasool, I., Hussain, M., Janjua, Q. R., Yasir, W., Aslam, B., & Ahmad, S. (2024). Epistemological Access to Higher Education and Service Quality in Pakistan: Students Perspective. *Remittances Review*, 9(2), 1392-1414.
3. Shafqat, T., Mushtaq, R., Tahir, Z., & Shaheen, W. A. (2021). Effects of Total Quality Management (Tqm) on Financial and Non-Financial Performance: Evidence From Higher Educational Sector of Pakistan. *Humanities & Social Sciences Reviews*, 9(3), 1027-1037.
4. Khan, J., Akram, K., Adeel-Farooq, R. M., Jamal, W. N., & Ahmmed, S. (2020). Moderating effect of collaboration and top management support on the relationship between knowledge acquisition and competitive advantage in the public higher education institutions. *Journal of the Research Society of Pakistan*, 57(1), 401-415.
5. Akram, K., & Ahmad, U. (2021). Knowledge sharing and competitive advantage in public universities: Mediating role of strategic intent. *IRASD Journal of Management*, 3(3), 310-317.
6. S Hasham, E. (2018). Academic institutions are no different to any other: Total quality management does enhance performance. *International Journal of Organizational Leadership*, 7, 348-373.
7. Akgün, A. E., Ince, H., Imamoglu, S. Z., Keskin, H., & Kocoglu, İ. (2014). The mediator role of learning capability and business innovativeness between total quality management and financial performance. *International Journal of Production Research*, 52(3), 888-901.
8. Ebrahimi, M., & Sadeghi, M. (2013). Quality management and performance: An annotated review. *International Journal of Production Research*, 51(18), 5625-5643.
9. Iqbal, S., Taib, C. A. B., & Razalli, M. R. (2024). The effect of accreditation on higher education performance through quality culture mediation: the perceptions of administrative and quality managers. *The TQM Journal*, 36(2), 572-592.
10. Singh, V., Kumar, A., & Singh, T. (2018). Impact of TQM on organisational performance: The case of Indian manufacturing and service industry. *Operations Research Perspectives*, 5, 199-217.
11. Cheah, L. F., Cheng, M. Y., & Hen, K. W. (2023). The effect of quality management practices on academics' innovative performance in Malaysian higher education institutions. *Studies in Higher Education*, 48(4), 643-656.
12. Escrig-Tena, A. B., Segarra-Ciprés, M., García-Juan, B., & Beltrán-Martín, I. (2018). The impact of hard and soft quality management and proactive behaviour in determining innovation performance. *International Journal of Production Economics*, 200, 1-14.
13. Sila, I. (2018). Linking quality with social and financial performance: A contextual, ethics-based approach. *Production and Operations Management*, 27(6), 1102-1123.
14. Ma, J. (2020). Research on higher education quality assurance in China during the popularization. *Higher Education Research*, 5(1), 1.
15. Nallusamy, S. (2016). A proposed model for sustaining quality assurance using TQM practices in small and medium scale industries. *International Journal of Engineering Research in Africa*, 22, 184-190.
16. Nasim, K., Sikander, A., & Tian, X. (2020). Twenty years of research on total quality management in Higher Education: A systematic literature review. *Higher Education Quarterly*, 74(1), 75-97.
17. Hambali, M., & Idris, I. (2020). Transformational leadership, organizational culture, quality assurance, and organizational performance: Case study in Islamic higher education institutions (IHEIS). *Jurnal Aplikasi Manajemen*, 18(3), 572-587.
18. Texeira-Quiros, J., Justino, M. d. R., Antunes, M. G., Mucharreira, P. R., & Nunes, A. d. T. (2022). Effects of innovation, total quality management, and internationalization on organizational performance of higher education institutions. *Frontiers in Psychology*, 13, 869638.
19. Iqbal, S., Ashfaq, T., Azlan Bin Taib, C., & Rizal Razalli, M. (2023). The effect of quality culture on service quality of public and private Universities: A comparative analysis. *Plos one*, 18(4), e0283679.
20. De La Torre, E. M., Agasisti, T., & Perez-Esparrells, C. (2017). The relevance of knowledge transfer for universities' efficiency scores: an empirical approximation on the Spanish public higher education system. *Research Evaluation*, 26(3), 211-229.
21. Zimmerman, B. J. (2023). Dimensions of academic self-regulation: A conceptual framework for education. In *Self-*

- regulation of learning and performance (pp. 3-21): Routledge.
22. Asif, M., & Searcy, C. (2014). Determining the key capabilities required for performance excellence in higher education. *Total Quality Management & Business Excellence*, 25(1-2), 22-35.
  23. Ahn, T.-H., Park, S.-Y., & Lee, D.-H. (2023). Effect of Managers' Positive Leadership on Quality Management Activities and Business Performance: Focusing Non-Ferrous Metal Manufacturing Industry. *Journal of Korean Society of Industrial and Systems Engineering*, 46(4), 107-115.
  24. Castañeda, L., & Selwyn, N. (2018). More than tools? Making sense of the ongoing digitizations of higher education. In (Vol. 15, pp. 1-10): SpringerOpen.
  25. Keçetep, İ., & Özkan, İ. (2014). Quality assurance in the European higher education area. *Procedia-Social and Behavioral Sciences*, 141, 660-664.
  26. Lim, W. M., Ciasullo, M. V., Douglas, A., & Kumar, S. (2022). Environmental social governance (ESG) and total quality management (TQM): a multi-study meta-systematic review. *Total Quality Management & Business Excellence*, 1-23.
  27. Javed, Y., & Alenezi, M. (2023). A case study on sustainable quality assurance in higher education. *Sustainability*, 15(10), 8136.
  28. Kukali, A. (2023). The Relationship Between Quality Assurance and Standards Assessment and Public Primary Schools Performance at the Kenya Certificate of Primary Examinations. *Journal of African Interdisciplinary Studies*, 7(1), 13-30.
  29. Cabacang, G. S. (2021). Quality is Never an Accident: A Survey on the Total Quality-Management Practices amongst Selected Higher Education Institutions in the Philippines. *International Journal of Learning, Teaching and Educational Research*, 20(10).
  30. Chandel, P. (2019). Assessing the Association of Employee Engagement with affective Organizational Commitment in Higher Education Institutions. *Research Review International Journal of Multidisciplinary*, 4(2), 907-913.
  31. Lazić, Z., Đorđević, A., & Gazizulina, A. (2021). Improvement of quality of higher education institutions as a basis for improvement of quality of life. *Sustainability*, 13(8), 4149.
  32. Taroreh, S. R., Saerang, D. P. E., Maramis, J., Worang, F. G., & Wenas, R. S. (2022). Implementation of total quality management in higher education institutions: a literature review. *Jurnal EMBA: Jurnal Riset Ekonomi, Manajemen, Bisnis dan Akuntansi*, 10(2).
  33. Owlia, M. S., & Aspinwall, E. M. (1996). A framework for the dimensions of quality in higher education. *Quality assurance in education*, 4(2), 12-20.
  34. Greere, A. (2023). Training for quality assurance in higher education: practical insights for effective design and successful delivery. *Quality in higher education*, 29(2), 165-191.
  35. Seyfried, M., & Reith, F. (2019). The seven deadly sins of quality management: trade-offs and implications for further research. *Quality in higher education*, 25(3), 289-303.
  36. Hafeez, M., Naureen, S., & Sultan, S. (2022). Quality Indicators and Models for Online Learning Quality Assurance in Higher Education. *Electronic Journal of e-Learning*, 20(4), 374-385.
  37. Ghaith, Y., Ghosh, U., Guerra, M., Hammouri, Q., Alkhuzai, Y., & Ghaith, M. (2023). Quality management application and educational performance in higher education institutions: A bibliometric analysis. *Uncertain Supply Chain Management*, 11(4), 1657-1666.
  38. Yusuf, F. A. (2023). Total quality management (TQM) and quality of higher education: A meta-analysis study. *International Journal of Instruction*, 16(2), 161-178.
  39. Ahmad, M., Zakuan, N., Rasi, R. Z. R., & Hisyamudin, M. (2015). Mediator effect of TPM between TQM and business performance in Malaysia automotive industry. Paper presented at the IOP Conference Series: Materials Science and Engineering.
  40. Vykydal, D., Foltá, M., & Nenadál, J. (2020). A study of quality assessment in higher education within the context of sustainable development: A case study from Czech Republic. *Sustainability*, 12(11), 4769.
  41. Al-Zoubi, Z., Qablan, A., Issa, H. B., Bataineh, O., & Al Kaabi, A. M. (2023). The degree of implementation of total quality management in universities and its relationship to the level of community service from the perspectives of faculty members. *Sustainability*, 15(3), 2404.
  42. Saeed, S. T. (2018). Impact of quality assurance on academic performance. *International Journal of Social Sciences & Educational Studies*, 5(1), 178-190.

43. Sweis, R., Abualsondos, A., Magableh, M., Alamayreh, E., Sukkari, L., & Alawneh, A. (2020). The effect of total quality management practices on the academic performance of ISO: 9001 certified private schools: the case of Jordan. *International Journal of Information, Business and Management*, 12(1), 113-140.
44. Kayyali, M. (2023). An overview of quality assurance in higher education: Concepts and frameworks. *International Journal of Management, Sciences, Innovation, and Technology (IJMSIT)*, 4(2), 01-04.
45. Hilman, H., Abubakar, A., & Kaliappen, N. (2017). The effect of quality culture on university performance. *Journal of Business and Retail Management Research*, 11(4).
46. Afriadi, B., Fatkar, B., Mirza, M., Fitri, F., Nur, M., Sobirov, B., . . . Prastowo, S. L. (2023). Systematic Review of Education Quality Assurance Management in Schools Method Matching. *International Education Trend Issues*, 1(2), 58-67.
47. Ilyasov, A., Imanova, S., Mushtagov, A., & Sadigova, Z. (2023). Modernization of quality assurance system in higher education of Azerbaijan. *Quality in Higher Education*, 29(1), 23-41.
48. Ahmed, M. A., & Sajid, N. M. (2023). Leadership and Its Impact on Total Quality Management. *Journal of Advanced Research in Economics and Administrative Sciences*, 4(3), 37-55.
49. Iqbal, S., Ashfaq, T., Azlan Bin Taib, C., & Rizal Razalli, M. (2023). The effect of quality culture on service quality of public and private Universities: A comparative analysis. *Plos one*, 18(4), e0283679.
50. Umrani, W. A., Kura, K. M., & Ahmed, U. (2018). Corporate entrepreneurship and business performance: The moderating role of organizational culture in selected banks in Pakistan. *PSU Research Review*, 2(1), 59-80.
51. Akram, K., Raza, S., Fazal, H., & Suhardi, M. (2022). Knowledge Acquisition and Product Development Capability Magnify Competitive Advantage: Insight into Higher Education Institutions of Pakistan. *Jurnal Pengurusan*, 64.
52. Bayraktar, E., Tatoglu, E., & Zaim, S. (2008). An instrument for measuring the critical factors of TQM in Turkish higher education. *Total Quality Management*, 19(6), 551-574.
53. Jasti, N. V. K., Venkateswaran, V., Kota, S., & Sangwan, K. S. (2022). A literature review on total quality management (models, frameworks, and tools and techniques) in higher education. *The TQM Journal*, 34(5), 1298-1319.
54. Yaakub, M. H., & Mohamed, Z. A. (2019). Measuring the performance of private higher education institutions in Malaysia. *Journal of Applied Research in Higher Education*, 12(3), 425-443.
55. Alzafari, K., & Ursin, J. (2019). Implementation of quality assurance standards in European higher education: does context matter? *Quality in Higher Education*, 25(1), 58-75.
56. Dicker, R., Garcia, M., Kelly, A., & Mulrooney, H. (2019). What does 'quality' in higher education mean? Perceptions of staff, students and employers. *Studies in Higher Education*, 44(8), 1425-1441.
57. Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European business review*, 31(1), 2-24.
58. Ab Hamid, M. R., Sami, W., & Sidek, M. M. (2017). Discriminant validity assessment: Use of Fornell & Larcker criterion versus HTMT criterion. Paper presented at the *Journal of physics: Conference series*.
59. Hair Jr, J. F., Matthews, L. M., Matthews, R. L., & Sarstedt, M. (2017). PLS-SEM or CB-SEM: updated guidelines on which method to use. *International Journal of Multivariate Data Analysis*, 1(2), 107-123.