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Impact of Total Quality Management & Human Capital on Organizational Performance in Pakistani Higher Education Institutions: A Mediating Role of Sustainability

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Abstract: This study examines the impact of total quality management and human capital on the organizational performance of public and private sector higher education institutions in Karachi, Sindh, Pakistan, with the mediating role of sustainability. The research used a quantitative, cross-sectional study design. The data were collected through a structured survey from 308 respondents who were senior- and mid-level academic and administrative personnel in public and private sector higher education institutions in Pakistan. The study adopted a multistage sampling approach that combined purposive and stratified non-probability techniques to ensure valid and relevant responses. The data were analyzed using SPSS for descriptive analysis and SmartPLS 4 with partial least squares structural equation modeling (PLS-SEM). The measurement and structural models were assessed, revealing that TQM and human capital have a strong positive impact on sustainability, while sustainability similarly affects organizational performance. Moreover, mediation analysis confirms that sustainability partially mediates the relationship between total quality management and human capital and organizational performance. The present study contributes theoretically by establishing an integrated framework connecting total quality management, human capital, sustainability, and organizational performance. From a practical viewpoint, stakeholders may use the study's insights to strengthen standards, while HEI administrators can prioritize human development, continuous quality improvement, and sustainability to enhance long-term effectiveness.

Keywords: Human capital, Higher education institutions, organizational performance, sustainability, total quality management.

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INTRODUCTION

This study examines the organizational practices of Total Quality Management (TQM), Human Capital (HC), and the mediating role of Sustainability (SUS) in enhancing Organizational Performance (ORP) in the context of Pakistani higher education institutions (HEIs). According to empirical data, TQM improves institutional performance through mechanisms such as continuous quality improvement, process optimization, and increased leadership commitment (Wassan, Memon, Mari, & Kalwar, 2022). Similarly, human capital is crucial for reinforcing organizational capabilities; faculty competencies, information sharing, and skill development directly contribute to innovation and performance enhancement (Ali, Zin, & bin Ismail, 2024; Strielkowski et al.,

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2023). Furthermore, sustainability is acknowledged as a crucial linking construct that coordinates institutional objectives with environmental, social, and governance priorities while incorporating quality management and HR practices into long-term organizational effectiveness (Khalil & Muneenam, 2021).

The theory also highlights organizational processes, feedback mechanisms, and constrained rationality as important factors affecting managerial choices and organizational flexibility. Sustainable practices and organizational performance dynamics are becoming increasingly significant in institutions. Organizational performance assessment frameworks that go beyond traditional financial measurements are gradually incorporating environmental, social, and ethical considerations. This shift reflects the growing complexity of organizational environments, where stakeholders seek sustainable and socially responsible organizational performance in addition to financial success.

Total Quality Management (TQM) and human capital (HC) are now crucial elements in assessing organizational effectiveness. TQM enhances organizational success through increased stakeholder satisfaction, operational effectiveness, and continuous improvement (Alam, Jumady, Fajriah, Halim, & Hatta, 2024). Effective HR management also improves employee morale, motivation, and engagement, as demonstrated by Abdelmotaleb and Saha (2020). Abdullah, Nazir, Rauf, Marwat, and Naveed (2025) examined the connection between environmental, social, and governance (ESG) performance in industrial and service organizations and organizational outcomes. According to their research, sustainable practices improve both financial and non-financial outcomes, including competitiveness, employee loyalty, and corporate reputation. Additionally, the study demonstrated a relationship between overall organizational performance and organizational inputs such as TQM and human capital. Few studies have combined TQM, human capital, sustainability, and organizational performance into a single framework, particularly in higher education institutions (HEIs), despite prior research examining moderating and mediating factors such as leadership style, environmental uncertainty, innovation, and employee engagement (Hameed, Waris, & Amin ul Haq, 2019; Leal Filho et al., 2023). This study examines how sustainability functions as a mediator in the relationship between TQM, human capital, and organizational performance in HEIs in Karachi, Sindh, Pakistan. The study offers a comprehensive framework for understanding how institutional performance and competitiveness can be enhanced through sustainable organizational practices.

Research Objectives/Aim

1. To examine the impact of TQM on Sustainability and Organizational Performance.
2. To examine the impact of HC on Sustainability and Organizational Performance.
3. To investigate the impact of Sustainability on organizational performance.
4. To determine the mediating role of sustainability in the relationship between total quality management, human capital, and Organizational Performance.

Research Questions

1. What is the (TQM) impact on Sustainability and Organizational Performance?
2. What is the Human Capital (HC) impact on Sustainability and Organizational Performance?
3. What is the impact of sustainability (SUS) on organizational performance (ORP)?
4. Does sustainability impact or have a relationship as a mediator between total quality management, human capital, and organizational performance?

THEORETICAL BACKGROUND AND LITERATURE REVIEW

To understand the theoretical and conceptual connections among total quality management, human capital, sustainability as a mediator, and organizational performance, this research adopts the Resource-Based View (RBV) as its primary theoretical framework. RBV provides the most appropriate perspective for explaining these relationships through the lens of sustainability. The theory states that organizational performance is driven by internal resources that are valuable, rare, inimitable, and non-substitutable (Barney, 1991). From the perspective of higher education institutions, total quality management and human capital represent strategic

resources that enhance institutional effectiveness and long-term performance. Empirical studies confirm that "total quality management and human capital strongly contribute to organizational performance by improving operational efficiency and strategic positioning" (Zehir & Zehir, 2023). However, RBV also suggests that resources must be transformed into capabilities, which further demonstrates the importance of this study. Sustainability supports this transformation process by representing the organizational capability through which total quality management practices and human capital promote compliance and advance long-term economic, social, and environmental objectives. Thus, RBV explains the effects of total quality management and human capital on organizational performance, with sustainability playing a mediating role. The theory also supports the argument that sustainability enhances and strengthens the effects of TQM and HC on organizational performance.

Total Quality Management (TQM) and Organizational Performance

The basis of Total Quality Management (TQM) was established by Deming (1986) which emphasized the importance of employee involvement and systematic process improvement in achieving organizational efficiency. Deming maintained that quality is an organization-wide attitude motivated by leadership dedication to ongoing improvement and a thorough comprehension of process variation rather than a stand-alone function. In order to increase internal skills and maximize performance outcomes, his concepts emphasized the necessity for organizations to establish a culture of quality that spans departments and incorporates all employees into quality improvement projects. Deming (1986) concept also emphasized the significance of building human capital through empowered decision-making and training, which immediately improves an organization's capacity for adaptation, operational effectiveness, and long-term sustainability. By presenting quality as a managerial duty that necessitates strategic planning, quality control, and organized improvement procedures, a complementary viewpoint to quality management. Juran (2003) quality trilogy quality planning, quality control, and quality improvement offered businesses a methodical road map for determining client needs, setting quantifiable objectives, keeping an eye on performance, and putting improvement plans into action.

The framework of total quality management extends the idea that quality management frameworks extend beyond traditional settings into strategic organizational performance idea is strengthened by more recent research (Yücel, 2024), which investigates the correlation between total quality management practices, human capital development, and sustainable organizational performance within modern organizational contexts. Rendering Yücel (2024) empirical study, organizations with strong total quality management practices not only improves organization operations but also encourage better employee capability, engagement, and ongoing learning, which improves the role of sustainability and overall organizational performance. Total Quality Management enhances process efficacy and goods/service quality when it is in line with both policy and operational management. This additionally promotes employee engagement, teamwork, and participation, all of which are essential for long-term performance results.

Hence, a comprehensive policy for achieving long-term organizational goals and competitive advantage is offered by combining Total Quality Management with sustainability and human capital practices. By addressing contemporary corporate issues, such as social responsibility, environmental issues, and change conditions, the integration. The alternative hypotheses are.

H_1: Total quality management has a significant positive impact on organizational sustainability.

H_2: Total quality management practices have a significant positive impact on organizational performance.

Human Capital and Organizational Performance

Human capital has long been defined as employees' knowledge, skills, abilities, and experiences, which are key factors in shaping how well an organization performs. According to Becker (1993), companies may enhance productivity and gain a competitive advantage by capitalizing on human capital through education, training, and skill development. This pivotal work highlighted the policy significance of managing and growing human capital by emphasizing that employee capabilities are significant intangible resources that contribute to both

employee and organizational outcomes. According to Alnachef and Alhajjar (2017), positive creativity, adaptability, and socially conscious behaviour, as inputs into employee skills and knowledge, not only increase procedural competence but also improve organizational sustainability. Their research supports the idea that employee capabilities are decisive for incorporating total quality management and sustainability initiatives into performance improvement policies by showing a robust correlation between human capital development and sustainable organizational results.

The central idea underlying the contextual application of these practices is that the effectiveness of organizational practices, such as total quality management and human capital development, depends on the specific institutional, cultural, and environmental conditions in which they are established and implemented. For example, in emerging economies and higher education institutions, contextual factors such as regulatory pressures, resource availability, and stakeholder expectations play a critical role in shaping the effects of these practices on sustainability and organizational performance. Therefore, understanding the context is essential for accurately inferring relationships among variables and ensuring the successful implementation of management strategies. There remains a research gap in integrating sustainability, total quality management, and human capital into a coherent framework. Despite these considerations, few empirical studies have examined how quality management, human capital, and sustainability practices work together to influence organizational performance. Hence, to understand how organizations can simultaneously improve process quality, employee capabilities, and sustainable outcomes in a competitive business environment, this gap must be addressed. The alternative hypothesis will be:

H_3: Human Capital has a significant positive impact on organizational sustainability.

H_4: Human Capital has a significant positive impact on organizational performance.

Sustainability and Organizational Performance

There are several theories defining sustainability as playing a critical role in impacting organizational performance in terms of economy, environment, and processes, where "sustainability contributes to organizational performance by aligning business operations with stakeholder expectations and long-term value creation" (Adnan, Younas, Khan, & Haseeb, 2023). Sustainability strategically transforms organizational practices to achieve better financial and operational targets by integrating economic, environmental, and social sustainability into their strategies (Bernal-Torres, Torres-Guevara, Aldana-Bernal, Nicolás-Rojas, & Pando-Ezcurra, 2023). The experimental proof from evolving economies indicates that sustainability is a central force of performance, where performance improvement is enforced by social, environmental, and economic integration (Sardana, Gupta, Kumar, & Terziovski, 2020). In the context of this literature review, the study leads to the hypothesis that sustainability has a significant effect on organizational performance.

H_5: Sustainability has a significant positive impact on organizational performance.

Sustainability as Mediating Variable

In the 1990s, the idea of sustainability attracted a lot of attention as businesses and decision-makers realized how crucial it was to strike a balance between social responsibility, environmental preservation, and economic growth. During international environmental negotiations, the United Nations Conference on Environment and Development (1992) placed a strong emphasis on sustainable development, urging states and organizations to implement policies that guarantee long-term ecological balance and prudent resource management. This international project made sustainability a tenet for businesses looking to grow over the long term while reducing adverse effects on the environment and society. Sustainability is still being promoted as a crucial element of organizational strategy by more recent research. According to Lozano and Barreiro-Gen (2023), organizational transformation comprising creativity, leadership dedication, and ethical management techniques is necessary for sustainability. He claims that integrating sustainability into management practices and corporate culture can improve long-term competitiveness, efficiency, and stakeholder trust. Therefore, to this, sustainability focused green innovation improves operational procedures, cuts waste, and stimulates innovative problem-solving, connecting Total Quality Management procedures and human capital to measurable performance outcomes. Similarly, it is becoming more widely recognized that sustainability plays

an important role in mediating the relationship between enhanced organizational performance and organizational practices like human capital development and Total Quality Management. Thus, sustainability is a well-established concept; regardless of its theoretical and practical significance, there are still few empirical studies probing its mediating role, especially in cross-industry and cross-cultural conditions. Here are several unanswered questions about how sustainability impacts the collective benefits of Total Quality Management and human capital on performance by interacting with industry-specific characteristics; hence, to offer a wide-ranging framework that elaborates how sustainability integrates organizational practices to attain long-term organizational performance, competitive advantage, and ethical business outcomes, these gaps must be defined by hypotheses:

H_6: Sustainability mediates the relationship between total quality management practices and organizational performance.

H_7: Sustainability mediates the relationship between human capital and organizational performance.

Conceptual framework

This conceptual framework (Figure 1) is developed to examine the relationship between Total Quality Management, Human Capital, and Organizational Performance, with Sustainability serving as a mediating variable. The framework proposes that TQM and human capital contribute to organizational performance both directly and indirectly.

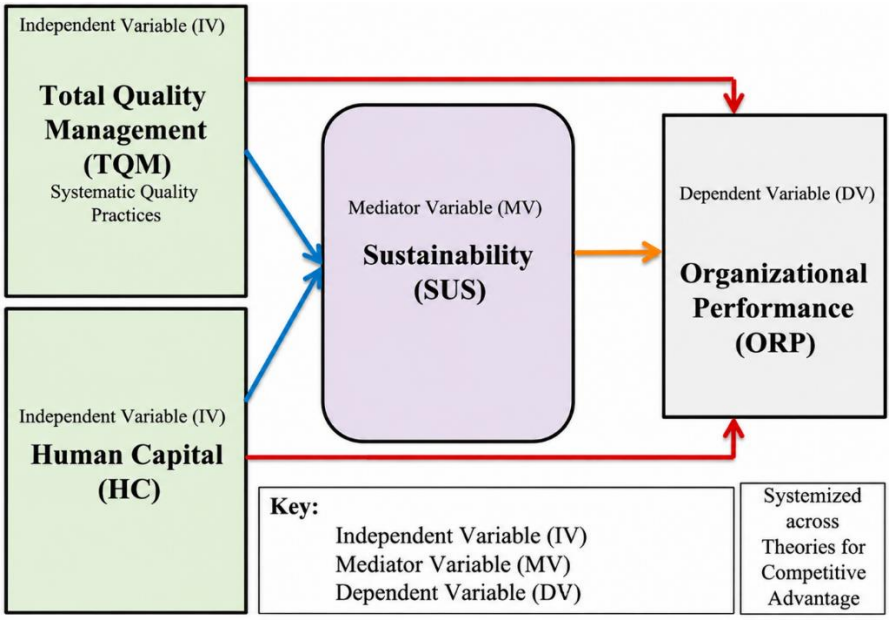


Figure 1: Conceptual framework

METHODOLOGY

Procedures and Participants

The research deductive approach utilized to investigate the connection between Total Quality Management, Human Capital, Sustainability, and Organizational Performance is presented in this chapter. This study uses a quantitative, correlational research design. This research is grounded in a cross-sectional survey approach.

The senior- and mid-level academic and administrative personnel who work for public- and private-sector higher education institutions (HEIs) recognized by the Higher Education Commission (HEC) of Pakistan, particularly in Karachi, Sindh, constitute the target population of this research. They were selected because

they are an important source of operational knowledge and responsible decision-makers who implement TQM frameworks, human capital development strategies, and sustainability initiatives within their institutions.

The study adopted a multistage sampling approach that combines purposive and stratified techniques, both non-probability sampling methods, to ensure representation from various departments and hierarchical levels. Purposive sampling was used to identify companies that actively implement sustainable human capital and total quality management when access issues arose (Taherdoost, 2016).

An appropriate sample size is necessary for cross-sectional survey research employing Structural Equation Modeling (SEM) in order to guarantee accurate parameter estimates and acceptable statistical power. For SEM analysis, methodological experts like Hair, Hult, Ringle, and Sarstedt (2017) advise a minimum sample size of 200–300 respondents; bigger samples enhance model correctness and stability, according to sampling recommendations. In order to guarantee sufficient statistical power and trustworthy analysis.

Data Collection Instruments

The data collection tool used in this study is a structured survey questionnaire. This tool is appropriate for achieving the research objectives, which involve evaluating the relationships between Total Quality Management, Human Capital, Sustainability, and Organizational Performance across a large sample (Saunders, Lewis, & Thornhill, 2023).

Design of Instruments

The questionnaire is divided into four sections and uses a 5-point Likert scale, with 1 signifying "strongly disagree" and 5 signifying "strongly agree." The scale will be used to obtain feedback scores for each item.

Data on Demographics

The detailed data are presented in terms of the following variables: type of organization, employee position, experience, education level, gender, and age.

Total Quality Management (TQM) Independent Variable (IV)

The data items of the known variable, Total Quality Management, the scale is altered (Alam et al., 2024). Where this validate the Total Quality Management scale reliability; the results show a high degree of internal consistency and measurement reliability through Cronbach's Alpha, which is calculated (0.87).

Human Capital, Independent Variable (IV)

The second data item for the human capital variable was used to assess construct reliability. The results show that Cronbach's alpha was calculated at 0.85, demonstrating strong internal consistency among the assessed items.

Sustainability, Mediator Variable (MV)

The third data item of the sustainability variable was used to assess construct reliability; the results show that Cronbach's alpha was calculated at 0.85, demonstrating strong internal consistency among the assessed items.

Performance of the Organization: Dependent Variable (DV)

Hence, the assessment of organizational performance depends on financial performance, competitive advantage, operational effectiveness, and innovation. Items were adapted from organizational performance scales that have been validated in other studies. Cronbach's alpha was used to assess construct reliability, and the results demonstrate a high degree of internal consistency and reliability (0.88).

Data Analysis Techniques

The software SPSS and SmartPLS were used to analyze the collected data. The initial data analysis was conducted using these tools, and data screening was carried out to verify the accuracy and consistency of the collected data through reliability analysis and descriptive statistics. In addition, SmartPLS was used to conduct

partial least squares structural equation modeling (PLS-SEM) to test the proposed hypotheses and investigate the relationships between the study variables.

Ethical Considerations

In accordance with accepted ethical research guidelines, this study complied with requirements including anonymity, confidentiality, informed consent, and voluntary participation. To achieve the research objectives, respondents were given the freedom to understand the study and could withdraw at any time without incurring any consequences. Therefore, all data were stored and used solely for academic purposes; no personal interests could deviate from the research objectives.

Data Collection Process

The questionnaire is the basic tool for quantitative research in social and communication sciences (Trușcă & Sălcudean, 2024). The data were collected through an online Google survey form using WhatsApp; the questionnaire was distributed, but before this, a detailed message for this study was given to respondent groups, which explained the research objectives and guaranteed the privacy of respondents' data. Electronic informed consent was incorporated as a mandatory screening question at the beginning of the online Google Forms survey, requiring participants to click "Agree" before proceeding, thereby ensuring compliance with ethical standards for digital surveys.

The data were collected over a period from March 16, 2026, to April 22, 2026. The response rate was 77% (308 out of 400 respondents). Before conducting the final statistical analysis, the collected data were examined for outliers and missing values to ensure data reliability and accuracy. Missing data were analyzed using SPSS, and cases with a high percentage of missing responses were removed. Imputation techniques and mean replacement were applied to minor amounts of missing data. To identify outliers, boxplots and standardized z-scores were used. Cases exceeding the permitted threshold values were carefully examined and removed to maintain the robustness and normality of the dataset. These methods improved the validity and consistency of the data before using SmartPLS to conduct structural equation modeling (SEM).

The research presents the results of the data analysis, organized into five sections. The first addresses data screening, including errors and missing values. The second examines the response rate and potential survey bias. The third section provides respondents' profiles and descriptive statistics. The fourth section explains the measurement and structural models. The last section summarizes hypothesis testing, model validation, and model fit. After data entry into the statistical analysis software, the data were carefully examined for errors and missing values. The variables were properly coded and labeled before analysis, including descriptive statistics, measurement model assessment, and hypothesis testing. Data analysis was conducted using IBM SPSS and SmartPLS 4 software. Table 1 shows that the following HEIs are categorized as public and private institutions.

Table 1: Total Responses

HEI Category	No. of HEIs Targeted	Respondents
Public Sector HEIs	10	113
Private Sector HEIs	12	195
TOTAL SAMPLE	22	308

Table 2 shows the demographic profile of the respondents (N = 308), indicating a relatively balanced gender distribution, with 53.6% male and 46.40% female respondents. In terms of age, 22.70% were in the 20–35-year age group. The majority of respondents were in the 36–45-year age group (47.1%), followed by those in the 46–55-year age group (21.10%); 9.10% were aged 56 or above. A large proportion belonged to private HEIs (63.31%), while 36.69% belonged to public HEIs. In terms of years of experience, 20.10% had less than 2 years, 27.90% had 2–5 years, 23.40% had 6–10 years, 17.90% had 11–15 years, and 10.70% had more than 15 years of

experience. Furthermore, 69.8% of respondents reported direct involvement in TQM and human capital practices, confirming the relevance of the sample to the study.

Table 2: Demographic Characteristics of Respondents (N = 308)

Demographic Variable	Category	Frequency(n)	Percentage %
Gender	Male	165	53.60%
	Female	143	46.40%
Age	20–35 years	70	22.70%
	36–45 years	145	47.10%
	46–55 years	65	21.10%
	56 & above	28	9.10%
Designation	Manager Admin	30	9.74%
	Senior Lecturer	29	9.42%
	Professor	22	7.14%
	Associate Professor	22	7.14%
	Dean	21	6.82%
	Associate Dean	20	6.49%
	Manager HR	18	5.84%
	Head of Department	18	5.84%
	Assistant Director	16	5.19%
	Director	15	4.87%
	Deputy Registrar	15	4.87%
	Coordinator	14	4.55%
	Registrar	13	4.22%
	Manager Finance	13	4.22%
	Section Head	9	2.92%
	Assistant Registrar	7	2.27%
	Lecturer	7	2.27%
	Research Coordinator	6	1.95%
	Deputy Director	6	1.95%
	Assistant Professor	4	1.3%
	Director QEC	3	0.97%
HEI Type	Public	113	36.69%
	Private	195	63.31%
Experience	< 2 years	62	20.10%
	2–5 years	86	27.90%
	6–10 years	72	23.40%
	11–15 years	55	17.90%
	> 15 years	33	10.70%
Involvement in TQM / Human Capital	Yes	215	69.80%
	No	93	30.20%

Table 3: Descriptive statistics

Construct	N	Mean	Std. Dev.
Total Quality Management (TQM)	308	3.91	0.68
Human Capital (HC)	308	3.85	0.72
Sustainability (SUS)	308	3.74	0.74
Organizational Performance (ORP)	308	3.88	0.71

According to the descriptive statistics, the data indicate that all constructs have relatively high mean values, suggesting that respondents generally agree that total quality management practices, human capital,

and sustainability are positive and contribute to good organizational performance. In Table 3, Total Quality Management had the highest mean score (M = 3.91, SD = 0.68), suggesting that respondents generally believe TQM practices are well implemented in their organizations. Organizational Performance (ORP), with a relatively high mean (M = 3.88, SD = 0.71), also indicates a positive perception of institutional performance. Human Capital (HC), with a mean of M = 3.85 (SD = 0.72), indicates that respondents agree that employees' skills, knowledge, and capabilities are relatively strong. Although it is above the midpoint, Sustainability (SUS) has the lowest mean (M = 3.74, SD = 0.74), indicating that institutions accept sustainability benchmarks. The standard deviation values for each construct range from 0.68 to 0.74, indicating consistency. Overall, the research suggests that all aspects are generally regarded as moderate to high, with TQM and organizational performance being somewhat stronger. However, sustainability is also viewed favorably.

Table 4: Reliability Statistics

Construct	No. of Items	Cronbach's α	CR (Composite)	Reliability Status
TQM	8	0.872	0.891	Good
HC	8	0.854	0.878	Good
SUS	7	0.847	0.869	Good
ORP	8	0.883	0.901	Excellent
Overall Instrument	31	0.916	0.928	Excellent

Note: The Criteria: Loadings > 0.70; AVE > 0.50; CR > 0.70; Cronbach's α > 0.70 (Hair, Risher, Sarstedt, & Ringle, 2019).

According to Table 4, these results demonstrate that all constructs meet and satisfy the recommended reliability criteria. For TQM, α = 0.872 and CR = 0.891, indicating that all eight items measure the same concept. Similarly, for HC, α = 0.854 and CR = 0.878, indicating that all eight items measure the same concept. The same applies to SUS, where α = 0.847 and CR = 0.869, and all seven items are consistent. For ORP, α = 0.883 and CR = 0.901, indicating that all eight items consistently measure the same concept. These findings confirm the strong internal consistency of the measurement scales. Therefore, the model is reliable and appropriate for structural analysis.

Table 5: Pearson Correlation Matrix

Construct	TQM	HC	SUS	ORP
TQM	1.000			
HC	0.641**	1.000		
SUS	0.686**	0.606**	1.000	
ORP	0.284**	0.261**	0.728**	1.000

Note: **p < 0.01 (two-tailed).

Table 5 shows that the correlation between total quality management and human capital (r = 0.641) indicates a moderately strong positive relationship, suggesting that effective quality management practices are associated with strong human capital development. The correlation between total quality management and sustainability (r = 0.686) indicates a moderate positive relationship, meaning that total quality management contributes to sustainability initiatives. The association between human capital and sustainability (r = 0.606) further confirms that enhanced human capital supports sustainability. Regarding organizational performance, the correlation between total quality management and organizational performance (r = 0.284) indicates a strong positive relationship, suggesting that total quality management enhances organizational performance. Although the correlation between human capital and organizational performance (r = 0.261) indicates a moderately strong association, it also highlights the importance of human capital in improving performance. The strongest correlation is between sustainability and organizational performance (r = 0.728), indicating that sustainability has the strongest relationship with organizational performance among all constructs. Overall, the Pearson correlation matrix indicates positive and significant relationships among all constructs, showing

that they move in the same direction. Furthermore, all correlations are below 0.90, indicating no multicollinearity issues. These results support the proposed relationships and provide preliminary evidence for the structural model analysis.

Smart PLS 4 reports the PLS-SEM Model. The Smart PLS 4 analysis is conducted using two methods: a new criterion for assessing discriminant validity in variance-based structural equation modeling (Henseler, Ringle, & Sarstedt, 2015). Both are reported before interpreting hypotheses.

Measurement Model Assessment

Table 6 shows the Heterotrait–Monotrait (HTMT) ratio, which is used to assess discriminant validity among the study constructs. The recommended benchmark for HTMT is below 0.85 (strict criterion) or below 0.90 (lenient criterion). The results indicate that all HTMT values are within acceptable limits. Specifically, the HTMT values between total quality management and human capital (0.741), total quality management and sustainability (0.812), and human capital and sustainability (0.768) are well below the benchmarks, demonstrating clear distinctions among these constructs.

Table 6: Discriminant Validity — Heterotrait–Monotrait Ratio (HTMT)

Constructs	TQM	HC	SUS	ORP
TQM	—			
HC	0.741	—		
SUS	0.812	0.768	—	
ORP	0.463	0.438	0.842	—

Note: HTMT threshold: < 0.85.

Similarly, the HTMT values for organizational performance and total quality management (0.463), human capital and organizational performance (0.438), and sustainability and organizational performance (0.842) remain within acceptable ranges. Therefore, the results confirm adequate discriminant validity among the constructs, indicating that each construct measures a distinct concept and that there are no concerns regarding discriminant validity.

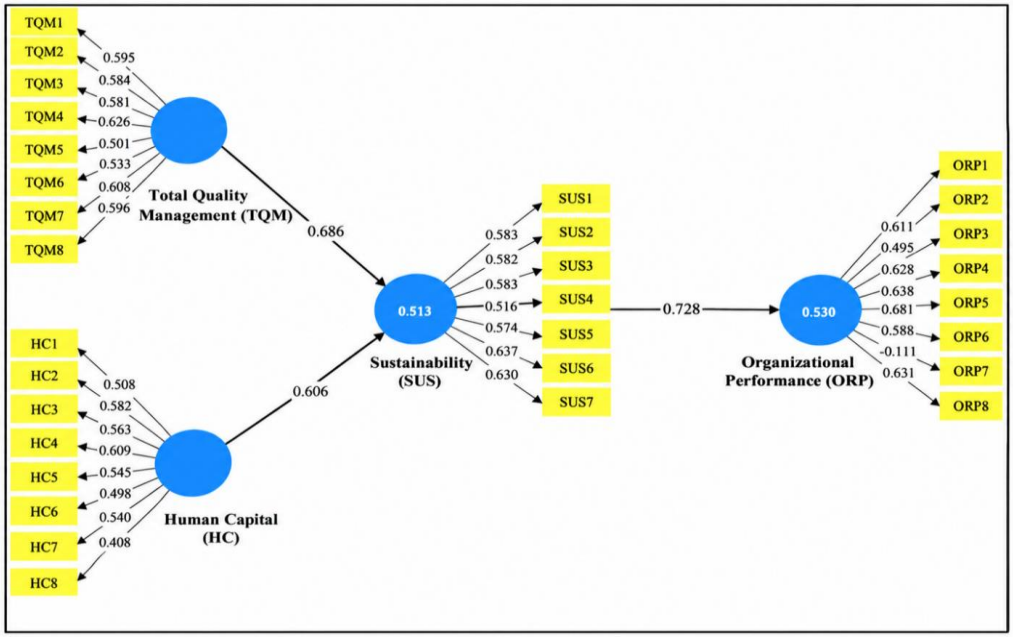


Figure 2: PLS-SEM structural model

Figure 2 shows the PLS-SEM structural model, indicating the relationship among Total Quality Management, Human Capital, Sustainability as a mediator, and Organizational Performance.

Structured Inner Model

Total quality management → Sustainability (β = 0.686), indicating a strong positive relationship and suggesting that better TQM practices contribute significantly to sustainability.

Human Capital → Sustainability (β = 0.606), showing a moderately strong positive impact and indicating that effective human capital management contributes profoundly to sustainability. Sustainability → Organizational Performance (β = 0.728), showing a strong relationship in the model and indicating that sustainability plays an important role in improving organizational performance. The important finding is that sustainability acts as a significant driving force, linking management practices to performance outcomes in HEIs.

R^2 Variance

Sustainability (R^2 = 0.513) is explained by total quality management and human capital, accounting for a moderate to strong proportion of the variance. Organizational Performance (R^2 = 0.530) is explained by sustainability, indicating strong predictive ability.

Measurement Model (Outer Loading)

The strength of the correlation between each indicator and its corresponding construct in the measurement model is represented by the outer loadings. In exploratory research, most indicator loadings exceed 0.50, indicating acceptable indicator reliability. However, certain items, such as HC5, HC7, ORP2, and ORP3, exhibit comparatively lower loadings, indicating weaker contributions to their respective constructs and potentially requiring further analysis or improvement in subsequent research.

The Mediation Role of Sustainability

Total quality management and human capital do not directly enhance performance; instead, they first improve sustainability, which then has a strong impact on performance.

This confirms partial mediation, meaning that direct impacts exist, but indirect effects through sustainability are stronger and more pronounced.

Hence, the model demonstrates that total quality management practices and human capital significantly enhance sustainability, and sustainability strongly drives organizational performance. Thus, sustainability serves as the key mediating mechanism that transforms management practices into improved HEI performance.

Table 7: Structural Model: Path Coefficient & Hypothesis Testing

H	Path	β	SE	t-value	p-value	95% CI	Decision
H1	TQM → SUS	0.686	0.062	11.065	0	[0.564, 0.808]	Accepted
H2	TQM → ORP	0.284	0.063	4.508	0	[0.161, 0.407]	Accepted
H3	HC → SUS	0.606	0.058	10.448	0	[0.492, 0.720]	Accepted
H4	HC → ORP	0.261	0.061	4.279	0	[0.142, 0.380]	Accepted
H5	SUS → ORP	0.728	0.065	11.2	0	[0.601, 0.855]	Accepted
H6	TQM → SUS → ORP	0.120	0.028	4.286	0	[0.065, 0.175]	Accepted
H7	HC → SUS → ORP	0.105	0.025	4.2	0	[0.056, 0.154]	Accepted

Note: The global direct impact of core independent inputs (TQM & HC combined) on Organizational Performance is (β = 0.352, t = 5.415, p < 0.001)

Findings – Acceptance or Rejection of Hypotheses

Table 7 shows the structural model results for the hypothesized direct relationships. Total quality management has a strong positive impact on sustainability (SUS) (β = 0.686, t = 11.065, p < 0.001). Human capital (HC) also strongly influences sustainability (β = 0.606, t = 10.448, p < 0.001), confirming that both factors contribute to organizational sustainability practices. Regarding the direct impact on organizational performance (ORP), total quality management (β = 0.284, t = 4.508, p < 0.001) and human capital (β = 0.261, t = 4.279, p < 0.001) demonstrated strong positive effects. These results show that improvements in quality management and human capital directly enhance HEI performance (β = 0.352, t = 5.415, p < 0.001), demonstrating their central role as key drivers of performance outcomes. Further mediation analysis confirms that sustainability partially mediates the relationships between TQM and ORP (β = 0.120, t = 4.286, p < 0.001) and between HC and ORP (β = 0.105, t = 4.200, p < 0.001). This indicates that TQM and HC positively affect ORP through both direct and indirect pathways. Overall, the findings strongly support all the hypotheses (H1–H7), demonstrating that TQM and human capital enhance sustainability and thereby significantly improve organizational performance, positioning sustainability as an important mediating mechanism in the model.

Table 8 shows test results indicating that the structural model demonstrates strong explanatory power, predictive relevance, and an acceptable model fit. Hence, the R2 value for sustainability is 0.513, and that for organizational performance is 0.530, both of which exceed the recommended threshold (≥ 0.26). These results indicate substantial explanatory power, suggesting that the independent variables meaningfully explain variations in both sustainability and organizational performance, with stronger predictive power for organizational performance. The Q2 values for sustainability (0.382) and organizational performance (0.447) are greater than 0, confirming that the model has good predictive relevance and can reliably forecast the endogenous constructs. The SRMR value (0.058) is below the benchmark of 0.08, indicating an overall good model fit. In addition, the NFI value reaches an acceptable level of 0.926 0.926, reflecting an acceptable level of model fit. Lastly, the VIF values (< 2.5) are well below the critical threshold of 5.0, confirming the absence of multicollinearity among the indicators. In a broader framework, these results confirm that the model is statistically robust, well fitted, and has strong predictive capability, making it suitable for hypothesis testing and interpretation.

Table 8: Model Fit Indices & R^2 Values

Criterion	Value	Threshold	Status
R^2 – Sustainability (SUS)	0.513	≥ 0.26 = Substantial	Substantial
R^2 – Organizational performance (ORP)	0.530	≥ 0.26 = Substantial	Substantial
Q^2 – Predictive Relevance (SUS)	0.382	≥ 0 = Relevant	Relevant
Q^2 – Predictive Relevance (ORP)	0.447	≥ 0 = Relevant	Relevant
SRMR (Model Fit)	0.058	< 0.08 = Good Fit	Good Fit
NFI (Normed Fit Index)	0.926	≥ 0.90 = Acceptable	Acceptable
VIF (All indicators)	< 2.5	< 5.0 = No Multicollinearity	No Multicollinearity

DISCUSSION

The results demonstrate that total quality management influences organizational performance and sustainability. The findings show that total quality management is highly important for both outcomes. This suggests that applying quality-driven techniques, such as engaging employees and ensuring that processes are standardized and continuously improved, can make operations more sustainable and help organizations perform better. Previous research has likewise found that total quality management is a key component of achieving organizational excellence over time. Overall, total quality management is important for both performance and sustainability (Zehir & Zehir, 2023).

The results regarding human capital show an impact on organizational performance. It has a value of 0.261, which is significant. Human capital also affects sustainability, with a value of 0.298, which is also significant. This demonstrates how crucial it is to have employees who are knowledgeable, skilled, and driven to advance sustainable practices. These employees help improve outcomes. Although human capital is important, its effects are often mediated through quality systems. The effect size of human capital is relatively smaller than that of total quality management. Human capital plays a role in driving sustainability and organizational performance. The impact of human capital on sustainability and performance is substantial. Furthermore, sustainability has the greatest direct impact on organizational performance. This shows that businesses that adopt sustainable economic, social, and environmental practices perform better.

Mediating Effects

Sustainability, through strong implementation, plays a crucial mediating role in translating organizational capabilities, especially resilience, into improved performance outcomes. According to the study, organizations with more adaptable and resilient structures are better able to achieve their sustainability objectives, thereby improving overall organizational effectiveness. Overall, sustainability is found to be a crucial mechanism that connects enhanced performance outcomes with organizational capabilities (Yao & Wang, 2024).

Theoretical Implications

This study contributes to the literature by explaining how sustainability associates with organizational capabilities, quality management practices, and institutional performance.

It supports Resource-Based View (RBV) theory by emphasizing human capital as a strategic organizational resource. The study reinforces the importance of total quality management (TQM) practices and human capital development in achieving long-term institutional effectiveness and sustainability. It also theoretically integrates sustainability, total quality management, and human capital into a unified framework. This study enhances our understanding of how organizations can foster a continuously improving work environment in Pakistani higher education institutions (HEIs). It reminds stakeholders that effective quality management is essential and that TQM and human capital are crucial for long-term progress in higher education institutions, while sustainability plays a crucial mediating role in continuous performance improvement.

Practical Implications and Potential Benefits

The findings have practical implications for stakeholders and legislators in higher education institutions. Higher education institutions (HEIs) should implement Total Quality Management (TQM) practices to enhance institutional performance, accountability, and continuous improvement. HEIs should invest in employee training, leadership development, and skills enhancement to support long-term organizational growth. Sustainability-driven practices could be integrated into academic, administrative, and operational activities, as they considerably improve institutional performance. Policymakers and institutional stakeholders should adopt an integrated strategy that aligns quality management systems, human capital development, and sustainability initiatives. Investing in employee training, leadership, and skills development is necessary for long-term growth. Higher education institutions should incorporate environmentally friendly practices into their daily operations, management, and academic processes because these practices greatly improve performance. Stakeholders and administrators should promote a culture of continuous improvement and sustainable development to reinforce competitiveness and institutional efficacy.

Limitations of the Study

Considering these limitations, the study has several constraints. First, it examines only higher education institutions in Sindh, specifically those located in Karachi, Pakistan. Therefore, the findings may not be generalizable to a broader population. Second, the cross-sectional design captures data at a single point in time, making it difficult to determine causal relationships or assess changes over time. Finally, in examining

organizational performance, the study considers only total quality management, human capital, and sustainability. Other factors may also influence organizational performance.

Recommendations for Future Research

Future research could expand the geographical scope beyond Sindh (Karachi) to include higher education institutions across other provinces of Pakistan, or conduct cross-country comparisons.

Given the cross-sectional nature of the current research, future studies are encouraged to adopt longitudinal research designs for a better understanding of relationships and changes over time. This would provide deeper insights into how total quality management, human capital, and sustainability evolve and affect organizational performance, especially in higher education institutions. Future studies could incorporate additional variables that may influence HEI performance, such as leadership style, organizational culture, innovation capability, digital transformation, and government practices. Finally, further research could adopt mixed-method approaches by using both qualitative and quantitative methods.

CONCLUSION

Sustainability (SUS) was used as a mediating variable in this study, which examined how Total Quality Management (TQM) and Human Capital (HC) influenced Organizational Performance (ORP) in Higher Education Institutions. The results demonstrated that TQM and HC significantly improved both sustainability and organizational performance, confirming the validity of all proposed hypotheses (H1–H7). Furthermore, sustainability was found to be a robust predictor of organizational performance, illustrating its crucial role in translating TQM and HC into improved organizational outcomes. Additionally, TQM and HC had strong positive effects on sustainability and directly affected organizational performance, indicating partial mediation. This study concludes that, by integrating quality management practices with human capital development through sustainability-driven procedures, HEIs can achieve long-term institutional effectiveness. However, the study's reliance on cross-sectional data and its exclusive focus on HEIs in Karachi, Pakistan, may limit the generalizability of its findings. Future studies should employ longitudinal designs to confirm causal relationships over time and extend this paradigm to other fields and industries.

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INFORMED CONSENT STATEMENT: Electronic Informed consent was obtained from all participants, and all data were anonymized to ensure participant confidentiality.

TRANSPARENCY: The authors confirm that this manuscript provides an honest, accurate, and transparent account of the study. No important aspects of the study have been omitted, and any deviations from the originally planned study have been appropriately disclosed. The study was conducted and reported in accordance with relevant ethical standards.

COMPETING INTERESTS: The authors declare that they have no competing interests.

AUTHORS' CONTRIBUTIONS: Both authors contributed equally to the conception and design of the study. Both authors have read and approved the final version of the manuscript.

REFERENCES

Abdelmotaleb, M., & Saha, S. K. (2020). Socially responsible human resources management, perceived organizational morality, and employee well-being. *Public Organization Review*, *20*(2), 385–399. https://doi.org/10.1007/s11115-019-00447-3

Abdullah, S. N., Nazir, M. W., Rauf, F., Marwat, A., & Naveed, K. (2025). Does ESG performance affect corporate commitment, competitiveness, and profitability? Evidence from a developing country. *Discover Sustainability*, *6*(1), 1124. https://doi.org/10.1007/s43621-025-01353-z

Adnan, M., Younas, H., Khan, J., & Haseeb, A. (2023). Impact of sustainability practices on organizational performance: Mediating role of economic performance. *International Journal of Contemporary Issues in Social Sciences*, *2*(4), 1191–1200.

Alam, S., Jumady, E., Fajriah, Y., Halim, A., & Hatta, S. (2024). Integrating total quality management with strategic, operational, and human resource management: A qualitative exploration of synergies for enhanced organizational performance. *Golden Ratio of Marketing and Applied Psychology of Business*, *4*(2), 88-100. https://doi.org/10.52970/grmapb.v4i2.439

Ali, Q. B., Zin, M. L. M., & bin Ismail, S. A. (2024). The role of human capital, structural capital, and relational capital in higher education institutions performance. *Journal of Management Info*, *11*(2), 185-196. https://doi.org/10.31580/jmi.v11i2.2874

Alnachef, T. H., & Alhajjar, A. A. (2017). Effect of human capital on organizational performance: A literature review. *International Journal of Science and Research*, *6*(8), 1154-1158.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, *17*(1), 99-120. https://doi.org/10.1177/014920639101700108

Becker, G. S. (1993). *Human capital: A theoretical and empirical analysis, with special reference to education* (3rd ed.). Chicago, IL: University of Chicago Press.

Bernal-Torres, C. A., Torres-Guevara, L. E., Aldana-Bernal, J. C., Nicolás-Rojas, Y. W., & Pando-Ezcurra, T. T. (2023). The moderating role of innovation in the relationship between business sustainability and organizational performance in companies of an emerging economy. *SAGE Open*, *13*(4), 21582440231217870. https://doi.org/10.1177/21582440231217870

Deming, W. E. (1986). *Out of the crisis*. Cambridge, MA: Massachusetts Institute of Technology, Center for Advanced Engineering Study.

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. https://doi.org/10.1108/EBR-11-2018-0203

Hair, J. F. J., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). Los Angeles, CA: Sage.

Hameed, I., Waris, I., & Amin ul Haq, M. (2019). Predicting eco-conscious consumer behavior using theory of planned behavior in Pakistan. *Environmental Science and Pollution Research*, *26*(15), 15535-15547. https://doi.org/10.1007/s11356-019-04967-9

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*(1), 115-135. https://doi.org/10.1007/s11747-014-0403-8

Juran, J. M. (2003). *Juran on leadership for quality*. New York, NY: Free Press.

Khalil, M. K., & Muneenam, U. (2021). Total quality management practices and corporate green performance: Does organizational culture matter? *Sustainability*, *13*(19), 11021. https://doi.org/10.3390/su131911021

Leal Filho, W., Simaens, A., Paço, A., Hernandez-Diaz, P. M., Vasconcelos, C. R. P., Fritzen, B., & Mac-Lean, C. (2023). Integrating the sustainable development goals into the strategy of higher education institutions. *International Journal of Sustainable Development & World Ecology*, *30*(5), 564-575. https://doi.org/10.1080/13504509.2023.2167884

Lozano, R., & Barreiro-Gen, M. (2023). Organisations' contributions to sustainability. An analysis of impacts on the sustainable development goals. *Business Strategy and the Environment*, *32*(6), 3371-3382. https://doi.org/10.1002/bse.3305

Sardana, D., Gupta, N., Kumar, V., & Terziovski, M. (2020). CSR 'sustainability' practices and firm performance in an emerging economy. *Journal of Cleaner Production*, *258*, 120766. https://doi.org/10.1016/j.jclepro.2020.120766

Saunders, M. N. K., Lewis, P., & Thornhill, A. (2023). *Research methods for business students* (9th ed.). Harlow, England: Pearson.

Strielkowski, W., Kulagovskaya, T., Panaedova, G., Smutka, L., Kontsevaya, S., & Štreimikienė, D. (2023). Post-soviet economics in the context of international trade: Opportunities and threats from mutual cooperation. *Economic Research-Ekonomska Istraživanja*, *36*(1), 2021-2044. https://doi.org/10.1080/1331677X.2022.2094444

Taherdoost, H. (2016). Sampling methods in research methodology; how to choose a sampling technique for research. *International Journal of Academic Research in Management*, *5*(2), 18–27.

Truşcă, C., & Sălcudean, M. (2024). The questionnaire as a research tool in social and communication sciences. Opportunities and challenges generated by the evolution of artificial intelligence (AI). *Saeculum*, *58*(2), 26-35. https://doi.org/10.2478/saec-2024-0015

United Nations Conference on Environment and Development. (1992). *Agenda 21*. New York, NY: United Nations.

Wassan, A. N., Memon, M. S., Mari, S. I., & Kalwar, M. A. (2022). Impact of total quality management (TQM) practices on sustainability and organisational performance. *Journal of Applied Research in Technology & Engineering*, *3*(2), 93-102. https://doi.org/10.4995/jarte.2022.17408

Yao, C.-L., & Wang, L.-Y. (2024). Corporate sustainable development performance through top management team's transactive memory system and organizational resilience: A moderated mediation analysis. *Heliyon*, *10*(3), e24674. https://doi.org/10.1016/j.heliyon.2024.e24674

Yücel, D. (2024). Enhancing organizational sustainability: The role of total quality management in fostering talent management practices. *Sosyal Mucit Academic Review*, *5*(1), 24-49. https://doi.org/10.54733/smar.1438949

Zehir, S., & Zehir, C. (2023). Effects of total quality management practices on financial and operational performance of hospitals. *Sustainability*, *15*(21), 15430. https://doi.org/10.3390/su152115430

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