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## THE ROLE OF MANAGEMENT COMMITMENT IN ADOPTION OF OCCUPATIONAL HEALTH AND SAFETY AT HIGHER EDUCATION INSTITUTIONS

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**Abstract.** At the very core of organizational sustainability lies the health and safety of its people, the welfare of society, and the conservation of resources. Adoption of Occupational Health and Safety (OHS) is considered as a way forward to achieve organizational sustainability. However, due to an increased number of incidents, OHS has become a serious concern in Pakistan. This creates a dire need for OHS adoption in Higher Education Institutions (HEIs) to prevent such incidents and achieve sustainable OHS performance. This study aims to examine the factors playing a vital role in OHS adoption that leads to sustainable OHS performance in HEIs of Pakistan. The data were collected through a survey questionnaire from academic and administrative employees of the top 23 universities of Pakistan. A total of 306 responses were analysed in the Partial Least Square (PLS) approach of Structural Equation Modelling (SEM) to test the research hypotheses and validate the model. The findings showed that external pressure (regulatory, mimetic, competitive, and social) serves as the main stimulus for the adoption of OHS practices in HEIs of Pakistan. In addition, management commitment in implementing the OHS practices serves as a mediator that catalyses the impact of external pressure on OHS adoption. Consequently, successful adoption of OHS practices leads to sustainable OHS performance in HEIs. The findings imply that external pressure alone may not be sufficient to push HEIs for OHS adoption unless the top management shows real commitment.

**Keywords:** Sustainable OHS performance; Regulatory Pressure; Mimetic Pressure; Competitive Pressure; Social Pressure; Formal Policy; Formal Training; Encouragement

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## 1. Introduction

Aimed the global concerns over natural resources, climate change, sustainability received much attention of the organizations of all types across the world. Most organizations have embraced this mindset in all aspects including people, planet, and profit (OSHA, 2021). However, in the field of higher education, it remained a relatively novel and under-researched theme. Casarejos et al. (2017) believed that at the very core of organizational sustainability lies the health, safety, and welfare of its people — the most valuable asset. In the context of HEIs, sustainability is mainly concerned with its people, educational services, physical environment, and infrastructure. HEIs serve as important landmarks of cities and contribute to urban. The physical environment that entails modern and environmentally friendly infrastructure plays a vital role in ensuring the health and safety of the workforce (employees and students) (Pandita & Kiran, 2020). Beyond anything, an overall safe environment and established infrastructure of facilities are the major requirements for a sustainable educational system. For establishing a sustainable and safe educational environment, occupational health and safety (OHS) is a major factor that needs to be acquired or maintained (Koonmee et al., 2010). A safe and healthy working environment leads to the quality management of human resources, along with the assurance of high performance. Leggat et al. (2011) also argued that occupational health and safety in higher education institutions have a significant positive effect on their quality assurance. However, Westgaard and Winkel (2011) stated that OHS is not only considered as an important factor for a sustainable education system but considered as people's rights within an organization. National and international quality standards organizations enforce the HEIs for the adoption of OHS standards. However, such efforts are relatively less effective in developing countries. OHS-related regulations and legislations and their implementation are quite weak in developing countries like Pakistan (Lakhiar & Lakhiar, 2021). Noman et al. (2021) reported that OHS is still a serious concern in Pakistan as a high number of OHS-related incidents have been observed in recent years in various organizations and industrial sectors including HEIs. HEIs face a myriad of OHS-related issues. Like any other workplace, they face various hazards such as ventilation, electrical hazards, internal roads, and parking issues, slips, trips, and falls, etc. Apart from these traditional infrastructural and environmental, health and safety issues, most universities have medical labs containing toxic, flammable, and reactive chemicals posing a serious hazard to the people on campus (Nascimento & Tenuta Filho, 2010). Likewise, some HEIs have animal houses on campus that could cause allergies, infections, and various other diseases, if OHS practices are not in place.

In most Pakistani universities the OHS practices are far below the standards. The recent incidents attracted the attention of concerned authorities, policymakers, and the government that forces HEIs to adopt OHS practices at the workplace. Consequently, HEIs in Pakistan are facing pressure from regulatory authorities, national and international organizations, and other stakeholders to improve their physical environment in terms of OHS practices to be recognized as sustainable organizations (Farrukh et al., 2019). Having said that, HEIs are in dire need of answering the questions such as: How HEIs can successfully adopt OHS practices? What internal and external factors may contribute to the successful adoption of OHS practices? And what would be the outcome of successful OHS adoption that leads to sustainable HEIs? The extant research lacks answers to these questions. This study endeavors to empirically investigate the answers to these questions by identifying antecedents and consequences of OHS adoption in HEIs as well as the role of top management as a mediator. This study contributes to the body of knowledge by filling these gaps and offers important implications for sustainable HEIs and provides future research directions.

## 2. Theoretical Background and hypotheses development

Sustainability is a broader and multifaceted notion that in general refers to such development that meets the present needs without affecting the needs of future generations (Lozano, 2008). Its three broader dimensions include environmental, social, and economic. Sustainability in the context of HEIs as defined by Velazquez et al. (2006) and cited by Aleixo et al. (2018), implies the mitigation of negative environmental, economic, social, and

health effects of resource utilization while performing the core functions of teaching, research, and community partnership to help the society making a transition to a sustainable lifestyle. Adoption of OHS practices helps in minimizing such negative effects and leads to sustainability.

Workplace injuries and accidents pose serious challenges for organizations around the globe. According to Adu-Gyamfi (2020), every year 270 million people suffer from fatal and non-fatal workplace injuries. These injuries can be prevented or at least mitigated by the effective adoption of OHS measures. OHS is considered as a complete mental, social and physical well-being at the workplace that leads to the sustainability of the organization (Ahmad et al., 2020). However, the issues of health and safety often are not prioritized due to a lack of resources (Wong et al., 2015). It has often been agreed that the status of practices of OHS is improved in the internationally qualified and prominent universities of developed countries, but a similar notion has not been found in developing countries (Hossain et al., 2015). Developed countries possess HEIs specific OHS regulations, however, developing countries lack such specific regulations. Likewise, this area is better researched in developed countries as compared to developing nations.

OHS in general is a well-researched area. A vast amount of literature exists on OHS in various industries and organizations. However, OHS research on HEIs is quite a handful. Some of the notable scholars focused recently on OHS in HEIs include Morrish (2019), Kersh (2018), Zhang et al. (2018), Malik et al. (2017), Franco-Santos and Doherty (2017), and Hossain et al. (2015). These scholars professed that certain internal and external factors compel organizations to the adoption of OHS practices. Hossain et al. (2015) identified four main constructs of external pressure that impact an organization's adoption of OHS including regulatory pressure, mimetic pressure, competitive pressure, and social pressure. However, other scholars like Malik et al. (2017) and Morrish (2019) did not consider social pressure as a stimulus for OHS adoption. Society or community is one of the main stakeholders of HEIs from which employees and students are attracted. In addition to regulatory, competitive, and mimetic pressures HEIs also face social pressure that force them to adopt OHS practices. Apart from these external factors, internal factors also play a vital role in effective adoption of OHS practices. Among them, top management is one of the leading factors that serves as a catalyst and strong intervening force. Previous studies addressed top management in different perspectives. This study, however, considered top management as a mediator between external pressures and OHS adoption.

**OHS practices in HEIs of Pakistan:** While developed countries have effective health and safety regulations specific to educational institutions, developing countries like Pakistan lack them. No independent health and safety law for educational institutions exists as of today. The existing OHS laws are primarily directed towards various manufacturing industries. For instance, Chapter 3 of the Factories Act 1934 is the main law that deals with the health and safety of workers. Established in 2002, the Higher Education Commission of Pakistan (HEC) is the regulatory authority on HEIs in Pakistan (Baloch et al., 2021). It officially refers to the Factories Act 1934 when it comes to health & safety, inspection, paid holidays, working hours, and other special provisions. Due to the lack of specific OHS laws, educational institutions in Pakistan have been vulnerable to numerous incidents, including fire eruption, building collapse, kidnapping, and even terrorist attacks such as Peshawar School Massacre (Biberman & Zahid, 2019). Thus, the government needs to formulate specific OHS laws for educational institutions, and HEC should effectively implement the regulations to the universities to attain a safe and healthy workplace. Apart from the regulatory authorities, OHS should be of equal concern for accreditation bodies that can exert pressure on the universities through the accreditation process.

**OHS adoption and external pressure:** Researchers believe that certain external pressures force organizations to adopt OHS practices. Previous research identified four types of external pressures including regulatory pressure, mimetic pressure, competitive pressure, and social pressure. In the first place, organizations are bound to comply with national legal and regulatory standards. The regulatory environment of any organization impacts its practices associated with OHS adoption (Chambers et al., 2013). Regulations have been serving as a powerful force urging

the organization to adopt the practices and policies of OHS. In addition to regulatory pressure, organizations face mimetic pressure. Castro de Castro Maia et al. (2016) asserted that mimetic isomorphism is the notion that occurs when the firm is prone to imitate the practices of its competitors to reach the horizons of legitimacy and success. To attract students, HEIs often mimic their competitors because health and safety measures, availability of various facilities, and overall environment are of great concern to the students (Pilbeam et al., 2016). HEIs, often find it easier to mimic other organizations to develop their safety programs (Hossain et al., 2015).

Another main external pressure that impacts the firm adopting OHS practices is competitive pressure (Hossain et al., 2015). Introducing health and safety measures within the organization is associated with competing concerns. And the adoption of the consistent and coherent policies of OHS is only possible if the organization can compete ostensibly in the market (Hermanus & Hermanus, 2001). Intense competition is one of the major categories that entail the adoption of OHS practices by HEIs (Lamm et al., 2017). World Health Organization (2002) also acknowledged competitive pressure as one of the factors influencing OHS adoption. However, the private sector faces more competition than public sector organizations. Private HEIs despite limited resources often provide a better working environment and health and safety measures than their counterparts.

In addition to this, the construct of social pressure has also been included to claim that it can impact the adoption of OHS. van Heerden et al. (2018) have identified that societal pressure is regarded as one of the major reasons as well as motivations behind the OHS adoption. As per the social cognitive theory, social recognition is one of the main motivators of adopting such measures that can lead towards respect and better image and prestige of the organization and it can also impact their adoption of OHS policies. Based on the review of the literature, this study forwards the following hypotheses.

*H1: External pressure has a significantly positive effect on top management commitment.*

*H2: External pressure has a significantly positive effect on OHS adoption.*

**Top Management Commitment:** The attitude of the management is often reflected in how much it is motivated to adopt, disseminate and develop the formal policies, encourage participants, and engage in the formal training regarding OHS (Mullen et al., 2018; Purba et al., 2015; Ramos-Galarza et al., 2019). The implementation of formal policies and training exhibit top management commitment to adopt OHS. Mousa and Othman (2020) claimed that organizations engaged in incorporating good safety measures believe in controlling the risk and implementing formal OHS policies. OHS adoption leads to better organizational Sustainable OHS performance. Laberge et al. (2014) believe that effective Sustainable OHS performance depends on providing appropriate training to employees. Whereas the commitment of top management towards the implementation of OHS practices is associated with how it is prone to train its people.

Hence, OHS adoption primarily depends on top management commitment towards the implementation of OHS that leads to effective Sustainable OHS performance (Podgórski, 2015), this study examines it as a mediator between external pressure and OHS adoption. Management commitment has been extensively examined as a mediator variable in numerous previous studies as well: See, for example, Yousef (2000), Patulak et al. (2013), and Lee and Jeong (2017) in this regard. Yeap et al. (2020) also regarded the commitment of top management as the factor that impacts the adoption of OHS policies within the firm. Based on the review of the literature, this study forwards the following hypotheses.

*H3: Top management commitment has a significantly positive effect on OHS adoption.*

*H4: Top management commitment has a significantly positive effect on Sustainable OHS performance.*

*H5: Top management commitment mediates the relationship between external pressure and OHS adoption.*

**Sustainable OHS Performance:** Organizational sustainability is a multidimensional construct that considers financial, social, and environmental aspects of sustainability. However, the scope of this study is limited to the environmental dimension as it primarily examines the adoption of OHS practices. Hossain et al. (2015) argued that organizations that incorporate full practices of OHS are often prone to encourage and motivate their people to perform as per the rules and standards of OHS. The management is responsible for encouraging employees and their participation in OHS management (Mousa & Othman, 2020). Employees' participation in OHS practices increases organizational Sustainable OHS performance and effectiveness. Further, this has also been supported by Mohammadfam et al. (2016), who professed that the adequate level of safety management impacts the Sustainable OHS performance in the organization and also offers satisfactory results of safety management. Hence, the adoption of OHS policies and practices creates a significant impact on Sustainable OHS performance if the variables mentioned above are used as measures. Based on the review of the literature, this study forwards the following hypotheses and proposes the research model shown in Figure 1.

**H6:** *OHS adoption has a significantly positive effect on Sustainable OHS performance.*

**Conceptual framework:** The theoretic foundations of the conceptual framework of this research remain in Stimulus-Organism-Response (SOR) theory. Where external pressure (regulatory, mimetic, competitive, and social) serves as the stimuli that force top management of HEIs for the adoption of OHS practices (organism) that eventually leads to sustainable OHS performance (response). Based on the hypotheses the conceptual framework is presented in Figure 1.

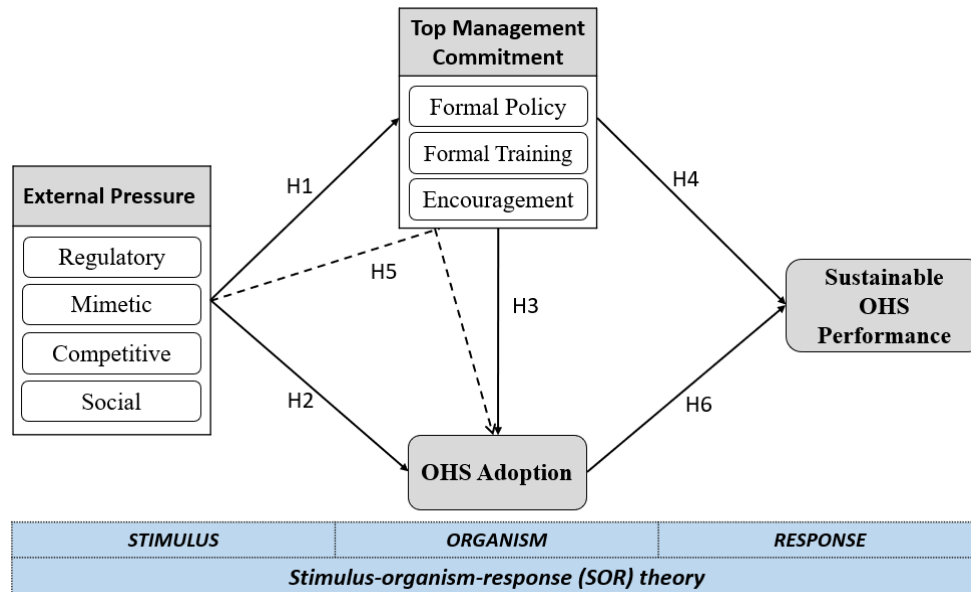


Figure 1. Conceptual framework

### 3. Research methodology

**Population and sampling:** This study employed a positivist research paradigm employing a survey questionnaires strategy. For exploratory and descriptive research, the survey strategy is most appropriate and commonly used (Saunders et al., 2016). The population of this study included 196 recognized HEIs as per the Higher Education Commission (HEC) of Pakistan’s website (Habib et al., 2021). In this study, the top 23 HEIs with a score greater than 50 on HEC’s latest ranking (2015) in the general category were chosen to collect data.

The authors extracted the email addresses of 920 participants (40 from each university) from the top 23 HEIs. The participants included both administrative and academic staff members. The participants were approached by email and were requested to fill out the online survey created in QuestionPro.

Saunders et al. (2016) guidelines on questionnaire development and validity were followed. The questionnaire did not require any personal information of the participants and their participation was made voluntary. The questionnaire contained nine latent variables with 33 measured variables/items/indicators apart from the demographic profile. For minimum sample size, Hair Jr et al. (2014) recommended 5:1 respondents to item ratio for multivariate analyses. Following this rule, the minimum sample size should be 165 (5x33) for this study. The measurement scale for OHS sustainable performance was adapted from Lingard et al. (2011) and Lee and Ha-Brookshire (2017) whereas, scales for external pressure, management commitment, and OHS adoption were adopted from Hussain and Shah (2015). To measure participants' response for each statement, a five-point Likert scale was utilized with 1 indicating 'strongly disagree' and 5 indicating 'strongly agree'. Three professors of operations management having a background in OHS were requested to review the questionnaire. After face validity, a pilot test was conducted with 30 participants to refine and finalize the questionnaire. Once finalized, the link for the self-administered questionnaire was emailed to 920 participants across the top 23 selected HEIs.

**Data collection:** A total of 920 questionnaires was circulated to the respondents from March to June 2021. Out of which 412 were returned, producing a response rate of 45%. After applying the filtration and data screening process, 106 questionnaires were dropped from the analysis because they were incomplete, partially filled, or attempted in an unengaged manner. Only 306 responses were maintained for final analysis.

**Data Analysis:** The data were analysed in Smart PLS3 software that utilizes PLS-SEM (Partial Least Square-Structural Equation Modelling). As per guidelines by Hair Jr et al. (2014), the research model was analysed in two phases. In the first phase, the measurement model was analysed to establish the validity and reliability of the model. In the second phase, the structural/path model was assessed for hypotheses testing. The reliability of the measurement model (both in first and second-order) was ensured with relatively higher factor loadings and composite reliability scores (>0.7). Whereas validity of the model at both levels was ensured through discriminant and convergent validity tests. After validating the measurement model and ensuring its reliability, hypotheses testing was performed for the structural model. The two steps data analysis procedure was adopted in many previous studies such as Syed et al. (2019), Syed et al. (2020), and Eltayeb and Ahmad (2021).

#### 4. Results

**Descriptive statistics:** Among the top 23 universities of Pakistan, 18 (78%) were public universities. Only 5 (22%) private HEIs could secure a place among the top 23. In the socio-demographic profile of respondents, most were male (83%) which is consistent with the gender composition of the population in the HEIs. Most respondents (around 80%) were aged between 26 and 45, whereas around 10% were between 18 and 25 years and 10% were above 45 years. Concerning education level, 56% of respondents held a master's degree, 34% had a Ph.D. degree and 10% had a bachelor's degree. Based on the nature of the study and the ability of the participants to respond to this survey, employees on lower-level jobs which require below bachelors' qualification were not included in the survey. Most respondents (72%) had job experience between 6 and 20 years, 20% had 5 years or less experience, 8% had over 20 years of experience. Around 54% of participants belonged to academia while 46% were administrative staff at middle and senior-level positions.

**Measurement model assessment:** This research contains a higher-order measurement model composed of four constructs including external pressure, top management commitment, OHS adoption, and Sustainable OHS performance. Among them, external pressure and top management commitment are second-order constructs having four and three dimensions, respectively (see Figure 1). According to Hair Jr et al. (2014), the validity and

reliability of second-order constructs should be established once the validity and reliability of first-order variables (latent) have been established. In the first order, the model contains nine latent variables including regulatory pressure, mimetic pressure, competitive pressure, social pressure, formal policy, formal training, encouragement, OHS adoption, and Sustainable OHS performance (See Figure 1). Accordingly, the reliability and validity of the measurement model were ensured, as detailed below.

**Table 1.** Reliability and convergent validity

<b>Variables &amp; Indicators</b>	<b>Factor Loading</b>	<b>CR</b>	<b>AVE</b>
<b>Regulatory Pressure</b>		<b>0.889</b>	<b>0.728</b>
Rgltry1	0.851		
Rgltry3	0.793		
Rgltry4	0.913		
<b>Mimetic Pressure</b>		<b>0.930</b>	<b>0.816</b>
Mimtic1	0.873		
Mimtic2	0.900		
Mimtic3	0.936		
<b>Competitive Pressure</b>		<b>0.900</b>	<b>0.751</b>
Compt1	0.891		
Compt2	0.852		
Compt3	0.857		
<b>Social Pressure</b>		<b>0.840</b>	<b>0.638</b>
Social2	0.740		
Social4	0.880		
Social5	0.770		
<b>Encouragement</b>		<b>0.939</b>	<b>0.837</b>
Enrg2	0.918		
Enrg3	0.909		
Enrg4	0.917		
<b>Formal Policy</b>		<b>0.878</b>	<b>0.643</b>
Policy1	0.775		
Policy3	0.814		
Policy4	0.811		
Policy6	0.807		
<b>Formal Training</b>		<b>0.955</b>	<b>0.841</b>
Train1	0.925		
Train2	0.896		
Train3	0.952		
Train4	0.893		
<b>OHS Adoption</b>		<b>0.934</b>	<b>0.781</b>
Adopt1	0.832		
Adopt2	0.921		
Adopt3	0.881		
Adopt4	0.898		
<b>OHS Sustainability Performance</b>		<b>0.933</b>	<b>0.698</b>
OHSP1	0.886		
OHSP3	0.846		
OHSP4	0.853		
OHSP5	0.738		
OHSP6	0.781		
OHSP7	0.901		

A factor loadings criterion of greater than 0.70 was set to ascertain the reliability of the measurement model. The indicators that did not fulfil the criterion were eliminated from further analysis. Each indicator was loaded to its respective latent variable fairly above 0.70, as shown in Table 1 it ranges between 0.738 and 0.952. Likewise, above 0.70 scores of composite reliability (ranging between 0.840 and 0.955) were achieved which further

reinforces the reliability of the measurement model. As per Hair Jr et al. (2014) guidelines, a measurement model must fulfil three conditions to claim the convergent validity: (i) AVE > 0.5; (ii) CR > 0.7; and (iii) CR > AVE. As shown in Table 1, the model fulfilled all three criteria to establish convergent validity.

By employing Fornell and Larcker (1981) criterion discriminant validity of the model was established. This criterion compares  $\sqrt{AVE}$  with the squared correlation coefficients. The measurement model's discriminant validity was established as all  $\sqrt{AVE}$  values alongside the diagonal were fairly greater than the corresponding squared of correlation coefficients of the latent variables vertically and horizontally (See Table 2).

**Table 2.** Discriminant validity of 1<sup>st</sup> order variables

Latent Variables	1	2	3	4	5	6	7	8	9
1. Competitive Pressure	<b>0.867</b>								
2. Encouragement	0.402	<b>0.915</b>							
3. Mimetic Pressure	0.523	0.357	<b>0.903</b>						
4. OHS Adoption	0.605	0.312	0.350	<b>0.884</b>					
5. Sustainable OHS performance	0.488	0.433	0.436	0.714	<b>0.836</b>				
6. Formal Policy	0.474	0.344	0.283	0.664	0.523	<b>0.802</b>			
7. Regulatory Pressure	0.496	0.471	0.609	0.432	0.484	0.408	<b>0.853</b>		
8. Social Pressure	0.769	0.333	0.529	0.473	0.340	0.412	0.486	<b>0.799</b>	
9. Formal Training	0.337	0.608	0.295	0.342	0.353	0.561	0.386	0.282	<b>0.917</b>

*N.B: The shaded bold values along the diagonal are the square root of AVE that should be higher horizontally and vertically.*

**Assessment of 2nd order construct:** The research model contains two-second order constructs, including external pressure and top management commitment. External pressure has four dimensions, namely regulatory pressure, mimetic pressure, competitive pressure, and social pressure. Similarly, top management commitment was measured through formal policy, formal training, and encouragement (see Figure 1). The validity and reliability of second-order constructs are provided in Table 3, and discriminant validity is provided in Table 4. As shown in the respective tables, the factor loadings of all the latent variables are higher than 0.70 thresholds for each construct and range between 0.793 and 0.909. The composite reliability values of 0.926 and 0.923 show that both measurement scales are sufficiently reliable. Similarly, AVE values for both constructs are above the threshold of 0.5, and all CR values are greater than AVE. Therefore, the convergent validity of both constructs remains intact. As shown in Table 4, the criteria for discriminant validity were also satisfied that established the reliability and validity of the 2nd order measurement model.

**Table 3.** Second-order construct validity and reliability

Constructs & Indicators	Loading	T-value	CR	AVE
<b>External Pressure</b>				
Competitive Pressure	0.831	37.55		
Mimetic Pressure	0.860	41.21	<b>0.926</b>	<b>0.513</b>
Regulatory Pressure	0.837	28.98		
Social Pressure	0.815	32.25		
<b>Top Management Commitment</b>				
Formal Training	0.909	69.50		
Formal Encouragement	0.769	20.82	<b>0.923</b>	<b>0.525</b>
Formal Policy	0.773	24.81		

*Note: T-value = 1.96 (P<0.05)*



**Table 4.** Discriminant validity of 2<sup>nd</sup> order constructs

	External Pressure	Management Commitment	OHS Adoption	Sustainable OHS performance
External Pressure	<b>0.716</b>			
Management Commitment	0.533	<b>0.725</b>		
OHS Adoption	0.558	0.526	<b>0.884</b>	
Sustainable OHS performance	0.529	0.519	0.614	<b>0.836</b>

*N.B: The shaded bold values along the diagonal are the square root of AVE that should be higher horizontally and vertically*

**Structural model assessment:** After establishing the reliability and validity of the measurement model, the structural model was analysed for testing the hypotheses and research model. To evaluate the explanatory power of the model and assess the significance and relevance of the hypotheses, the coefficient of determination ( $R^2$ ) and path coefficients ( $\beta$ ) were utilized. Hair Jr et al. (2014) provided guidelines on coefficient of determination:  $R^2 > 0.67$  = substantial;  $R^2 > 0.33$  = moderate;  $R^2 > 0.10$  = weak; and  $R^2 < 0.10$  = no explanatory power or it is by chance. In addition, all the values above 0.10 must be statistically significant.

The results of this study have demonstrated a sufficient statistical significance of  $R^2$  values of exogenous variables. The  $R^2$  value of management commitment is 0.284 ( $t=5.158$ ;  $p= 0.000$ ), which is predicted by external pressure. Similarly, OHS adoption has a value of 0.384 ( $t=7.239$ ;  $p= 0.000$ ) predicted by external pressure and management commitment, whereas Sustainable OHS performance was predicted by external pressure, management commitment, and OHS adoption by the amount of 0.538 ( $t=11.108$ ;  $p= 0.000$ ). All the explanatory power values remained statistically significant. Overall, all three endogenous constructs had moderate explanatory power, indicating a parsimonious research model.

The model was also analysed for path coefficients. Table 5 shows the results of the path coefficient analysis. Hypotheses 1-5 show a direct effect and hypothesis 6 shows an indirect effect. The indirect effect was analysed using top management commitment as a mediator. All the hypothesized paths of the study were statistically significant with a t-value of 1.96 and a p-value below 0.05. The findings indicated that both direct and indirect relationships were statistically significant, hence, supporting all six hypotheses (See Table 5). An assessment of mediator analysis is provided in the following section.

**Table 5.** Hypotheses testing and path coefficient assessment

Hypothesis	$\beta$	T-value	P-value	Decision
H1 External Pressure -> Management Commitment	0.533	10.071	0.000	Supported
H2 External Pressure -> OHS Adoption	0.387	5.998	0.000	Supported
H3 Management Commitment -> OHS Adoption	0.320	4.382	0.000	Supported
H4 Management Commitment -> Sustainable OHS performance	0.199	3.775	0.000	Supported
H6 OHS Adoption -> Sustainable OHS performance	0.609	10.530	0.000	Supported
<b>Indirect Effects (Through Mediator)</b>				
H5 External Pressure -> Management Commitment -> OHS Adoption	0.171	3.021**	0.001	Supported

*N.B.: t-value = 1.96 (P<0.05)*

**Mediator Analysis:** Apart from one-on-one causal effects, the proposed model contained a mediatory relationship of top management commitment between external pressure and OHS adoption. Both direct and indirect effects between external pressure and OHS adoption were statistically significant, as shown in Table 5. However, structural equation modelling requires assessing the existence and amount of mediation as well. To examine the existence and amount of mediation, Hair Jr et al. (2014) suggested following a three-step process given in Table 6.

Following the guidelines, the model was assessed for mediation analysis, and the findings showed that top management commitment partially mediates the relationship between external pressure and OHS adoption. The results confirmed the existence of top management commitment as a mediator between external pressure and OHS adoption. Concerning the amount of mediation, Variance Accounted For (VAF) analysis was conducted as per Hair Jr et al. (2014) guidelines. The results showed that top management commitment partially mediates (30.47%) the relationship between external pressure and OHS adoption.

**Table 6.** Mediation analysis of management commitment

Paths	$\beta$	T - value	P-value	Result	Decision
EP -> ADOPT (Direct- Without Mediator)	0.558	11.706	0.000	Significant.	Mediation Exists
EP -> ADOPT (Direct- With Mediator EO)	0.389	5.754	0.00	The direct effect decreased and remained significant.	
EP -> MC (Direct- With Mediator EO)	0.533	10.071	0.00	The indirect effect is significant.	
MC -> ADOPT (Direct- With Mediator EO)	0.320	4.382	0.00		
<b>Variance Accounted For (VAF) =</b>				<b>30.47%</b>	<b>Partial Mediation</b>
<i>VAF = (IV - Med x Med - DV) / (IV - Med x Med - DV + IV - DV)</i>					
<i>EP = External Pressure; ADOPT = OHS Adoption; MC = Management Commitment</i>					

## 5. Discussion, implications, limitations, and future research directions

The objective of this research was to identify the antecedents and consequences of OHS adoption in HEIs of Pakistan. The empirical evidence has confirmed that external pressure and top management commitment are the two major antecedents of OHS adoption, whereas, and Sustainable OHS performance is the consequence. In addition to a significant causal effect, top management commitment mediates the relationship between external pressure and OHS adoption. This implies that external pressure alone may not be a sufficient condition for OHS adoption. Rather, it is more effective when the top management is committed. The top management commitment is reflected through practical measures such as the formation and implementation of formal OHS policies, companywide OHS training programs, and encouraging the stakeholders to adopt OHS policies and practices. The successful adoption of OHS practices leads to better Sustainable OHS performance that eventually helps in long-term survival (Ahmad et al., 2019). The findings are consistent with the existing OHS literature and suggest the parsimony of the proposed model, as discussed below.

A significant positive impact of external pressure and top management commitment on OHS adoption was supported by Hossain et al. (2015) in an empirical study on Bangladeshi universities. Whereas, external pressure reflected by regulatory, mimetic, competitive, and social pressures serves as a stimulus for universities' intention

to adopt OHS measures. Hossain et al. (2015) have shown that external pressure in general and top management commitment, in particular, have a positive influence on OHS adoption in Bangladeshi universities. Similarly, Wu et al. (2008) conducted an empirical study on four universities in Taiwan and found a positive impact of OHS adoption and Sustainable OHS performance. To some extent, our results are contrary to the existing evidence provided by Hossain et al. (2015). For instance, mimetic and competitive pressures had an insignificant impact on OHS adoption in Bangladeshi private universities. Whereas, in our studies, all four types of pressures have shown a positive impact on OHS adoption. The significant positive effect of top management commitment on OHS adoption is also well supported in numerous studies, see, for instance, Laberge et al. (2014); Nielsen (2014). The findings of this study have important theoretical and practical implications, as discussed below.

**Implications:** Concerning theoretical implications, this study proposed and validated the mediating role of top management commitment between external pressures and OHS adoption. Existing OSH literature on higher education institutions or universities is mainly focused on the causal relationship (Hossain et al., 2015; Wu et al., 2008). Top management commitment has been widely perceived as an intervening variable between various organizational aspects in numerous other studies, see, for example, Čater et al. (2018); Michaelis et al. (2009); Tzempelikos (2015). However, its mediating role in OHS research is unexplored despite the existence of theoretical and literature support. Besides, this study extends the existing research on OHS adoption to the consequences, whereas previous studies primarily focused on the antecedents. Thus, an integrative model of OHS adoption proposed and empirically validated in this study significantly contributes to the body of knowledge on OHS adoption.

In addition, the literature on higher education institutions of Pakistan, in general, is quite a handful, it is almost unexplored from the safety and health perspective (Khalid & Tadesse, 2021). Accordingly, this study contributes to the body of knowledge by providing the first empirical evidence on OHS practices in HEIs of Pakistan.

The practical implications of this study target various stakeholders mainly including HEIs, the government, the regulatory authorities (HEC), and accreditation bodies. Among the external pressures, the regulatory pressure by the government, regulatory authorities, and accreditation bodies is the most effective factor in OHS adoption (Hossain et al., 2015). Considering the existing state OHS of in HEIs, which has long been neglected, both central and provincial governments, in general, and HEC in particular need to pay attention and accordingly device appropriate OHS policies and standards in addition to increasing the fund allocation for the adoption of OHS practices.

On the other hand, the empirical results entail important practical implications for the top management of the HEIs. The top management commitment plays a key role in OHS adoption. The management needs to realize the importance of a safer environment for the student and staff not only to abide by the regulations but to have a truly safe work environment and to get a competitive advantage. It is the top management that can inculcate OHS adoption in true essence. As stated earlier and the results showed, top management commitment mediates the influence of external pressure on OHS adoption. This implies that external pressure alone may not be sufficient conditions for OHS adoption in HEIs unless the management is not committed. Hence, management needs to play a proactive role and exhibit commitment through practical measures. Developing an OHS plan along with the guidelines, disseminating them to all the stakeholders, providing training, conducting audits, and rewarding the best performers would be some of the effective ways of creating an organizational culture for safety practices. OHS adoption and practice will enhance the image of the HEIs that eventually brings numerous rewards, including the financial rewards for private institutions and increased funding for public institutions (Khan, 1991). In recent years, the major focus of the government funding has been on quality of education, research, and scholarships (Ramzan et al., 2012), while safety and health issues, as well as infrastructure development, have been relatively neglected areas. Thus, the management should conceive the external pressure (regulatory, competitive, mimetic, and social) as an opportunity rather than a threat and capitalize on them.

**Limitations and future research direction:** This study has certain limitations that open new avenues for future research. First, this study included only the top 23 HEIs from the list of 196 HEC recognized HEIs. This may not be a representative sample as most top HEIs are located in mainstream cities. HEIs of remote and less developed areas may have different socio-economic, political, and cultural factors that may affect the opinions of the respondents. Thus, future research may apply other sampling methods to represent the population better. Secondly, this study did not include other academic institutions such as vocational and professional institutions. Future research may focus on examining the OHS practices in these institutions and conduct a comparative analysis with the results of this study.

## 6. Conclusion

The objective of this research was to identify the antecedents and consequences of OHS adoption in HEIs of Pakistan. To achieve this objective, data were collected from 306 employees of the top 23 universities of Pakistan through a self-administered survey questionnaire. The data were analysed using Partial Least Square Structural Equation Modelling in Smart PLS3. The findings have empirically shown that top management commitment and external pressure are the core antecedents of OHS adoption in HEIs of Pakistan. Furthermore, it suggests that external pressure alone may not be sufficient conditions for these institutions to adopt OHS practices unless top management is committed to implementing the policies. The top management commitment is primarily reflected by devising formal OSH policies and implementing them. The effective implementation entails formal OSH training programs for employees. It further suggests that formal policies and training programs should be accompanied by encouragement from the top management in the form of a certain reward system for adherents and best performers. Once in place, OHS adoption will enhance organizational Sustainable OHS performance, as the empirical findings of this study have indicated. Overall, the findings of this study are aligned with the existing research conducted in other geographical contexts and for other forms of organizations.

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