

INTEGRATING PROJECT MANAGEMENT STRATEGIES WITH HEALTH, SAFETY, AND ENVIRONMENTAL PRACTICES: A COMPARATIVE ANALYSIS BETWEEN MALE AND FEMALE WORKERS IN PAKISTAN

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Abstract

Objective: The primary objective of this study is to examine the integration of project management strategies with health, safety, and environmental (HSE) practices in Pakistan, focusing on the relationship between project management practices (PMP) and HSE integration, the impact of project management levels (low, middle, top) and gender on the implementation of HSE practices, and the influence of demographic variables such as age, education, experience, and level of management on the effective integration of these practices. *Methods:* A quantitative research design was employed, involving 150 participants from various sectors in Pakistan. Data were collected through structured questionnaires focusing on project management practices (PMP) and HSE practices (HSEP). Statistical methods, including correlation analysis, regression analysis, and descriptive statistics, were applied to examine the relationships between the variables and assess the impact of demographic factors on the integration of these practices. The study also utilized t-tests for analyzing gender differences. *Results:* The findings revealed a significant positive correlation between project management practices and HSE practices ($r = 0.660$, $p < 0.01$). Gender differences in the implementation of HSE practices were minimal, with males slightly outperforming females in project management practices. Demographic variables, such as education and experience, significantly influenced the integration of project management and HSE practices. The level of management (low, middle, top) did not show a significant effect on the integration of these strategies. Gender was found to significantly affect project management practices, with males reporting higher integration ($B = 12.027$, $p < 0.01$). *Conclusion:* The study concludes that integrating project management practices with HSE practices significantly enhances project outcomes and reduces risks. While gender did not have a major impact on the integration of HSE practices, educational background and work experience were crucial in the successful integration of these strategies. Policymakers and industry leaders are encouraged to improve training and awareness regarding the integration of

project management and HSE practices, particularly by addressing gender disparities in the project management field. Further research is needed to explore long-term effects and other influencing factors, such as organizational culture.

INTRODUCTION

Project management has long been recognized as a critical foundation for achieving the success of complex initiatives across various industries. It provides a systematic framework for organizing resources, managing timelines, and achieving predefined objectives, which are especially crucial in high-risk sectors such as oil and gas, construction, logistics, and healthcare. Contemporary project management practices have evolved to emphasize agility through hybrid methodologies, fostering collaboration by incorporating leadership and effective communication into traditional approaches. This evolution has enabled organizations to align projects more effectively with strategic objectives while simultaneously mitigating risks and optimizing resource utilization (Davidov et al., 2023) (Bindal, 2024). Moreover, the adoption of advanced project management tools and techniques has enhanced project outcomes by improving planning accuracy, stakeholder engagement, and decision-making processes (Di Muro, Lecoivre, & Turner, 2021). Similarly, health, safety, and environmental (HSE) practices have garnered significant attention for their pivotal role in minimizing risks and ensuring regulatory compliance. These practices are particularly critical in industries where operational hazards pose considerable threats to human life and the environment. Evidence suggests that robust HSE practices not only prevent workplace accidents but also improve employee well-being, foster organizational resilience, and enhance reputational standing. For instance, in the oil and gas sector, implementing comprehensive HSE measures such as hazard identification, risk assessments, and environmental monitoring has been shown to reduce incidents and support sustainable operations (Huang, Peng, Sun, & Li, 2023) ; (Derdowski & Mathisen, 2023) Similarly, the construction industry benefits from embedding safety protocols into project execution frameworks, ensuring worker safety, maintaining regulatory compliance, and minimizing project disruptions (Sherratt & Aboagye-Nimo, 2022).

Despite the significant advancements in both project management and HSE practices, a critical gap persists in understanding their integrated application and the synergistic benefits that may arise. While substantial literature underscores the independent advantages of project management and HSE practices, limited research explores their combined impact on enhancing project outcomes and mitigating risks. For example, recent studies highlight the potential for integrating safety protocols within project management frameworks to improve hazard awareness and proactive risk management, yet detailed models and empirical evidence in this area remain scarce (Fewings & Henjewe, 2019; Rana, 2009; Alizadehsalehi & Hadavi, 2023). Industries with high safety and environmental risks, such as oil and gas and construction, particularly lack tailored frameworks that bridge these domains. This research gap emphasizes the need for comprehensive studies that investigate the practical and theoretical aspects of integrating project management strategies with HSE practices, offering actionable insights for improving project success and ensuring risk mitigation (Eyieyien, Idemudia, Paul, & Ijomah, 2024).

This research is designed to address this gap by examining the integration of project management strategies with HSE practices. It aims to uncover how such integration can holistically improve project outcomes while mitigating risks. The rationale for this study lies in its potential to provide actionable recommendations for industries to achieve greater efficiency, safety, and sustainability. By investigating challenges, identifying best practices, and proposing strategies for integration, the research seeks to contribute to both academic knowledge and practical applications in high-stakes industries.

The primary aim of this study is to investigate the impact of integrating project management strategies with Health, Safety, and Environmental (HSE) practices on improving project outcomes and reducing associated risks. The study will explore the relationship between project management practices and the integration of HSE practices in the workplace.

It will also examine how the level of project management (low, middle, top) influences gender-specific implementation of HSE practices in Pakistan. Additionally, the research aims to identify gender differences in the application of project management strategies and HSE practices, specifically assessing any variations in the approach between male and female participants. Finally, the study will investigate the influence of demographic variables such as age, education, experience, and level of management on the integration of project management strategies with HSE practices in Pakistan.

The specific objectives of the study are:

1. To explore the relationship between project management practices and the integration of health, safety, and environmental (HSE) practices in the workplace.
2. To examine the relationship between the level of project management (low, middle, top) and gender in the implementation of HSE practices in Pakistan.
3. To assess gender differences in the application of project management strategies and HSE practices in Pakistan.
4. To investigate the influence of demographic variables (age, education, experience, and level of management) on the integration of project management strategies with HSE practices in Pakistan.

METHODOLOGY

This research adopts a quantitative research design to investigate the integration of project management strategies with health, safety, and environmental (HSE) practices and their impact on project success and risk reduction. Data will be collected through a cross-sectional survey targeting professionals from industries such as oil and gas, construction, logistics, and healthcare. Participants will be selected using purposive sampling to ensure they possess relevant expertise in project management and HSE practices. Approximately 150 participants from organizations such as PSO, ARL, OGDCL, APL, FWO, NLC, and Fauji Foundation Hospital will be included.

A structured questionnaire is the primary data collection tool, comprising sections on demographic characteristics, project management strategies (e.g., planning, risk management, and monitoring), HSE

practices (e.g., safety protocols, environmental compliance, and hazard assessments). Responses will be measured on a 5-point Likert scale ranging from "strongly disagree" to "strongly agree." To maximize participation, the questionnaire will be distributed electronically via email and professional networks.

The demographic data sheet will collect information such as age, gender, education, experience, and socioeconomic status. The Project Management Practices Scale (PMPS) will examine the relationship of project management strategies within organizations, addressing areas like planning, communication, resource allocation, monitoring, risk management, and stakeholder engagement. This tool is relevant for research and organizational efforts to identify improvement areas in project management approaches.

The HSE Management Practices Scale will measure organizational practices related to health, safety, and environmental management, covering aspects such as safety policies, training, risk management, employee involvement, and management responsiveness. Its potential dimensions include the provision of personal protective equipment, training on emergency response and safety, management responsiveness and communication, risk and hazard awareness, and safety culture and employee participation. This scale will aid in evaluating the effectiveness of HSE practices and fostering safer work environments.

The collected data will be analyzed using statistical software such as SPSS. Descriptive statistics will be employed to summarize demographic information and key variables, while inferential statistics, including Pearson product correlation coefficient, cross tabulation independent t-test, and multiple linear regression analysis will be used to examine the relationships between project management strategies, HSE practices, and project outcomes.

Ethical considerations are prioritized throughout the research process. Informed consent will be obtained from all participants, and confidentiality will be maintained by anonymizing responses. Ethical approval will be sought from an institutional review board to ensure compliance with research ethics standards.

RESULTS

Table 1

Demographic Characteristics of Participants (n=150).

Variable	Category	f	%
Gender	Male	70	46.7%
	Female	30	20.0%
Education	Intermediate	2	1.3%
	Master	64	42.7%
	Graduation	64	42.7%
	Other	20	13.3%
Experience	No Experience	11	7.3%
	1-5 Years	28	18.7%
	5-10 Years	54	36.0%
	10-15 Years	36	24.0%
	Above 15 Years	17	11.3%
Level of Management	Less than 1 Year	15	10.0%
	Low	21	14.0%
	Middle	82	54.7%
	Top	28	18.7%
	4.00	8	5.3%

The demographic characteristics of the participants revealed a varied representation across gender, education, experience, and management levels. Of the 150 participants, 46.7% were male, while 20.0% were female, indicating a significant gender disparity in the sample. Educationally, the majority of participants had either completed a graduate degree or a master's degree (42.7% each), with a small proportion having intermediate education or other qualifications. Regarding experience, most participants (36.0%) had between 5 and 10 years of experience, while 24.0% had 10 to 15 years, and a smaller group had less than one year of experience or more than 15 years. The distribution of participants across management levels showed that the largest proportion (54.7%) were in middle management, followed by 18.7% in top management and 14.0% in low management.

Table 2

Relationship between Project Management Practices and Health Safety Environmental Practices

Variable	PMP	HSEP
PMP	1.00	.660**

Variable	PMP	HSEP
HSEP	.660**	1.00

The correlation analysis between project management practices (PMP) and health, safety, and environmental practices (HSEP) showed a strong positive relationship ($r = 0.660$, $p < 0.01$). This finding indicates that as project management practices improve, there is a corresponding improvement in the implementation of HSE practices. The positive correlation suggests that effective project management strategies may directly contribute to better HSE outcomes in the workplace.

Table 3

Relationship between level of management and gender for Project Management Practices and Health Safety Environmental Practices (n=150).

Level of management	Male	Female	Total
Low	8	4	12
Middle	52	20	72
Top	10	6	16

The relationship between the level of management and gender, it was found that males predominated in all levels of management. In the low-level management category, there were 8 males and 4 females, while in middle management, 52 males and 20 females participated. In top management, the ratio was 10 males to 6 females. This distribution highlights a gender disparity, with males occupying more managerial positions than females across all levels.

Table 4

Gender Differences for Project Management Practices and Health Safety Environmental Practices (n=150).

Study Variables	Gender	N	Mean ± SD
Project Management Practices	Male	103	111.51 ± 18.61
	Female	47	117.32 ± 23.83
Health Safety Environmental Practices	Male	103	73.68 ± 11.91
	Female	47	73.17 ± 14.09

Gender differences in project management practices and HSE practices, males had a mean score of 111.51

± 18.61 for project management practices, while females had a slightly higher mean of 117.32 ± 23.83. For health, safety, and environmental practices, males had a mean score of 73.68 ± 11.91, while females scored 73.17 ± 14.09. Although females scored

slightly higher in project management practices, the differences were minimal, suggesting that gender does not play a significant role in the integration of project management and HSE practices in the sample.

Table-5

Project Management Practices and Health Safety Environmental Practices predicting with age gender education experience and level of management (n=150).

Category Variables	Unstandardized Coefficients (B)	Unstandardized Coefficients (Std. Error)	Standardized Coefficients (Beta)	t	Sig.
PMP (Constant)	59.747	13.035		4.583	0.000
Gender	12.027	4.472	0.267	2.689	0.008
Age	4.075	2.541	0.166	1.604	0.112
Education	11.338	3.329	0.324	3.406	0.001
Experience	2.447	1.453	0.166	1.684	0.095
Level of management	5.124	3.627	0.145	1.413	0.161
HSEP (Constant)	51.548	8.007		6.438	0.000
Gender	1.260	2.747	0.046	0.459	0.647
Age	1.532	1.561	0.103	0.982	0.329
Education	7.970	2.045	0.377	3.897	0.000
experience	-0.003	0.892	0.000	-0.003	0.997
Level of management	3.144	2.228	0.147	1.411	0.162

The regression analysis for predicting project management practices revealed that gender, education, and experience had a significant impact. Males reported higher integration of project management practices compared to females, with a statistically significant coefficient (B = 12.027, p < 0.01). Education was another significant predictor (B = 11.338, p < 0.01), indicating that higher levels of education are associated with better implementation of project management practices. Experience, while showing a positive trend, was not statistically significant (B = 2.447, p = 0.095). The level of management was not found to be a significant predictor of project management practices (B = 5.124, p = 0.161), suggesting that regardless of whether a person is in low, middle, or top management, the level

of management does not significantly affect how project management practices are integrated. For health, safety, and environmental practices, education was the only significant predictor (B = 7.970, p < 0.01), with higher education levels contributing to better integration of HSE practices. Gender, age, experience, and the level of management were not significant predictors of HSE practices. Gender's lack of significance in predicting HSE practices (B = 1.260, p = 0.647) indicates that gender does not substantially influence how well HSE practices are integrated. Similarly, age and experience were also not significant predictors (p-values > 0.05), and the level of management did not show a meaningful relationship with HSE practices (B = 3.144, p = 0.162).

DISCUSSION

This research aimed to explore the integration of Project Management Practices (PMP) with Health, Safety, and Environmental Practices (HSE) in Pakistan, with a particular focus on gender differences and the influence of demographic factors such as age, education, experience, and level of management. The findings present several key insights that contribute to the understanding of how gender and various demographic variables influence the implementation of HSE practices within project management contexts. These results are discussed in comparison to existing literature on project management, gender dynamics, and HSE integration.

The analysis revealed a significant positive correlation between Project Management Practices (PMP) and Health, Safety, and Environmental Practices (HSE), as shown by the moderate correlation coefficient of 0.660**. This finding aligns with previous research that highlights the interconnectedness of project management processes and HSE practices. Effective project management has been found to significantly enhance safety performance and environmental compliance within construction projects (Saunders et al., 2017); (Khosravi et al., 2014) with organizations that prioritize robust project management frameworks likely to have better integration and implementation of HSE practices. The positive relationship between PMP and HSE practices suggests that organizations adopting comprehensive project management methodologies can improve overall project success and worker safety, particularly in industries where health and safety risks are prevalent (Zaid Alkilani, Jupp, Sawhney, & Building, 2013).

The results indicated notable gender differences in the implementation of both project management and HSE practices. Female participants reported a slightly higher mean score for Project Management Practices compared to male participants, while males reported slightly higher scores for Health, Safety, and Environmental Practices. These results suggest that gender influences the application of project management strategies and HSE practices, although the differences are not substantial. This contrasts with other studies, such as (Hasan, Kamardeen, & Management, 2022) which found that gender differences in the construction industry, especially regarding safety practices, are more pronounced, with

men often taking on higher-risk roles. However, the lack of significant gender disparities in this study may be attributed to the diverse range of industries represented by the participants, allowing for a more balanced approach to project management and safety practices, regardless of gender.

Furthermore, while some studies have highlighted the impact of gender stereotypes on women's participation in leadership roles, leading to less involvement in strategic safety decisions (Martínez-Huerta, Chavarría-Garza, Aquines-Gutiérrez, & Santos-Guevara, 2024; Galea, Powell, Loosemore, Chappell, & economics, 2015) the results of the current study suggest that gender, while influential, may not have as significant an effect on the implementation of safety practices as might be expected. Although women in this study may be managing projects effectively, societal and organizational barriers could still impede their ability to influence safety practices as substantially as their male counterparts. These findings point to a need for further research to examine the specific ways in which gender roles impact the practical implementation of HSE strategies, particularly in diverse cultural and organizational settings like Pakistan.

The regression analysis conducted indicated that education and gender were significant predictors of Project Management Practices (PMP), while education remained a strong predictor of Health, Safety, and Environmental Practices (HSE). The results showed that higher education levels positively influenced the implementation of both PMP and HSE practices, supporting previous research that emphasizes the role of education in improving the effectiveness of project management and safety protocols (Yang, 2022; Khosravi et al., 2014). Educated project managers are more likely to integrate safety measures into their planning and execution processes, ensuring that projects adhere to safety standards. The findings also highlight the importance of educational programs, particularly for workers and managers, to enhance the integration of safety practices into project management, especially given the limited educational opportunities in some sectors in Pakistan.

Interestingly, while education proved to be a strong predictor for both PMP and HSE practices, experience and level of management did not significantly affect the implementation of HSE practices. This finding

contradicts some previous research, which suggests that more experienced workers and higher-level managers are better positioned to implement and enforce safety practices (Hinze, Thurman, & Wehle, 2013). This discrepancy may be attributed to the diverse nature of the sample in this study, which included individuals from a wide range of management levels and experiences, potentially diluting the significance of these variables. It is also possible that the implementation of HSE practices is influenced more by organizational culture and the specific demands of the project, rather than the individual experience or management level of the workers involved. While previous research indicates that higher management levels are often associated with greater responsibility for safety implementation (Grote, 2015) the findings from this study suggest that this relationship may not hold true in the Pakistani context, where organizational structures may allow for more equal involvement in safety decision-making across gender and management levels.

The positive relationship between project management and HSE practices has important implications for both practice and policy. Organizations should focus on strengthening project management competencies to improve safety and environmental outcomes. This is consistent with recommendations from international bodies such as the International Labour Organization (ILO), which advocates for the stronger integration of project management and safety practices to enhance workplace health and safety outcomes (Wadsworth & Walters, 2019). The significant role of education in both PMP and HSE practices underscores the need for targeted training programs to ensure that workers, particularly those in lower management roles, have the skills and knowledge necessary to implement effective safety practices. Given the limited educational access in certain sectors, policy interventions should aim to improve access to education and vocational training for workers in project management and safety roles.

CONCLUSION

This research examined the integration of Project Management Practices (PMP) with Health, Safety, and Environmental Practices (HSE) in Pakistan, focusing on gender differences and demographic factors. A

significant positive correlation was found between PMP and HSE practices, indicating that effective project management enhances safety and environmental outcomes. Gender differences were observed, with females slightly outperforming males in PMP, but these differences were not statistically significant. Education was a strong predictor of both PMP and HSE practices, highlighting the importance of training in improving project and safety management. However, experience and level of management had minimal impact, suggesting that organizational and cultural factors might be more influential in shaping these practices in Pakistan.

RECOMMENDATION AND LIMITATION OF THE STUDY

This study recommends several steps to improve the integration of project management and HSE practices. First, organizations should invest in training programs focused on enhancing employees' knowledge and skills, particularly regarding HSE practices. Tailored training should be provided based on employees' roles and management levels. Although gender differences in project management and HSE practices were not significant, promoting gender equality and providing equal opportunities for both male and female workers is crucial for creating a more inclusive work environment. Additionally, future research could benefit from examining the influence of organizational culture and leadership styles on the integration of these practices, as these factors may significantly impact the effectiveness of project management strategies and HSE practices.

Furthermore, policymakers should consider implementing regulations that require the integration of HSE practices into project management strategies, which could improve safety standards and reduce project risks across various industries. However, the study has several limitations. The sample size of 150 participants limits the generalizability of the findings. A larger and more diverse sample would provide a broader perspective on the issue. The cross-sectional nature of the study provides only a snapshot of the situation, so longitudinal studies could offer more insights into how these practices evolve over time. The study also focused on a limited set of demographic variables and did not account for other potential influences, such as organizational structure or

industry type. Finally, since the research relied on self-reported data, future studies could incorporate objective measures or mixed methods to validate the results and reduce biases.

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