

Enhancing Safety Performance in the Power Sector: The Role of Safety Management Systems and Working Conditions

Victor Olabode Otitolaiye



الكلية الدولية للهندسة والإدارة
International College of
Engineering & Management

Summary

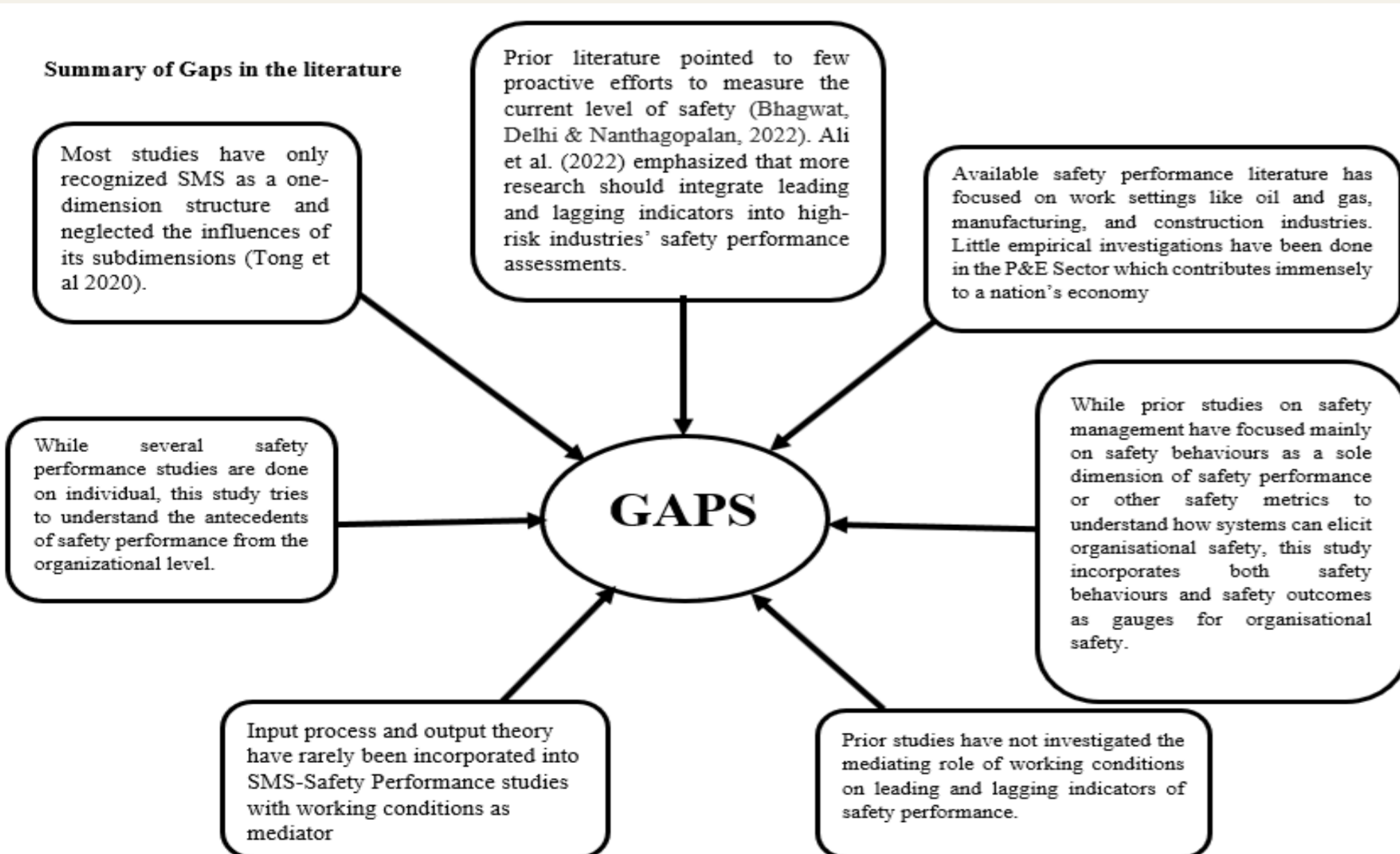
- Occupational accidents pose a significant threat to the sustainable development of nations, impacting both the well-being of employees and the financial stability of organizations. While strides have been made to reduce major accidents in various work contexts, the power sector remains a high-risk environment that demands special attention. This study aims to explore the relationship between safety management systems (SMS), working conditions, and safety performance in the power sector. This stems from a call by authors to understand the etiologies as well as pathways in understanding safety performance enhancements in high risk organizations.
- The research will employ a (SMS) as a potential solution for enhancing safety performance, emphasizing the need for a holistic approach to address safety performance enhancement. The study will also introduce a mediator to elucidate the mechanisms through which SMS influence safety performance, considering the impact of working conditions as well.
- Data will be collected from individual safety managers across power and electricity distribution companies, with the G-power analysis used to determine the sample size. The study will employ a SEM for data analysis, allowing for a robust examination of the relationship between SMS, working conditions, and safety performance.

Introduction

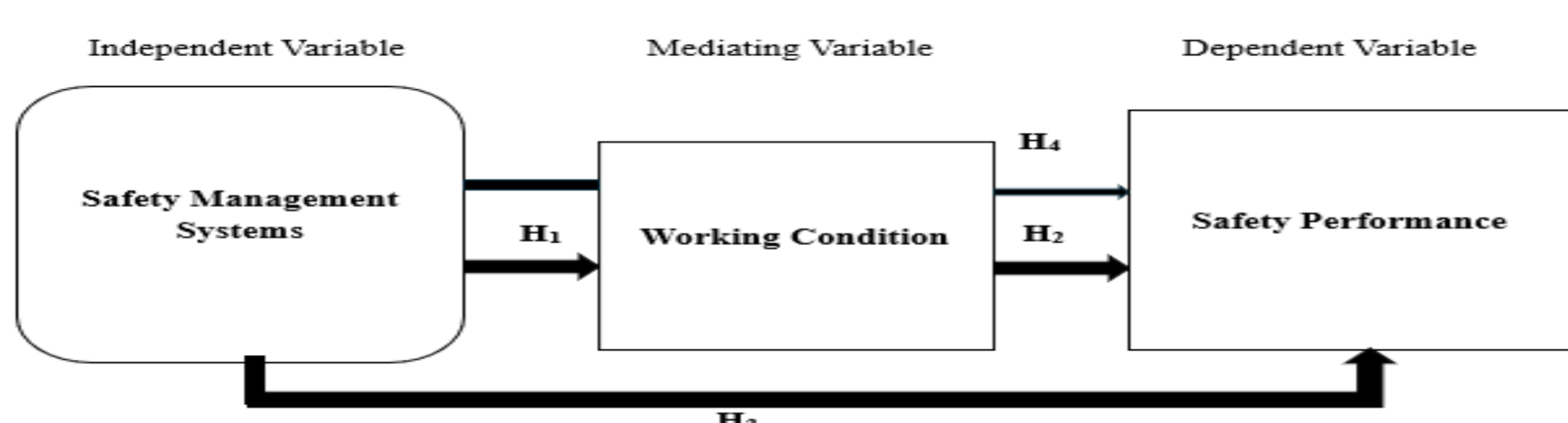
- Occupational accidents pose a significant threat to the sustainable development of many organizations, particularly in the power sector (Arooj et al., 2022). Global estimates revealed that about 4-6% of global GDP is affected by occupational accidents (ILO, 2020). Despite the role played by researchers in accident reduction, there have been calls to understand other factors that enhance safety performance (Sampson et al. 2014).
- While safety management systems have been acknowledged for enhancing safety performance in various work settings (Fan et al., 2020; Kim et al., 2018), the power sector has been largely overlooked (Obi et al., 2020). This study emphasizes the need for a paradigm shift in understanding safety performance enhancements by diverting attention from human error and emphasizing the safety management system, which has been advocated by previous authors in OHS research (Chong et al., 2018; Otitolaiye & Abd Aziz, 2023).
- Furthermore, it introduces a mediator to explain the mechanism by which safety management systems influence safety performance. Additionally, it seeks to explore the role of working conditions as mediators in explicating the relationship above and adopts the Input process output theory to explain the relationship between all variables in safety performance studies. This holistic approach aims to address the gaps in empirical evidence and improve safety performance in high-risk settings.

RQ, Theoretical Gaps & Research Model

- What is the relationship between SMS and safety performance?
- What is the relationship between SMS and working conditions?
- What is the relationship between working conditions and safety performance?
- Does working conditions mediate the relationship between SMS and safety performance?



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Hypothesis Statements

- H1. Management Commitment has a significant relationship with Safety performance.
- H2. Employee Involvement has a significant relationship with Safety performance.
- H3. Safety Communication has a significant relationship with Safety performance.
- H4. Safety Champion has a significant relationship with Safety performance.
- H5. Safety Training has a significant relationship with Safety performance.
- H6. Government Regulation has a significant relationship with Safety performance.
- H7. Working conditions have a significant relationship with Safety performance.
- H8. Management commitment has a significant relationship with Working Conditions
- H9. Employee involvement has a significant relationship with Working Conditions
- H10. Safety Communication has a significant relationship with Working Conditions
- H11. Safety Training has a significant relationship with Working Conditions
- H12. Safety champion has a significant relationship with Working Conditions
- H13. Government regulation has a significant relationship with Working Conditions
- H14. Working Condition as a Mediator between Management Commitment to Safety and Safety Performance
- H15. Working Condition as a Mediator between Employee Involvement and Safety Performance
- H16. Working Condition as a Mediator between Safety Communication and Safety Performance
- H17. Working Condition as a Mediator between Safety Champion and Safety Performance
- H18. Working Condition as a Mediator between Safety Training and Safety Performance
- H19. Working Condition as a Mediator between Government Regulations and Safety Performance

Methodology

Sample size determination using G-power analysis

NUMBERS OF PREDICTOR	Effect Size		
	Small	Medium	Large
1	390	53	24
2	481	66	30
3	547	76	35
4	599	84	39
5	645	91	42
6	686	97	46
7	726	102	48
8	757	108	51
9	788	113	54
10	844	117	56
15	952	138	67
20	1066	156	77
30	1247	187	94
40	1407	213	110

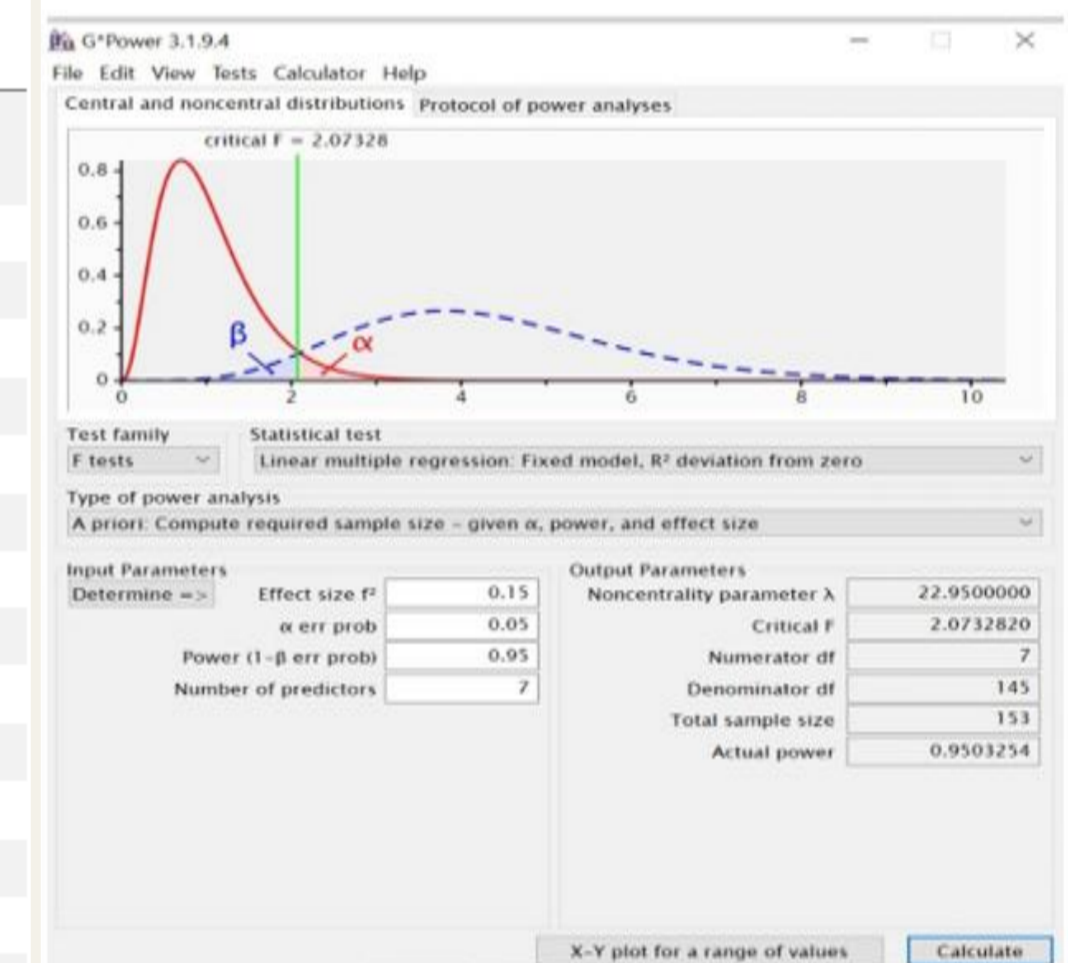


Figure 3.2
Total Sample Size Using G-power Analysis

Reliability Test

Pilot Study Reliability Result (n=42)

S/No	Constructs	No of Items	Cronbach's Alpha	Composite Reliability
1	Management Commitment to Safety	10	0.887	0.903
2	Employee Involvement	8	0.769	0.804
3	Safety Communication	4	0.721	0.824
4	Safety Training	8	0.898	0.918
5	Safety Champion	6	0.752	0.826
6	Government Regulation	5	0.744	0.826
7	Co-worker support	5	0.857	0.897
8	Environmental Conditions and Occupational Hazards	7	0.819	0.869
9	Safety Incentives	5	0.801	0.856
10	Work Pressure	4	0.700	0.755
11	Leading Indicators	4	0.725	0.824
12	Lagging Indicators	5	0.731	0.822

Conclusion: The findings of this study are expected to contribute to the existing body of knowledge on safety performance enhancement, particularly in high-risk settings such as the power sector. By shedding light on the interplay between safety management systems, working conditions, and safety performance, this research seeks to provide valuable insights for organizations and policymakers to improve safety outcomes in the power industry.

References

- Arooj, A., Majid, M., Alam, A., & Bilal, M. F. (2022). Assessment of workplace safety climate among power sector employees: A comparative study of cross-culture employer in Pakistan. *Plos one*, 17(8), e0272976.
- Chong, C. H., Ramayah, T., & Subramaniam, C. (2018). The relationship between critical success factors, internal control and safety performance in the Malaysian manufacturing sector. *Safety science*, 104, 179-188.
- Fan, D., Zhu, C. J., Timming, A. R., Su, Y., Huang, X., & Lu, Y. (2020). Using the past to map out the future of occupational health and safety research: where do we go from here? *The International Journal of Human Resource Management*, 31(1), 90-127.
- ILO (2022). Enhancing Social dialogue towards a culture of safety and health. *World Day for Safety and Health at Work 2022*. Retrieved from https://www.ilo.org/wcmsp5/groups/public/-/ed_protect/-/protrav/-/safework/documents/publication/wcms_842505.pdf
- Obi, M., Slay, T., & Bass, R. (2020). Distributed energy resource aggregation using customer-owned equipment: A review of literature and standards. *Energy Reports*, 6, 2358-2369.
- Otitolaiye, V. O., & Abd Aziz, F. S. (2024). Bibliometric analysis of safety management system research (2001-2021). *Journal of safety research*, 88, 111-124.
- Sampson, J. M., DeArmond, S., & Chen, P. Y. (2014). Role of safety stressors and social support on safety performance. *Safety Science*, 64, 137-145.