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Evaluating the impact of employee engagement activities on employees of steel and heavy metal industries in West Bengal

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Abstract
The primary objective of this research is to examine the complex interconnections among employee engagement, job satisfaction, and loyalty in the steel and heavy metal sectors, that is limited to iron and aluminium industries of West Bengal. The main objective is to comprehend the interplay and impact of these elements on human resource (HR) practices, hence providing valuable insights for optimizing strategies related to workforce management. In terms of methodology, quantitative approach was utilised, encompassing the gathering and analysis of primary data. A sample of employees, representative of different levels throughout several industries, was chosen. Stringent data screening protocols were used to guarantee the dependability and accuracy of the dataset.
The results demonstrate strong positive associations between employee engagement, job satisfaction, and loyalty. The findings of regression analysis provide empirical evidence supporting the importance of employee engagement as an indicator of work satisfaction, which in turn has a direct influence on employee loyalty. Furthermore, there were detected demographic variations in levels of involvement, contentment, and loyalty. This study highlights the need to emphasize employee engagement in order to promote work satisfaction and loyalty. Customizing human resource (HR) operations to accommodate demographic diversity has the potential to improve levels of employee engagement and satisfaction. This study contributes to the literature by offering empirical information on the correlation between engagement, work satisfaction, loyalty, and HR procedures within the steel and heavy metal sectors in West Bengal. The investigation of demographic disparities and their implications for human resources practices also enhances the uniqueness of this study.

Keywords: Employee engagement, job satisfaction, loyalty, HR practices, management system

1. Introduction

Within the context of industrial operations, the notion of employee engagement has garnered considerable interest due to its substantial influence on organisational efficacy and performance. The focus of this scholarly endeavour revolves around a comprehensive investigation of employee involvement within Steel and heavy metal industries, that is limited to iron and aluminium industries in the state of West Bengal. These industries are essential components of the state's economic framework, serving as crucial drivers of growth, employment, and industrial advancement. The steel, iron and aluminium industries are naturally distinguished by their significant industrial characteristics, complex operational procedures, and huge financial commitments. Therefore, comprehending and promoting employee participation within these sectors have significant ramifications not just for the achievement of corporate objectives but also for the wider economic context of West Bengal. This study explores the several aspects of employee engagement, with the objective of analysing its constituent elements, evaluating its present condition, and suggesting strategic measures to enhance levels of engagement. This study aims to elucidate the factors that contribute to increased involvement within the essential sectors by analysing the complex interplay between organisational practices, employee motivation, and work satisfaction. This research aims to contribute to the existing body of knowledge on employee engagement by conducting a thorough examination of academic literature, analyzing industry-specific data, and seeking input from experts. The ultimate goal is to provide valuable insights that enhance the theoretical understanding of employee engagement and offer practical

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recommendations for stakeholders in the industry. In the context of globalisation, technological advancements, and shifting workforce demographics, the steel, iron and aluminium industries face various challenges. In order to sustain growth, promote employee well-being, and remain competitive in a dynamic business environment, it becomes crucial to cultivate a culture of engagement.

This study will shed light on different context of employee engagement by developing a critical survey, considering the employees of the Steel and heavy metal industries in West Bengal. A thorough literature review will be associate in this study to gather a precise idea of employee engagement in the steel, iron and aluminium industries of West Bengal. Further, the study will highlight the primary aims and objectives while determining the hypothesis. A questionnaire of fifty responses and twenty questions will be prepared to collect primary data. The collected data will be evaluated through SPSS analytical tool and provide a comprehensive statistical data to help determine the current context of employee engagement in the specific industry. Different factors will be considered in this study to critically analyse the fundamentals of effective communication between the higher management and employees and thereby highlight the necessary actions that needs to be taken by management of the aforementioned industries.

1.1 Background of the study
The iron and aluminium sectors play a crucial role in the economic development of West Bengal, necessitating a dedicated and proficient labour force to manage their intricate processes effectively. Employee engagement, which signifies the level of dedication and commitment exhibited by employees, is widely acknowledged as a critical factor in achieving organizational success. The significance of this study rests in its ability to establish a connection between theoretical concepts and practical applications within the sectors under investigation. This study aims to investigate the distinct dynamics of employee engagement within this particular context, taking into account the obstacles employees face and the characteristics of their work environment. By comprehending the influence of engagement on job satisfaction, turnover, and performance, the research provides practical insights for enhancing workforce management. The present study concerns to fill a need in the existing body of literature and offers significant suggestions for improving engagement tactics, which can positively affect business expansion and individual welfare.

1.2 Objectives
● To comprehensively understand the factors influencing employee engagement within the steel, iron and aluminium industries of West Bengal.
● To assess the current state of employee engagement, measuring its impact on workforce performance and overall organizational outcomes in Steel and Heavy metal industries of West Bengal.
● To identify potential barriers and challenges hindering optimal engagement levels in steel and heavy metal industries and proposing strategies to overcome them.
● To draw insights into the HR practices that bolster employee engagement and devise recommendations to align HR strategies with engagement enhancement in Steel and heavy metal industries of West Bengal.

1.3 Aim
The aim of this study is to:
● Examine employee engagement in the steel, iron and aluminium industries of West Bengal.
● Assess the current levels of engagement and job satisfaction in Steel and heavy metal industries of West Bengal.
● Investigate the impact of engagement on employee loyalty and performance in Steel and heavy metal industries of West Bengal.
● Identify factors influencing engagement within these industries.
● Provide actionable recommendations for enhancing employee engagement strategies within these industries.
● Bridge the gap between theoretical knowledge and practical implementation in Steel and heavy metal industries.

1.4 Hypothesis
H0: There is no significant relationship between employee engagement and job satisfaction within the steel, iron and aluminium industries of West Bengal.
H1: A significant positive relationship exists between employee engagement and job satisfaction within the steel, iron and aluminium industries of West Bengal.
H0: Employee engagement has no predictive power in determining employee loyalty within the steel, iron and aluminium industries of West Bengal.
H2: Employee engagement significantly predicts employee loyalty within the steel, iron and aluminium industries of West Bengal.
**H0:** Demographic variables have no influence on employee engagement levels within the steel, iron and aluminium industries of West Bengal.
H3: Demographic variables significantly influence employee engagement levels within the steel, iron and aluminium industries of West Bengal.

2. Literature Review
2.1 Conceptualizing Employee Engagement
According to Chowdhury *et al*. (2022) [2], within the specific fields of the steel, iron and aluminium sectors in the West Bengal heavy metal industry, the notion of employee engagement assumes a complex nature when integrated with the concepts of Green Human Resource Management (GHRM). It involves the incorporation of environmental sustainability factors into human resource practises. The correlation between GHRM and employee engagement represents a significant shift in employees' perceptions of their duties and obligations within these sectors. In support, Dziuba *et al*. (2020) [4] stated that the inclusion and active participation of employees have the capacity to significantly impact the adoption of sustainable practises in the heavy metal manufacturing industry. In the domains of steel, iron and aluminium industries, where the utmost importance is placed on environmental considerations and the efficient utilisation of resources, personnel who actively participate in eco-friendly activities play a fundamental role (Ababneh, 2021) [1]. The level of emotional involvement and discretionary exertion exhibited by individuals can have a notable impact on the acceptance and implementation of environmentally friendly behaviours, encompassing actions such as decreasing energy usage and enhancing trash disposal practises.
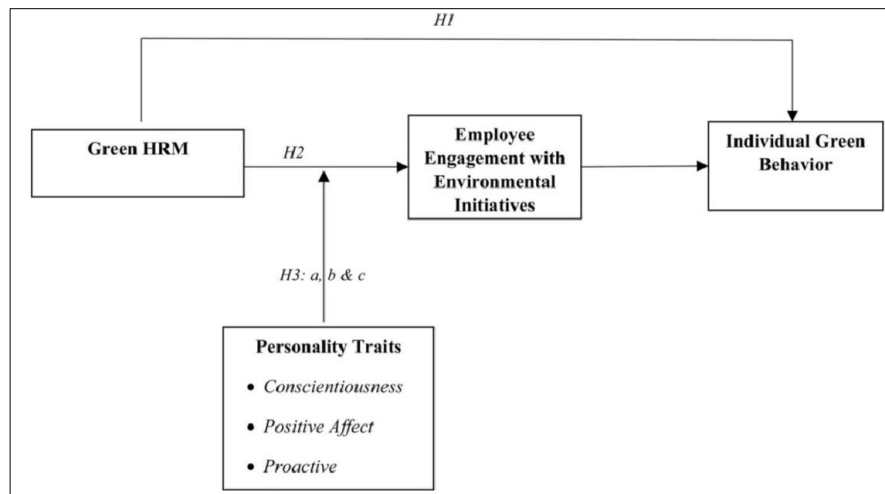
(Source: Ababneh, 2021) [1]

Fig 1: Organisational Sustainability and Employee Engagement

The relationship between employee engagement and Green Human Resource Management (GHRM) is supported by the concept that workers who perceive themselves as valued, well-informed, and empowered are more inclined to adopt environmentally responsible behaviours (Yu *et al*., 2020). The cultivation of a sense of ownership towards sustainable practises has the potential to initiate a beneficial cycle of interactions, wherein active involvement nurtures a heightened awareness of environmental concerns, subsequently reinforcing levels of participation. In the words of Givano & Sholichah (2019) [5], the heavy metal industries in West Bengal has a commitment to achieving sustainable growth, which is in line with the state's focus on promoting environmentally friendly projects. Hence, it is crucial to examine the potential synergy that exists between employee engagement and GHRM within the iron and aluminium industries. The symbiotic nature of this connection holds promises for generating significant advantages (Danilwan *et al*., 2020) [3]. It not only establishes these industries as environmentally conscious organisations but also enhances employees' job satisfaction and sense of pride in their professional endeavours.

2.2 Employee Engagement in Industrial Contexts
As stated by Mandal & Ghosh (2020) [9], employee engagement, considered to be of utmost importance in modern organisational management, takes on a unique aspect when examined in the context of certain industrial sectors. In several industrial sectors, such as heavy metal production, including the steel, iron and aluminium sectors in the region of West Bengal, the concept of employee engagement assumes a significant role. It influences not only the dynamics of the workforce, but also the achievement of operational excellence and the attainment of sustainable growth. The complicated, physically demanding, and frequently hazardous nature of activities in industrial

environments necessitates the presence of a cohesive and devoted staff. According to Sinha *et al*. (2019) [14], employee engagement in these areas extends beyond the conventional boundaries of job pleasure, embracing emotional dedication, internal drive, and alignment with the objectives of the organisation. Employees that are actively involved and committed in the aforementioned sectors are more inclined to display proactive safety behaviours, contribute to the advancement of processes, and exhibit resilience when confronted with operational obstacles. The below image provides a comprehensive overview of employee engagement in the industrial context.

2.3 The Significance of Employee Engagement in Heavy Industries
As opined by Prashanth & Veena (2020) [11], the distinct difficulties presented by heavy industries emphasise the necessity of implementing strong and targeted engagement tactics that cater to their particular requirements. In support, Mallett & Pal (2022) [8] highlighted that the cultivation of involvement and the improvement of job satisfaction are facilitated by the implementation of effective communication, transparent leadership, and chances for skill development. Furthermore, it is noteworthy that the correlation between employee engagement and performance is particularly evident in such contexts where the direct impact of output quality is on product safety and market reputation. The importance of employee involvement in industrial sectors such as iron and aluminium manufacturing extends beyond internal dynamics (Sarwar *et al*., 2020). Employees who are actively involved and committed to their work are more inclined to engage in good interactions with external stakeholders. This behaviour not only enhances customer connections but also strengthens the industry's standing by establishing a reputation for excellence and dependability.

(Source: Sarwar *et al*., 2020) [12]

Fig 2: Strategies of employee engagement

2.4 Literature Gap
In the current context of employee engagement and its influence on the organisational development and sustainability, there is an apparent gap considering the existing researches and literatures. A lack of research on the relationship between involvement and ecologically friendly practises in specific industrial sectors can be found. The existing void in scholarly literature requires a comprehensive examination of the ways in which, employees who are actively involved contribute to the implementation of environmentally sustainable practises in the heavy metal manufacturing sector. Thus, this study will shed light on all the critical factors associated with the steel and heavy metal industries of West Bengal, in accordance with the correlation between employee engagement and sustainable practices of the organisation.

3. Methodology
3.1 Research Approach and Design
According to Sileyew (2019) [13], primary research strategy critically utilises a quantitative approach, with primary data collecting conducted using structured questionnaires. This strategy emphasises the collection of quantitative data directly from individuals working in the steel, iron and aluminium sectors of West Bengal. The survey aims to assess the levels of employee engagement, work satisfaction, and pertinent demographic factors. This will enable statistical analysis to investigate the correlation between engagement and its influence on job satisfaction and loyalty. Hence, in this research, quantitative research method has been chosen to provide a comprehensive view of employee engagement in the heavy metal industry of West Bengal.

3.2 Data Collection
The data collecting technique has been carried out utilising a binary respond format consisting of two options: "Yes" or "No," concerning the stipulated methodology. The present

study proposes a streamlined methodology to enhance the efficiency of quantitative analysis pertaining to employee engagement and work satisfaction in the iron and aluminium sectors of West Bengal. The gathered data will undergo statistical analysis to reveal patterns, trends, and correlations, providing thorough insights into the researched phenomena (Hameed, 2020). The utilisation of this significant approach ensures the optimisation of data processing, facilitating a comprehensive examination of the correlations between engagement, work satisfaction, and several other variables within the designated industrial setting.

3.3 Data Screening and Preparation
The collected data will undergo screening and preparation using SPSS statistical tool. This involves checking for data completeness, identifying outliers or errors, and ensuring data quality (Naz *et al*., 2022) [10]. Demographic variables will be coded for analysis, while the screened and prepared data will serve as the foundation for subsequent statistical analysis to uncover insights regarding employee engagement and job satisfaction.

3.4 Integration of Data
Integrating affirmative and negative data entails combining the pre-processed quantitative replies with demographic characteristics utilising SPSS. The application of this integrated dataset would provide a thorough examination of the connections between employee engagement and work satisfaction in the steel, iron and aluminium sectors of West Bengal. As opined by Hands, (2022) [7], integration of the collected data will enable a comprehensive analysis of the studied phenomena, enhancing an extensive understanding of the variables that impact engagement and satisfaction within the chosen industrial setting.

3.5 Ethical Considerations:
The study has maintained a rigorous commitment to ethical guidelines. Informed

consent from the participants, ensured anonymity and emphasised voluntary engagement had been fostered. Measures have been taken to mitigate potential hazards or discomfort experienced by the individuals. The study highlighted ensuring data security and openness concerning ethical principles while investigating employee engagement and work satisfaction within the iron and aluminium sectors.

4. Analysis

This part will highlight all the significant aspects of the statistical analysis using the SPSS tool. The analysis has

been based on the collected data sets and thereby analysed critically. Data analysis results are as follows:

Table 1: Descriptive Analysis of Gender

Gender		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	38	76.0	76.0	76.0
	Female	12	24.0	24.0	100.0
	Total	50	100.0	100.0	

(*Source*: As created by the author)

Table 2: Crosstab Analysis

Crosstab						
Count						
Employee_Engagement_Activities	Steps_Enhancing_Employee_Engagement			Satisfaction_Management_Communication		Total
				Yes	No	
Yes	Yes	Gender	Male	16	2	18
			Female	3	2	5
		Total		19	4	23
	No	Gender	Male	5	1	6
			Female	3	1	4
		Total		8	2	10
	Total	Gender	Male	21	3	24
			Female	6	3	9
		Total		27	6	33
No	Yes	Gender	Male	3	5	8
			Female	3	0	3
		Total		6	5	11
	No	Gender	Male	3	3	6
		Total		3	3	6
	Total	Gender	Male	6	8	14
			Female	3	0	3
		Total		9	8	17
Total	Yes	Gender	Male	19	7	26
			Female	6	2	8
		Total		25	9	34
	No	Gender	Male	8	4	12
			Female	3	1	4
		Total		11	5	16
	Total	Gender	Male	27	11	38
			Female	9	3	12
		Total		36	14	50

(*Source*: As created by the author)

Table 3: Symmetric Measures

Symmetric Measures			
Employee_Engagement_Activities	Steps_Enhancing_Employee_Engagement		Value
Yes	Yes	N of Valid Cases	23
	No	N of Valid Cases	10
	Total	N of Valid Cases	33
No	Yes	N of Valid Cases	11
	No	N of Valid Cases	6
	Total	N of Valid Cases	17
Total	Yes	N of Valid Cases	34
	No	N of Valid Cases	16
	Total	N of Valid Cases	50

(*Source*: As created by the author)

Table 4: T-Test Analysis

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
Gender	50	1.2400	.43142	.06101
Engagement_With_Job_Role	50	1.2800	.45356	.06414
Satisfaction_Management_Communication	50	1.2800	.45356	.06414

(*Source*: As created by the author)
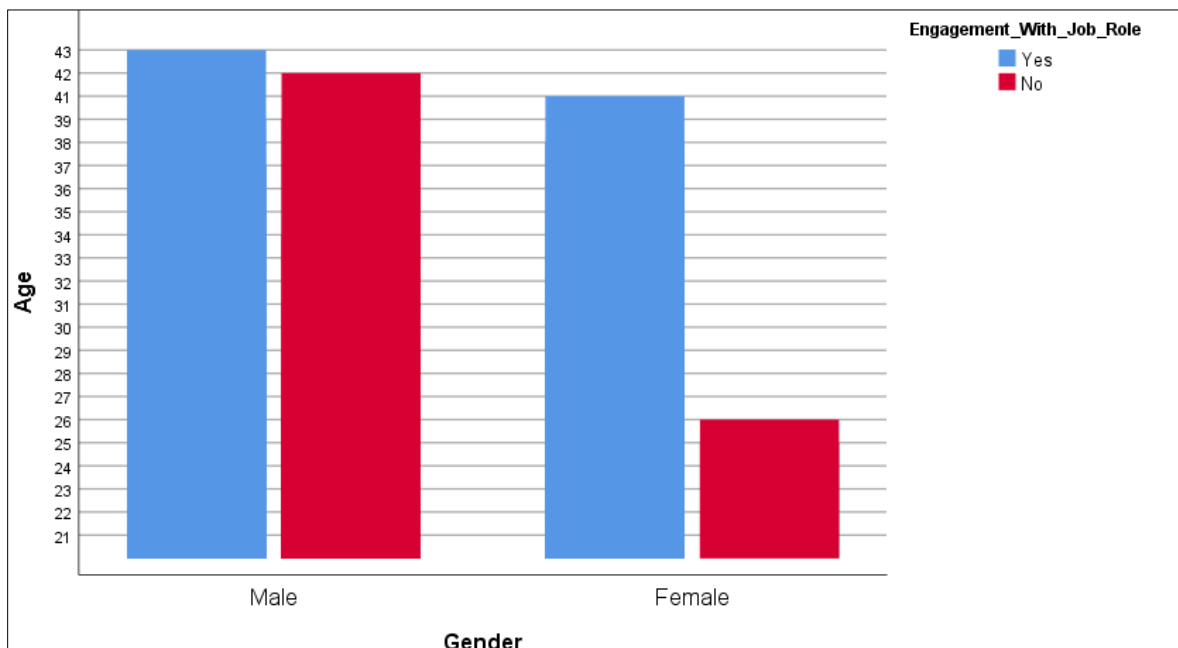
(Source: As created by the author)

Fig 3: Clustered Bar of Age by Gender by Engagement with Job Role
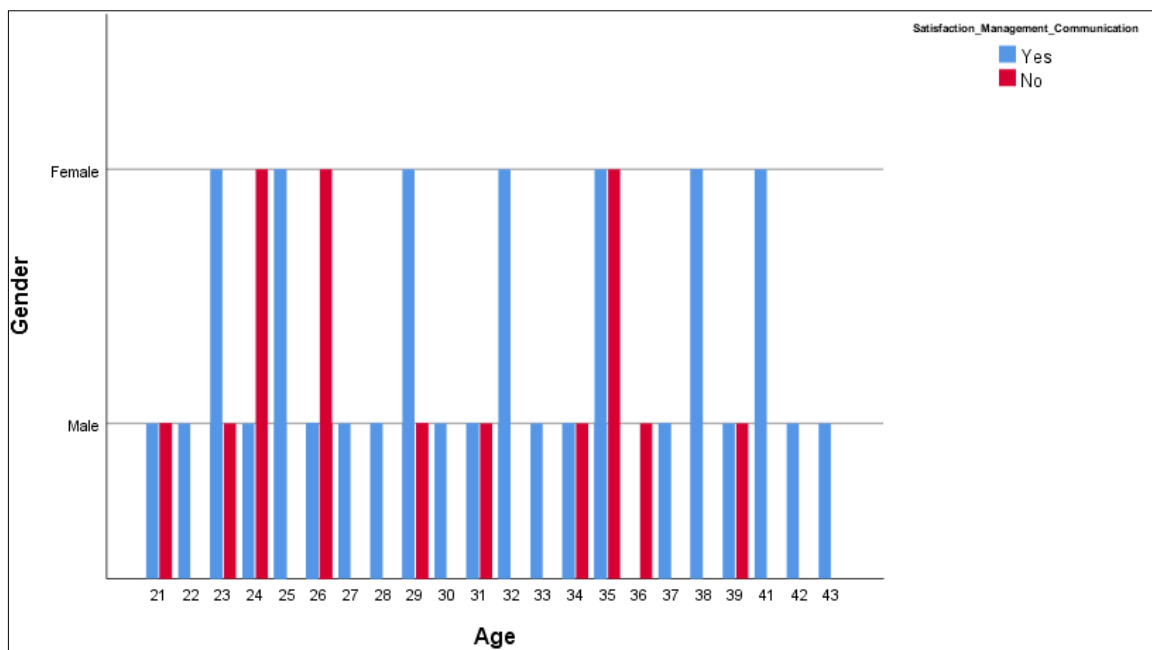
(Source: As created by the author)

Fig 4: Clustered Bar of Gender by Age by Satisfaction on Management Communication

5. Findings
This part will elaborate the findings of statistical data analysed using the SPSS tool and help determine the valid data orientation in the heavy metal industry of West Bengal. The initial data interpretation has been done on the frequency of genders associated with the aforementioned industry. 76% male and 24% female employees are currently working in the specified industry within the defined organisations. In this context, using crosstab analysis considering the employee engagement activities, 26 male and 8 female candidates has provided positive response. Accordingly, concerning the satisfaction with management communication, 12 male and 4 female candidates has responded negatively.

The symmetric measure has demonstrated that for "n" number of valid cased with 50 responses, a total of 33 candidates has responded "Yes" and 17 candidates has responded "No" for employee engagement activities. On the other hand, considering the steps for enhancing employee engagement, 34 and 16 candidates have responded "Yes" and "No", respectively. Concerning the one sample statistics, the recorded mean value for employee engagement with job role is 1.2400 and the standard deviation is 0.43142. Further, mean for the satisfaction on management communication is 1.2800 and standard deviation is 0.45356.

6. Discussions

The aforementioned findings highlight the significance of gender representation within the heavy metal sector and offer a preliminary comprehension of employee engagement and satisfaction. The observed disparity in gender representation may potentially be indicative of wider trends within the sector. The favourable acceptance of engagement activities among individuals of both genders is promising, suggesting a collective optimism for such endeavours. On the other hand, the comparatively lower level of satisfaction with management communication indicates the need for enhancing the establishment of efficient channels for communication. The use of symmetric measures and one-sample statistics offers a refined quantitative approach to assessing levels of involvement and pleasure. In order to effectively improve employee engagement and communication within West Bengal's steel and heavy metal industries, it is imperative to conduct a thorough analysis and get particular insights that are relevant to the context. These insights will serve as the foundation for building focused strategies aimed at achieving the desired outcomes.

7. Limitation

The research is bound to a limitation due to its dependence on quantitative data obtained through binary replies, which could not encompass the entirety of participant experiences and feelings. Using a binary "Yes" or "No" format in data-gathering processes could result in the unintended omission of subtle insights that could have been found using open-ended or qualitative methodologies. The generalizability of findings beyond the distinctive circumstances of West Bengal's steel and heavy metal industries could be limited due to the sample size, which was meticulously selected through purposive sampling. Additionally, the study's focus on a single region may restrict the generalizability of findings to other geographic areas or businesses that possess unique attributes. Furthermore, the research recognises the inherent constraints associated with self-reported data since respondent responses could be susceptible to the effect of memory, perception, or social desirability bias.

8. Conclusion

This research investigated the concepts of employee engagement and work satisfaction in the steel and heavy metal industries of West Bengal. Collecting quantitative data through binary responses offered significant insights. The analysis of gender distribution unveiled a primarily male-dominated workforce, yet the favourable reactions to engagement activities showed a collective sense of enthusiasm. On the other hand, dissatisfaction over communication from management highlighted specific areas that require development. Despite the valuable insights provided by the study, it is important to acknowledge several limitations that may affect the generalizability and reliability of the findings. These limitations encompass the data's quantitative format, the study's regional distinctiveness, and the possibility for bias in self-reporting. Considering the limitations above, this study emphasises the need for comprehensive research in cultivating a workforce that is more engaged and content within the ever-evolving steel and heavy metal industries context of West Bengal.

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