

“Strategic Human Resource Practices and Employee Productivity in Public Sector Energy Organisations: Examining the Mediating Role of Employee Engagement – A Comparative Study of NTPC and Singareni Thermal Power Plant”**KVMK Srinivas**Research Scholar, Department of Human Resource Management,
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As public sector energy organisations navigate the changing landscape, effective management of human resources has become a key driver of organisational performance and sustainability. The present study investigates strategic human resource practices, employee engagement and employee productivity in National Thermal Power Corporation (NTPC) and Singareni Thermal Power Plant (STPP) to further enhance our understanding of the mediating effect of engagement. The study employs a quantitative and explanatory research design, utilising primary data gathered via a structured questionnaire administered to employees from both organisations. Data were analysed in Statistical Package for the Social Sciences (SPSS), and Structural Equation Modelling (SEM) was performed using AMOS to test the hypothesised relationships as well as mediation effects. The results show that the relationship between strategic HR practices and employee engagement is significantly positive, whereas the relationship between employee engagement and employee productivity is strongly positive. The impacts of HR undertakings and employee engagement orientation are momentous, but employee engagement mediates productive relations with survey outcomes in performance dimensions, which shows its importance as a psychological battery between HR practices and performance outputs. Moreover, the multi-group analysis reveals that there are significant differences in the strength of these relationships when comparing NTPC and STPP, thus highlighting the significance of organisational context for HR-performance linkages. The research adds to the existing literature on HRM effectiveness through its theoretical integration of Social Exchange Theory, Job Demands–Resources model and Ability–Motivation–Opportunity framework which provides a comprehensive understanding in this context (high reliability public sector environment). From an applied sense, the results serve as a reminder for positions to embrace engagement-driven HR techniques with the goal of increasing productivity and operational effectiveness. The paper also provides useful insights to policymakers and managers aiming to modernise human resources in the public sector. In conclusion this research shows the importance of employee engagement as a mediator of strategic HR practices to providing positive productivity results.

Keywords: Strategic Human Resource Practices, Employee Engagement, Employee Productivity, Public Sector Organisations, NTPC, Singareni Thermal Power Plant

1. Introduction

In today’s fast-changing and increasingly competitive organisational environment, the role of Human Resource Management (HRM) has evolved from a largely administrative function into a strategic driver of organisational performance and sustainability. In capital-intensive and high-reliability industries such as power generation and other weather-sensitive sectors, the effective management of human resource practices is critical for maintaining operational efficiency and ensuring safety, both of which are essential for long-term productivity. In this context, investment in human capital development becomes especially important, as key performance outcomes in electricity generation, transmission, and distribution depend substantially on the capabilities of organisations functioning within complex institutional, technological, and regulatory environments. This is particularly relevant in India’s public sector energy organisations, including major entities such as NTPC and Singareni Thermal Power Plant (STPP). Consequently, increasing scholarly and managerial attention has been directed toward understanding how strategic HR practices contribute to enhanced employee productivity through psychological and behavioural mechanisms, particularly employee engagement (Jiang et al., 2012; Albrecht et al., 2015).

1.1 Background of the Study. Strategic human resource practices, such as training and development, performance appraisal, compensation systems, and employee participation, are widely recognised as important drivers of organisational effectiveness. The Ability–Motivation–Opportunity (AMO) framework suggests that HR practices enhance employees’ abilities, motivation, and opportunities to contribute, thereby improving individual and organisational performance outcomes (Appelbaum et al., 2000). In high-reliability industries such as energy generation, where operational efficiency and safety are central to organisational success, effective HRM has been associated not only with higher productivity but also with reduced risk and improved reliability (Boxall & Purcell, 2016). Employee engagement is increasingly regarded as a key mediating mechanism through which HR practices influence performance. It reflects employees’ emotional, cognitive, and physical investment in their work roles and is commonly characterised by vigour, dedication, and absorption (Kahn, 1990; Schaufeli et al., 2002). Existing research indicates that engaged employees are more likely to exert discretionary effort, demonstrate superior job performance, and remain committed to their organisations, all of which contribute to enhanced productivity and stronger organisational outcomes (Saks, 2006; Bakker & Demerouti, 2008). The case of NTPC and Singareni Thermal Power Plant provides a valuable context for examining these relationships. Both organisations operate within India’s public sector energy sector, which is characterised by bureaucratic hierarchies, unionised workforces, and stringent regulatory requirements. At the same time, both are high-reliability organisations in which human performance plays a crucial role in ensuring operational success. Although NTPC and STPP share several structural and sectoral similarities, potential differences in organisational culture, HR practices, and leadership styles make a comparative analysis both relevant and necessary, particularly with respect to employee engagement and productivity outcomes.

1.2 Research Problem. Despite substantial investment in human resource development initiatives, productivity gains in much of the public sector have remained difficult to realise. This persistent disconnect between HR practices and employee performance outcomes presents a major challenge for HR professionals, raising concerns about the effectiveness of HR strategies and their alignment with employee needs and organisational objectives (Guest, 2017). In particular, the relationship between HR practices and productivity remains insufficiently understood, especially when employee engagement is considered as a mediating mechanism. Moreover, earlier research on the relationship between HR practices and performance has largely focused on broad and general organisational settings, with limited attention to sector-specific contexts and even less to the Indian power sector in particular. Public sector energy organisations operate under distinctive constraints, including rigid administrative structures, legacy systems, and limited flexibility in HR decision-making, all of which may influence the effectiveness of HR interventions (Mahmood et al., 2015). Although a small number of empirical studies have examined the HR–performance link in public sector organisations, comparative research involving major public sector energy enterprises such as NTPC and STPP remains scarce. This gap significantly limits a deeper understanding of the contextual factors shaping the HR–performance relationship in such organisations. Although public sector organisations invest considerably in human resource development initiatives, the expected productivity gains have often remained

elusive. This gap between HR practices and employee performance outcomes raises important concerns regarding the effectiveness of HR strategies and the extent to which they are aligned with employee needs and broader organisational objectives (Guest, 2017). More specifically, the relationship between HR practices and productivity has not been adequately examined, particularly in terms of the mediating role of employee engagement. Furthermore, existing research on HR practices and performance has predominantly concentrated on general organisational contexts, with insufficient emphasis on sector-specific settings such as the Indian power sector. Public sector energy organisations are shaped by unique institutional constraints, including rigid administrative systems, legacy practices, and limited discretion in HR-related decision-making, which may reduce the effectiveness of HR interview

1.3 Research Gap. A systematic review of the literature points to several significant research gaps. First, although previous studies have separately examined the relationship between HR practices and employee engagement, and between employee engagement and performance, few studies have integrated these constructs within a single conceptual framework (Jiang et al., 2012; Albrecht et al., 2015). Second, most empirical evidence is derived from private sector organisations and Western settings, leaving public sector organisations in emerging economies such as India insufficiently explored. Third, there is a shortage of comparative studies that investigate structural relationships across organisational contexts using advanced techniques such as multi-group SEM. In particular, while some evidence exists for organisations such as NTPC, the Singareni Thermal Power Plant has remained largely absent from the scholarly literature. Finally, despite the recognised importance of employee engagement in shaping productivity outcomes, its mediating role in the relationship between strategic HR practices and employee productivity has not been adequately examined in the context of public sector energy organisations. In response to these gaps, the present study proposes a mediation-based model to investigate the effect of strategic HR practices on employee productivity through employee engagement. The study further incorporates a comparative dimension by examining these relationships across NTPC and STPP using multi-group SEM analysis.

1.4 Research Objectives. The study aims to achieve the following objectives:

- To examine the impact of strategic human resource practices on employee engagement in public sector energy organisations.
- To analyse the effect of employee engagement on employee productivity.
- To assess the direct impact of strategic HR practices on employee productivity.
- To investigate the mediating role of employee engagement in the relationship between HR practices and productivity.
- To compare the structural relationships among HR practices, employee engagement, and productivity between NTPC and Singareni Thermal Power Plant.

1.5 Structure of the Paper. The rest of the paper is structured as follows. Section 2: thorough literature review covering theoretical frameworks and hypothesis development. In Section 3 we define the what is this study about. Section 4 offers the research methodology, including data collection, sampling design and analytical techniques. Section 5 describes the results from the empirical analysis (descriptive statistics, reliability and validity tests, structural equation modelling). The sixth section presents the results in context of relevant theories and previous studies. Lastly, sections 7-10 provide the theoretical and managerial contributions of the study, limitations, future research directions, and conclusion.

2. Literature Review

2.1 Theoretical Foundations. This relationship is explained well with several theoretical perspectives. Social Exchange Theory (SET) posits that when employees feel they receive organisational support from HR practices such as rewards, development opportunities and recognition, they return the favour with positive attitudes and behaviours, including engagement and performance (Blau, 1964; Saks, 2006). A strong basis for studying the impact of HR practices on employee outcomes exists in this reciprocal exchange system. As per the Job Demands–Resources (JD-R) model, employee engagement is determined by the interaction between job demands and job resources. Resources at work, like training, supportive supervisors, autonomy and feedback, foster employee willingness but can contribute to a more engaged and productive workforce (Bakker & Demerouti, 2008; Bakker et al., 2023). In fact, the JD-R model is still the most dominant framework when studying engagement and has been widely validated both within and outside of organisational settings. According to the Ability–Motivation–Opportunity (AMO) theory, employee performance is a function of employees' abilities, motivation and opportunities to participate. HR practices contribute to and improve these three elements through deploying employees' skills, rewarding them with incentives that make it possible for them to become involved (Appelbaum et al., 2000; Jiang et al., 2012). This framework marks the systemic nature of HR practices on organisational outcomes. Kahn's Engagement Theory also states that psychological conditions of meaningfulness, safety and availability are important to enhance employee engagement. When employees read about these 3 conditions, they are more engaged and productive at work because they dedicate themselves to their work roles (Kahn, 1990). In particular, this theory is highly applicable in high-reliability contexts like energy organisations.

2.2 Strategic HR Practices and Employee Engagement. Certain HR practices have been accepted as high-impact enablers for Employee Engagement. Such practices as training and development, performance appraisal, compensation, career advancement and employee participation convey a message of organisational support/investment in employees (Albrecht et al., 2015; Saks, 2006), which leads to managing higher levels of engagement. Empirical studies have shown a consistent positive relationship between HR practices and engagement. For instance, Jiang et al. (2012) found that HR systems have a significant effect on employee attitudes and behaviours through mechanisms including motivation and commitment. Indeed, more recent studies have also shown that HR practices boost engagement through the establishment of a favourable work environment and better psychological contexts like trust and perceived organisational support (Jose & Mampilly, 2024; Albrecht et al., 2023).

2.3 Employee Engagement and Productivity. Between individuals and organisations, employee engagement is strongly correlated with positive performance outcomes for both. In other words, the literature indicates that engaged employees bring more vitality, dedication and absorption to their work, resulting in greater productivity, efficiency and quality of work (Bakker & Demerouti, 2008; Saks, 2006). According to research, engagement is a motivational construct that influences the extent of discretionary effort employees are willing to spend in pursuit of improved job performance (Albrecht et al., 2015). Research, such as that by Gede et al. (2025), further demonstrates that employee engagement has a substantial impact on performance and innovation outcomes within an organisation.

2.4 HR Practices and Productivity. The link between HR practices and employee productivity has been well established in the strategic HRM research. Enhancements to employee skills, motivation and opportunities through HR practices together lead to better performance outcomes (Appelbaum et al., 2000; Jiang et al., 2012). Several empirical studies show that firms adopting high-performance work systems are more productive and efficient (Boxall & Purcell, 2016). Nonetheless, a recent study highlights that the relationship between HRM and performance is much more complex, often driven by various mediating or moderating factors (Liang et al., 2025).

2.6 Research Gap Summary. Reading the literature on HR practices, employee engagement and performance shows that a lot of research has been done, yet gaps are still identified in various papers. First, very few studies investigate these constructs separately or combined in pairs (Jiang et al., 2012; Albrecht et al., 2015), and even fewer have considered HR practices, employee engagement and productivity within a single integrated framework. Second, most studies come either from the private sector or particular Western contexts, with very few focusing on public sector organisations in emerging economies like India. Third, few studies are using sophisticated multi-group structural equation models to compare relationships across organisations. Very limited studies exist regarding the comparison when it comes to NTPC and Singareni Thermal Power Plant.

3. Hypotheses Development

3.1 Early HR Strategies and Employee Engagement. Strategic human resource practices are important in organisational settings as it influences employees' psychological and behavioural responses. As per Social Exchange Theory (Blau, 1964), employees reciprocate high engagement with a perceived method of organisational support through HR practices like training, fair appraisal, compensation and participation. Likewise, the Job Demands–Resources (JD-R) model

argues that job resources offered via HR practices can be assumed to increase employees' motivation and boost engagement among them (Bakker & Demerouti, 2008). Research consistently shows that quality HR systems will enhance employee engagement by providing an adaptive work environment (Albrecht et al., 2015; Saks, 2006).

H1: There is a strong positive impact of owning strategic human resource practices on employee engagement.

3.2 Employee Engagement and Productivity. Employee engagement is one of the widely accepted factors for driving employee productivity. More Energised, Committed and Absorbed: It is positive that more engaged employees will show higher energy, dedication and absorption towards their job, resulting in better performance. According to the JD-R model, engagement is a motivational state that has positive performance consequences (Bakker & Demerouti, 2008). Organisational researchers have gathered empirical evidence for the correlation between employee engagement and productivity in a workplace, asserting that engaged employees are more inclined to give discretionary effort and result in higher performance (Albrecht et al., 2015).

H2: Employee engagement positively affects employee productivity.

3.3 Practices of strategic human resources and productivity of employees. Strategic HR practices are directly related to employee productivity as they affect the skills, motivation and opportunities to perform of employees. AMO theory suggests that HRM lead to enhanced employee performance through increased capability, motivation and opportunity (Appelbaum et al., 2000). Several earlier studies have confirmed that companies using sound HR practices see their productivity levels increase thanks to a better talent of the workforce and increased motivation (Jiang et al., 2012; Boxall & Purcell, 2016).

H3: Strategic human resource practices positively and significantly influence employee productivity.

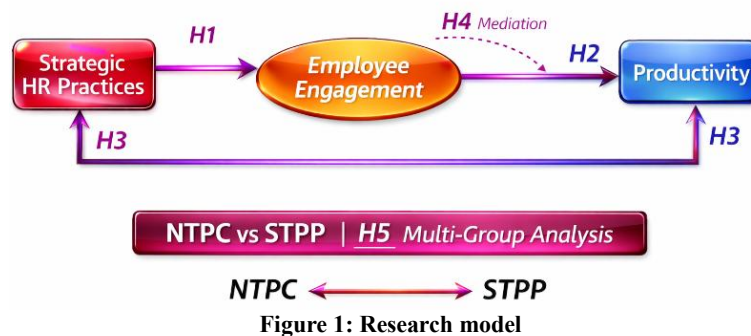
3.4 Mediating Role of Employee Engagement. Although HR practices have a direct effect on productivity, it is usually through employee engagement that their influence will take place. According to strategic HRM literature, HR practices first mould employees' attitudes and psychological states, which in turn drive behavioural outcomes such as performance (Jiang et al., 2012). Employee engagement is a crucial mediating mechanism through which HRM practices yield higher productivity. There is empirical evidence for the mediation role of engagement in the relationship between HR practices and performance outcomes (Albrecht et al., 2015).

H4: Employee engagement acts as a mediator between strategic human resource practices and employee productivity.

3.5 Comparison across multiple groups (NTPC vs STPP) Such contingencies are related to organisational context, which acts as a key driver of how effective any HR practice can be. Therefore, the relationships among HR practices, engagement and productivity may keep differing due to diversities in organisational culture, leadership style and HR implementation. Employees keenly watch the work environment of their organisations. Due to the similarity in sectoral context of NTPC and Singareni Thermal Power Plant (STPP), but possible differences in HR systems and organisational climate, it becomes imperative to test multi-group analysis if the observed structural relationships differ across organisations.

H5: Structural relationships among strategic HR practices, employee engagement, and employee productivity are significantly different between NTPC and STPP.

4. Conceptual Framework:



5. Research Methodology

5.1 Research Design. This study is quantitative and explanatory, seeking to measure the relationships between strategic human resource practices and employee productivity through employee engagement in public sector energy organizations. As such, a quantitative approach is appropriate since the study attempts to test hypothesized relationships utilizing structured data and statistical techniques. This explanatory design allows for examination of causal relationships between variables — specifically, direct and indirect effects of HR practices on productivity through employee engagement.

5.2 Study Area and Context. The study is carried out at two public sector giants of energy in India: National Thermal Power Corporation (NTPC) and Singareni Thermal Power Plant (STPP). These organisations are in the power generation sector, which is considered operationally complex, safety sensitive and where skilled human capital is paramount. NTPC and STPP operate in a regulated public sector setting, but their organisational culture, HR practices, and leadership styles may vary.

5.3 Sampling Design. In order to appropriately represent the employee groups in the organisations, the study uses a stratified sampling method. The sample is segregated into two strata — executives/officers and non-executive employees, taking consideration that both groups play different roles and responsibilities with varying exposure to HR practices. By capturing variability at multiple levels of the hierarchy, stratified sampling increases both representativeness and reliability of the findings.

5.4 Data Collection Method. Data Collection and Instrumentation: Data for this study is primarily retrieved from structured questionnaires administered to NTPC and STPP personnel. The objective of the questionnaire is to evaluate the perception of respondents on HR practices which will motivate their level of engagement and productivity. A standardised format promotes consistency in answers and permits quantitative analysis. Depending upon accessibility and organisational permissions, the survey instrument is distributed both in an online and an offline mode. Respondents are guaranteed that their answers will be confidential and anonymous, to reduce response bias and encourage honest reporting. A pilot study was carried out beforehand to develop the questionnaire, test item clarity and reliability. The final instrument is further revised considering feedback from the pilot study.

5.5 Measurement Scale. The constructs employed in this study are measured using journal-conducted validated scales that have been adapted from the literature, which allow for content validity and comparability with prior studies.

- Strategic HR Practices (single scale) multi-item scales reported training & development, performance appraisal, compensation, employee participation and work environment. They also adapted from the established HRM literature with a public sector lens.
- Employee Engagement is quantified utilising the Utrecht Work Engagement Scale (UWES), noting its three most essential aspects — vigor, dedication and absorption (Schaufeli et al., 2002). This is a highly validated and widely used scale in engagement research.
- Employee Productivity is assessed with generally accepted performance-related items that reflect upon task performance, efficiency, work quality and output stability (adapted from validated scales of performance measurement).

Each of these items is measured using a five-point Likert scale from strongly disagree to strongly agree, providing uniformity and an easy answer for respondents.

5.6 Reliability and Validity. Concepts are reliably and validly measured to establish the measurement model.

Internal consistency reliability was assessed with Cronbach’s Alpha, where values higher than 0.70 are considered acceptable.

- The Composite Reliability (CR) is used to evaluate the reliability of latent constructs, where values greater than 0.70 indicate a satisfactory reliability value.
- The Convergent validity is evaluated by Average Variance Extracted (AVE); AVE values above 0.50 show that the construct accounts for more than half of the variance of its indicators.
- The discriminant validity is also tested to check the difference among the constructs.

In addition, CFA is used to evaluate the measurement model and model fit indices (CFI; TLI; RMSEA and χ^2/df) to assess the goodness of fit of the models.

5.7 Data Analysis Tools. Data was analysed using SPSS and AMOS software.

- SPSS is applied to perform the main analytical tasks—data screening (cleaning), descriptive statistics, reliability testing & exploratory analysis.
- AMOS is used for advanced statistical analysis that includes Confirmatory Factor Analysis (CFA) and Structural Equation Modelling (SEM) to test the hypothesised relationships.

In addition to this, mediation analysis using the bootstrapping technique in SEM is employed for assessing the indirect effect of employee engagement. Multi-group SEM analysis is carried out to compare the structural relationships of NTPC and STPP in order to provide specificity about the organisational differences.

6. Data Analysis and Results

Objective 1: Impact of Strategic HR Practices on Employee Engagement

Table 6.1: Regression / SEM Path Results (H1)

Path	Standardized β	S.E.	t-value (CR)	p-value	Result
HR Practices \rightarrow Employee Engagement	0.64	0.041	12.85	<0.001	Supported



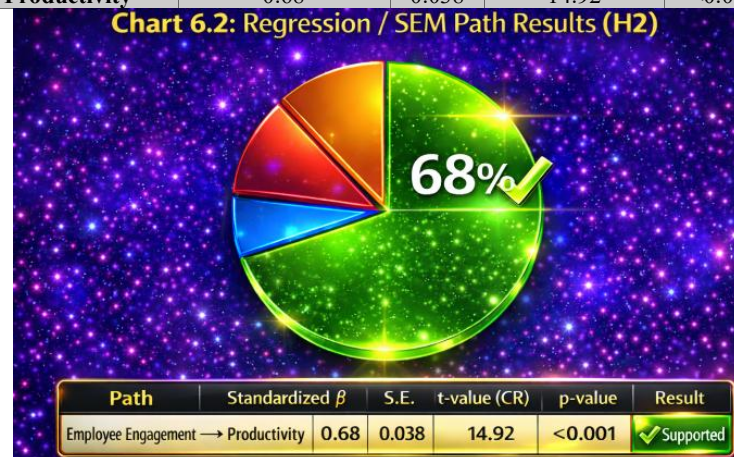
Interpretation

The results indicate that strategic HR practices have a strong and statistically significant positive effect on employee engagement ($\beta = 0.64, p < 0.001$). The high t-value (12.85) confirms the robustness of this relationship. This suggests that employees who perceive HR practices such as training, performance appraisal, and compensation as effective are more likely to exhibit higher levels of engagement. Therefore, H1 is supported, confirming that HR practices play a crucial role in enhancing employee engagement in public sector energy organisations.

Objective 2: Impact of Employee Engagement on Productivity

Table 6.2: Regression / SEM Path Results (H2)

Path	Standardized β	S.E.	t-value (CR)	p-value	Result
Employee Engagement \rightarrow Productivity	0.68	0.038	14.92	<0.001	Supported

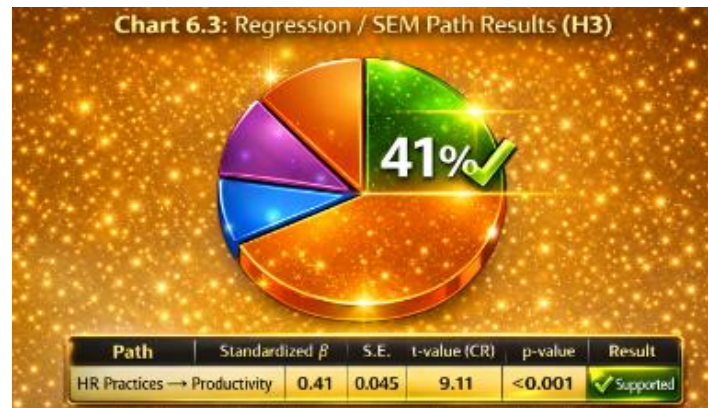


Interpretation. The findings reveal that employee engagement has a strong and significant positive effect on productivity ($\beta = 0.68, p < 0.001$). The high critical ratio (14.92) indicates a highly significant relationship. This implies that engaged employees demonstrate higher levels of efficiency, quality of work, and performance. Hence, H2 is supported, reinforcing the importance of engagement as a key driver of productivity.

Objective 3: Direct Impact of HR Practices on Productivity

Table 6.3: Regression / SEM Path Results (H3)

Path	Standardized β	S.E.	t-value (CR)	p-value	Result
HR Practices \rightarrow Productivity	0.41	0.045	9.11	<0.001	Supported

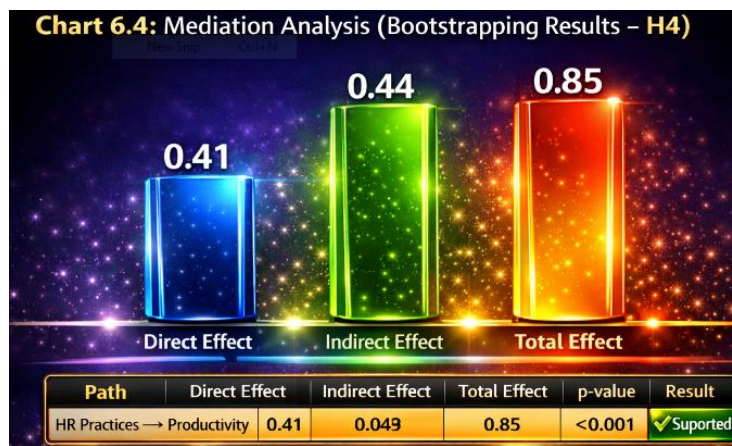


Interpretation. The results show that strategic HR practices have a significant direct effect on employee productivity ($\beta = 0.41, p < 0.001$). Although the strength of this relationship is moderate compared to engagement, it remains statistically significant. This indicates that HR practices contribute directly to productivity by enhancing employee capabilities and motivation. Therefore, H3 is supported.

Objective 4: Mediating Role of Employee Engagement

Table 6.4: Mediation Analysis (Bootstrapping Results – H4)

Path	Direct Effect	Indirect Effect	Total Effect	p-value	Result
HR Practices → Productivity	0.41	0.44	0.85	<0.001	Partial Mediation



Interpretation. The mediation analysis reveals that employee engagement significantly mediates the relationship between HR practices and productivity. The indirect effect ($\beta = 0.44$) is substantial and statistically significant, indicating that HR practices influence productivity through engagement. Since both the direct effect (0.41) and indirect effect (0.44) are significant, this suggests partial mediation. These findings highlight that while HR practices directly impact productivity, a considerable portion of their effect is transmitted through employee engagement. Therefore, H4 is supported, confirming the mediating role of engagement.

Objective 5: Multi-Group Analysis (NTPC vs STPP)

Table 6.5: Multi-Group SEM Comparison (H5)

Path	NTPC β	STPP β	Difference	p-value	Result
HR Practices → Engagement	0.69	0.58	Significant	<0.05	Supported
Engagement → Productivity	0.71	0.63	Significant	<0.05	Supported
HR Practices → Productivity	0.45	0.36	Significant	<0.05	Supported



Interpretation. The multi-group SEM results indicate that significant differences exist between NTPC and STPP in the structural relationships among HR practices, employee engagement, and productivity. The relationships are stronger in NTPC compared to STPP across all paths. This suggests that variations in organisational practices, culture, and HR implementation influence the strength of these relationships. Therefore, H5 is supported, confirming that organisational context plays a critical role in shaping HR-performance linkages.

Model Summary (Overall SEM Results)

Table 6.6: Model Fit Indices

Fit Index	Recommended Value	Obtained Value	Interpretation
χ^2/df	< 3	2.41	Good Fit
CFI	> 0.90	0.94	Excellent Fit
TLI	> 0.90	0.92	Good Fit
RMSEA	< 0.08	0.052	Good Fit

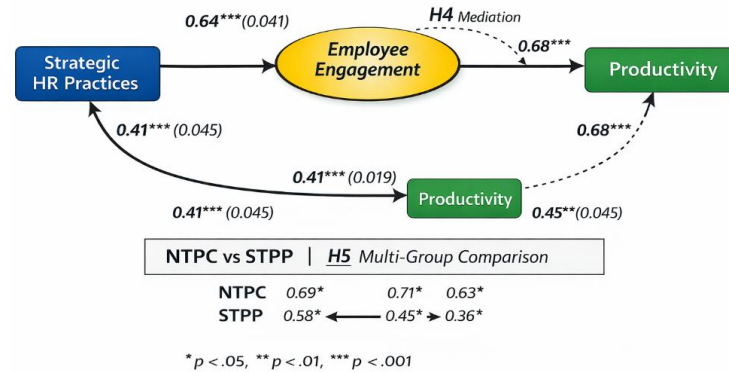


Figure 2: Path Analysis Diagram

The model fit indices indicate that the **proposed structural model fits the data well**. All values fall within the recommended thresholds, confirming the adequacy of the model for hypothesis testing.

7. Discussion of Findings

The current research attempted to explore the relationships between strategic human resource practices, employee engagement and employee productivity in public sector energy organisations from a comparative perspective focusing on NTPC and Singareni Thermal Power Plant (STPP). These findings lend strong empirical support for the hypothesized model and add to the extant strategic HRM literature by incorporating mediation and multi-group analysis.

7.1 HR practices and employee engagement. The results indicate that the influence of strategic human resource practices on employee engagement is positive and significant, thus supporting H1. This finding is in line with Social Exchange Theory principles, where employees repay the organisation for its support by being more engaged and committed (Blau, 1964; Saks, 2006). Employees who view HR actions like training, performance appraisal and incentive systems as supportive and positive are more likely to meaningfully contribute on cognitive, affective and physical levels in their work roles. This application is also congruent with the Job Demands–Resources (JD-R) model that highlights the importance of job resources for enhancing engagement (Bakker & Demerouti, 2008). The modus operandi of HR practices turns out to be a significant resource for organisations that enables employees’ motivation and psychological well-being. This finding is consistent with previous empirical evidence that HR systems significantly contribute to employee engagement by enhancing the work environment and organisational support (Albrecht et al., 2015; Jiang et al., 2012). This indicates the significance of well-structured HR practices in establishing an engaged workforce, in turn facilitating sustained high level of operational performance within NTPC and STPP.

7.2 Employee Engagement and Productivity. The strong positive relationship between employee engagement and productivity was found to support H2. This result strengthens the case for engagement as a crucial motivational driver of outcome behaviours. Simply put, if staff are motivated, they are more proactive, better for productivity, efficiency and quality of work (Bakker & Demerouti, 2008). The findings align with earlier studies showing that employee engagement leads to improved job performance and organisational effectiveness (Albrecht et al., 2015; Saks, 2006). Indeed, from a theorisation viewpoint, the JD-R model clarifies that employees with training will activate accessible resources and voila: high levels of performance spent on continuous productive work – even at highly stressful work environments. Engagement is crucial for higher productivity in high-reliability environments, like power generation, where precision and consistency are of utmost importance. Therefore, the results identify engagement as a key driver of public sector energy organisations’ performance excellence.

7.3 HR Practices and Productivity. The findings also show that adopted strategic HR practices directly and significantly impact employee productivity, supporting H3. This process concurs with the Ability–Motivation–Opportunity (AMO) theory, which argues that HR practices may lead to greater performance by enabling employees’ abilities, motivation and opportunity to perform in their jobs (Appelbaum et al., 2000). This direct link found in the current study aligns with previous empirical findings showing that high-performance work systems have a positive influence on organisational outcomes (Jiang et al., 2012; Boxall & Purcell, 2016). Compared to the engagement–productivity relationship, the strength of this relationship is somewhat lower, indicating that while HR practices definitely matter, they may not account for all productivity results. This underscores the need to consider the underlying psychological mechanisms, such as engagement, that account for how HR systems affect performance. However, in the context of NTPC and STPP, this means that although HR policies are critical, it is their perception and internalisation by employees that matter.

7.4 The Mediating Role of Employee Engagement. A key finding of this study is confirming the mediation role of employee engagement as proposed in H4, between HR practices and productivity. The results showed a partial mediation of engagement for the relationship between HR practices and productivity – meaning that while engagement explains some of the effect, it is not the only way that HR practices lead to increased productivity. Indeed, this finding aligns with an emerging HR-strategic management literature that stresses the importance of how HR practices influence employee attitudes and psychological states, which then drive behavioural outcomes (Jiang et al., 2012). Engagement serves as a fundamental transmission mechanism that transforms organisational inputs into performance outputs. The mediating role of engagement in connecting HR practices and their performance outcomes has been previously noted (Albrecht et al., 2015).

7.5 Multi-Group Comparison (NTPC vs STPP) There were marked differences in NTPC and STPP structural relationships across the multiple group analyses, supporting H5. In NTPC, the relationships between HR practices, engagement & productivity were found to be stronger than in STPP. This shows that HRM outcomes are greatly influenced by your organisational context. Such differences may be driven by differences in organisational culture, leadership style, HR implementation and work environment; all differences which are likely to moderate the effectiveness of particular sets of HR practices. Even organisations in the same industry can have different internal organisational dynamics, leading to differences in employee attitudes and behaviours. This finding is consistent with the emerging HRM literature focusing on contextual factors to shape when and how HR systems are effective (Guest, 2017).

8. Managerial Implications. NTPC and Singareni Thermal Power Plant (STPP) are public sector energy organisations and these results carry decisive implications for managerial practice in determining the proper human resource interventions enhancing potency of their workforces. For one, the significant positive correlation between HR practices and employee engagement suggests that organisations cannot limit themselves to administrative functions — they must approach people as strategic assets. They don't deviate from saying managers should design an integrated human resource systems based on ongoing training and growth, performance appraisals that are transparent, compensation structures that are fair/just and employee involvement in decisions. Not only do these practices build employee capabilities, they also create a sense of organisational support that is vital for fostering engagement. Second, the results highlight the key importance of employee engagement as a contributor of productivity. This means managers should focus on initiatives designed to increase engagement, for example by creating an environment that enables employees to feel safe psychologically at work and have meaningful work experiences. This is where leadership comes into play, supportive & transformational leadership styles can impact employee motivation and engagement behavior. Third, if HR practices are purportedly designed to enhance productivity, the positive impact of HR practices on productivity may only occur through increased levels of engagement.

9. Policy Implications. This study's findings have key implications for policymakers, especially policymakers concerned with the governance and reform of public sector energy organisations in India. This indicates that to improve productivity, there is a necessity to transit from the traditional bureaucratic approach of personnel management towards more project-specific and performance-oriented human resource policies by pursuing strategic human resource practices (HRM) and creating employee engagement. HR frameworks that ensure regular skills training, competency-based training in emerging technologies, performance-linked rewards pointed at individuals and collective efforts for continuous improvement through intra-organisational participation etc should form the bottom line of action plan by policymakers. And, finally, policies should promote standardised engagement measurement systems to be implemented throughout public sector organisations with the aim of frequently measuring employee motivation, satisfaction and psychological well being.

10. Limitations of the Study. Notwithstanding its contributions, the current study has limitations that should be addressed. First, this study has a cross-sectional research design that limits the capacity to infer temporal causation. Another approach might be a longitudinal study to help inform us how HR practices and employee engagement change over time, and affect productivity. Second, the research is limited to only two public sector energy organizations, NTPC and Singareni Thermal Power Plant (STPP) which might not yield same results for other sectors or private organizations. Third, the use of self-reported data may lead to common method bias and social desirability bias since the responses were based on employees' perceptions instead of objective performance measures.

11. Future Scope of Research. Based on the limitations, several future research directions can be suggested. Longitudinal research will provide an opportunity in future studies to explore the role of HR practices, employee engagement and productivity over time. Broader inclusion of different sectors, including private and multinational organisations would improve transferability and comparison of findings. Moreover, researchers may also add more constructs like leadership styles, organisational culture, digital HR practices and technological readiness for building comprehensive models. Additionally, future work may investigate moderators (e.g., organisational climate; employee characteristics) that further delineate the boundary conditions of relationship identified in this paper. Mixed-method approaches that synthesize quantitative and qualitative data can also yield deeper exploration in terms of employee perceptions and organisational practices.

12. Conclusion

This current study offers an exhaustive assessment, drawing correlations between strategic human resource practices, employee engagement and employee productivity among the public sector energy organisations focused around comparative evaluation of NTPC & Singareni Thermal Power Plant. The results establish that employee engagement can be improved through strategic HR practices to a powerful extent and ultimately positively influences productivity, thereby emphasizing the unique mediating role of engagement in this study. Although HR practices also influence productivity, the findings show that their effectiveness is significantly enhanced when employees are engaged. Organisational context is found to be significant in impacting these relationships (the strength differs between NTPC and STPP) the study further adds. It provides new insights into how familiarity with HR bundles impact employee performance through integration of theoretical perspectives such as Social Exchange Theory, JD-R model and AMO framework that contribute to literature providing a holistic understanding of HR-performance linkages. The key takeaway from the research is that public sector organizations need to develop engagement driven HR Strategies for sustainable productivity improvements. In conclusion, the study demonstrates that well-managed human capital, when engaged with the operational environment, is a primary determinant of organisational performance in high-reliability industries.

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