Policy Research Journal
ISSN (E): 3006-7030 ISSN (P) : 3006-7022 Volume 4, Issue 3, 2026

FROM TRAINING TO EFFICIENCY: THE PARALLEL MEDIATING ROLES OF PERCEIVED PAY OUTCOMES AND WORK INVOLVEMENT AMONG EMPLOYEES IN A MANUFACTURING SETUP IN PAKISTAN

Dr Farhan Iqbal

Assistant Professor, Institute of Business Management

farhan.iqbal@iobm.edu.pk

DOI: http://doi.org/10.5281/zenodo.19282644

Keywords
Training, Employee Efficiency, Work Involvement, Pay Outcomes, Parallel Mediation, Manufacturing Setup

Article History
Received: 29 January 2026
Accepted: 14 March 2026
Published: 28 March 2026

Copyright @Author
Corresponding Author: *
Dr Farhan Iqbal

Abstract
Training is widely used in manufacturing, yet organizations often lack clarity on how it translates into employee efficiency. Drawing on human capital theory and social exchange logic, this study examines whether training predicts efficiency and whether this link operates through perceived pay outcomes and work involvement. Survey data were collected from 150 manufacturing employees in Pakistan. A parallel mediation model was tested using 5,000 bootstrapped confidence intervals while controlling for gender, age group, and education. Construct-wise exploratory factor analysis and reliability testing supported score construction. Training showed a strong positive association with employee efficiency. Training also positively predicted perceived pay outcomes and work involvement; however, only work involvement carried a significant indirect effect, whereas the indirect pathway through perceived pay outcomes was not supported. The direct effect remained significant, indicating partial mediation. Organizations should focus on post-training reinforcement of involvement by aligning roles, providing opportunities to apply skills, and strengthening supervisory support. Clear communication about how training relates to progression and rewards may prevent unrealistic pay expectations. By testing two mechanisms simultaneously in a manufacturing context, the study shows that work involvement is the primary pathway linking training to efficiency, while pay perceptions play a weaker explanatory role.

Introduction

Manufacturing firms are under continuous pressure to enhance quality, minimize rework, and maintain production levels while operating with limited flexibility. In this context, workforce training transcends traditional HR function; it emerges as a fundamental capability essential for driving productivity and sustaining competitive advantage. At a national level, Pakistan's manufacturing sector faces demands for digital transformation and skills enhancement, underscoring the necessity for robust training systems rather than sporadic short-term courses (Hussain, 2025). Supporting this imperative, a comprehensive meta-analysis has revealed a positive correlation between training initiatives and organizational performance. However, the efficacy of this relationship depends on contextual factors and the caliber of the training investments made (Garavan et al., 2021).

While training is generally expected to enhance workplace outcomes, contemporary research indicates that its effectiveness is significantly influenced by transfer conditions, specifically, the circumstances surrounding the training both before and after its implementation within the

work system. For instance, recent studies emphasize the role of social support and the nature of post-training work conditions in determining whether the training effectively leads to knowledge sharing and measurable performance enhancements (Mehner et al., 2025). Additionally, examinations of workplace e-learning reveal that positive learning outcomes and effective transfer are not guaranteed; rather, successful transfer hinges on the congruence between training content, job demands, and the reinforcement mechanisms present in the work environment (O'Neill, 2025). Thus, even when training is implemented effectively, it may fail to yield consistent gains in efficiency if the transfer mechanisms are insufficiently robust.

In various manufacturing contexts, organizations frequently implement systematic training programs to enhance workforce capabilities. However, supervisors often observe varied improvements in employee productivity across different units. This variability poses a significant challenge for organizations; despite investments in training initiatives, performance improvements are inconsistent across departments, leadership levels, and employee demographics. The core problem does not stem from the inherent effectiveness of the training itself but rather from the uneven actualization of efficiency gains. This disparity is predominantly influenced by employees' perceptions of the training's value and their proficiency in translating acquired knowledge into sustained behavioral change in the workplace (Garavan et al., 2021; Mehner et al., 2025).

A notable gap exists in the training-performance research literature, which often demonstrates a generalized correlation but fails to clarify the psychological mechanisms that mediate this relationship, particularly within manufacturing contexts. Two key mechanisms merit deeper investigation, yet they are infrequently examined together within a cohesive framework. The first mechanism concerns compensation-related perceptions; specifically, the extent to which employees perceive that training contributes positively to their compensation outcomes and overall economic security. The second mechanism addresses work involvement, defined as the degree to which training promotes heightened engagement, a sense of ownership, and the willingness to invest effort in daily tasks.

Recent evidence reinforces the validity of the first mechanism addressed. A comprehensive meta-analysis and path analysis illustrate a significant positive correlation between pay-for-performance systems and job performance, mediated primarily by cognitive processes and perceptions of fairness that shape employee responses to incentives (Chen et al., 2023). This suggests that when employees recognize a direct link between their exertions, skill enhancement, and tangible economic rewards, there is an increased likelihood of performance improvement. Regarding the second mechanism, meta-analytic findings indicate a strong positive relationship between work engagement and performance outcomes, as well as notable correlations with absenteeism patterns. This implies that elevated levels of involvement and energy at work are substantial contributors to performance rather than merely attitudinal factors (Neuber et al., 2022). Collectively, these insights highlight the need to examine pay-related perceptions and work engagement as concurrent pathways through which training can foster greater efficiency. However, a critical gap exists in applied research, particularly in the domain of manufacturing in developing economies, where a rigorous parallel mediation analysis has yet to be tested. Without jointly modeling these mechanisms, previous studies may inadvertently overstate the impact of one pathway by failing to account for the other. Therefore, employing a parallel mediation framework is crucial, as it systematically evaluates the distinct variance in efficiency attributable to each pathway while accounting for the reciprocal influence of the alternative pathway within a unified model (Hayes, 2022). Contextual evidence further justifies this focus. The manufacturing sector in Pakistan faces documented challenges related to productivity, industrial upgrading, and capacity enhancement, making the effectiveness and transfer of training a practical imperative rather than a theoretical consideration (Government of Pakistan, Finance Division, 2023; Hussain, 2025). These contextual

realities underscore the importance of investigating not only whether training is effective, but also understanding the mechanisms through which it operates.

In Pakistan, manufacturing firms frequently contend with underdeveloped human resource frameworks, the absence of structured career advancement pathways, and inconsistent mechanisms to reinforce training outcomes. National strategic documents and sector analyses consistently highlight significant competency gaps within the workforce and underscore the urgency of enhancing training relevance, ensuring adherence to implementation protocols, and fostering skill development aligned with contemporary production requirements (Government of Pakistan, Finance Division, 2023; Hussain, 2025). Under these circumstances, employee efficiency is likely to increase not only through training but also through its perceived economic value, which is crucial for driving greater engagement and participation in daily operational tasks. Accordingly, this study examines whether organizational training is associated with employee efficiency among manufacturing employees and tests two mediators in parallel: Perceived pay outcomes, and Work involvement. By adopting a parallel mediation approach, the study evaluates whether each mediator transmits a unique portion of the training–efficiency relationship (Hayes, 2022).

The paper aims to produce a mechanism-focused account of training effectiveness in a manufacturing setting by (a) estimating the direct association between training and employee efficiency, (b) testing two theoretically defensible mediators simultaneously, and (c) situating findings within Pakistan's manufacturing and workforce-development context.

Theoretical Framework and Hypotheses

This study examines the rationale for the expectation that organizational training enhances employee efficiency, drawing on two complementary theoretical frameworks: human capital theory and social exchange theory. Human capital theory posits that training serves as an investment that enriches employees' job-specific competencies, such as knowledge, skills, and problem-solving abilities. Enhanced performance can be evidenced through reduced error rates, accelerated cycle times, and improved process control, subsequently leading to increased efficiency (Garavan et al., 2021). Recent findings emphasize that the effectiveness of training depends on the transfer of learning to routine tasks and on the level of support from the post-training environment, including the roles of peers and supervisors (Mehner et al., 2025; O'Neill, 2025).

Conversely, social exchange theory provides a motivational perspective, suggesting that employees interpret training as an organizational signal of support and commitment to their professional development. When employees perceive that the organization invests in their growth through training opportunities, they tend to reciprocate through enhanced engagement, perseverance, and discretionary effort in their roles (Blau, 1964). In production settings, characterized by high output demands and repetitive tasks, this reciprocal behavior can translate into increased attentiveness to work processes and more disciplined task performance, ultimately enhancing overall efficiency (Mehner et al., 2025).

Building on these theoretical frameworks, the proposed model delineates that training influences efficiency through both direct and indirect pathways, specifically via (a) perceived financial outcomes and (b) engagement in work. This dual mechanism aligns with established mediation logic, which posits that multiple pathways can simultaneously mediate the training effect and should be analyzed collectively to accurately assess their unique indirect contributions (Hayes, 2022).

Hypotheses development

Training interventions are designed to enhance employee efficiency by increasing task proficiency and minimizing performance variability. A review of meta-analytic studies indicates a strong positive correlation between organizational investments in training and resulting performance metrics. This relationship is particularly pronounced when the

quality of training and contextual support systems promotes effective application of skills in the workplace (Garavan et al., 2021). Furthermore, recent research emphasizes that training effectiveness is amplified under optimal transfer conditions, such as social support and knowledge-sharing mechanisms, which facilitate consistent application of learned content (Mehner et al., 2025). Thus, the study formulates the following hypothesis:

H1. Training is positively associated with employee efficiency.

Employees assess training initiatives through an economic perspective, recognizing that training is often linked to employability, opportunities for internal career advancement, and perceived eligibility for enhanced compensation packages. When employees perceive that training enhances their value within the organization, they tend to anticipate improved remuneration outcomes, either through established pay structures or performance-based compensation models (Chen et al., 2023; George & van der Wal, 2023). This viewpoint is particularly pronounced in manufacturing environments, where concerns about wage adequacy and equity can significantly influence employees' perceptions of organizational investment in training. Accordingly, the study posits:

H2. Training is positively associated with perceived pay outcomes.

Training enhances work involvement by signalling organizational support while simultaneously bolstering employees' confidence in managing job-related demands. Empirical evidence suggests that effective training transfer and supportive organizational climates can enhance employees' proactive use of their skills and deepen their engagement with work processes (Mehner et al., 2025; O'Neill, 2025). Concurrently, research on work engagement consistently demonstrates a positive correlation between higher employee involvement and improved performance metrics. This indicates that involvement may serve as a viable motivational conduit linking human resource investments to efficiency outcomes (Neuber et al., 2022). Consequently, this study hypothesizes:

H3. Training is positively associated with work involvement.

Perceived compensation outcomes play a crucial role in mediating the relationship between training and operational efficiency. Employees who perceive that training enhances their reward potential are more inclined to exert greater effort and uphold performance standards. Meta-analytic studies reveal a positive correlation between performance-based compensation and job performance, largely driven by motivational factors (Chen et al., 2023; George & van der Wal, 2023). Consequently, when training initiatives lead to an increase in perceived compensation, employees are likely to exhibit heightened performance behaviors, thereby boosting overall efficiency. This leads to the study's hypothesis:

H4a. Perceived pay outcomes mediate the relationship between training and employee efficiency.

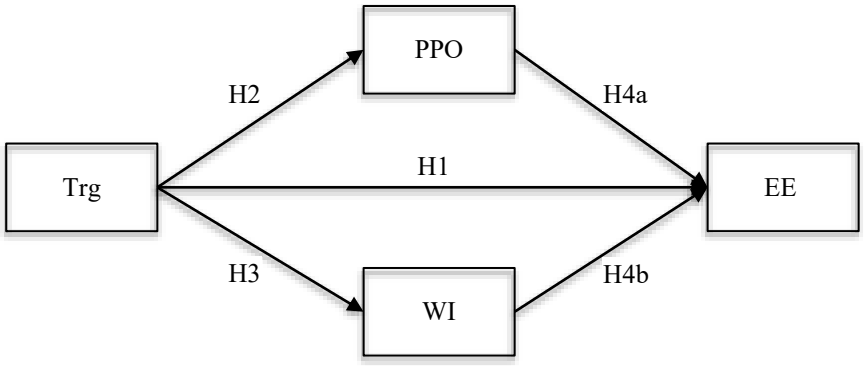
Work involvement significantly influences the transfer of training effects on operational efficiency by enhancing sustained attention, persistence, and the readiness to fulfill production requirements. A comprehensive meta-analysis indicates a positive correlation between work engagement and task performance, affirming that involvement serves as a strong predictor of performance outcomes (Neuber et al., 2022). If training effectively augments work involvement through mechanisms of capability enhancement and reciprocity, we can anticipate that this increased involvement will result in elevated efficiency levels. Consequently, the study posits the following hypothesis:

H4b. Work involvement mediates the relationship between training and employee efficiency.

Figure 1 presents the hypothesized parallel mediation model.

Figure 1

Conceptual Model: Training, Mediators (Perceived Pay Outcomes, Work Involvement), Employee Efficiency



Note. Pay Perceived Outcomes (PPO) and Work Involvement (WI) mediate the relationship between Training (Trg) and Employee Efficiency (EE)

Methodology

Design and Participants

This research was conducted in Pakistan, with manufacturing-sector employees as the unit of analysis. Using a structured questionnaire, data were collected in a single-phase, cross-sectional design. The questionnaire was distributed primarily via a Google Form link to employed individuals in operational roles within the manufacturing sector. To expand coverage, respondents and peers were encouraged to share the survey with colleagues in their networks. Participation was voluntary, and the survey was administered anonymously, which means no personal identifiers (e.g., name, phone number, or employer name) were requested. Moreover, the organization's name is withheld to protect anonymity. Respondents were informed that their data would be used only for academic purposes and would be reported in aggregated form to preserve confidentiality.

Using a convenience sampling approach, 150 responses were collected. All returned questionnaires were inspected for completeness, and all 150 were deemed usable for analysis. Respondents typically required 10–12 minutes to complete the questionnaire. The final dataset (N = 150) was used to test the hypothesized relationships using a parallel mediation framework with bootstrapped indirect effects, consistent with contemporary mediation analysis recommendations (Hayes, 2022). Demographic characteristics are summarized in Table 1. All procedures were carried out using SPSS (ver. 21).

Measures

All constructs were measured using a self-administered questionnaire. Respondents indicated their agreement on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Items were coded so that higher values reflected higher levels of the underlying construct. Following standard quantitative reporting expectations in business and management research, the study assessed measurement quality in two steps: (a) exploratory factor analysis (EFA) to evaluate dimensionality and identify items with weak or cross-loadings, and (b) internal consistency reliability using Cronbach's alpha (Howard, 2023; Rogers, 2022).

Importantly, although published measures exist for related domains (e.g., job involvement as a broad construct), the study's variables were operationalized in a manufacturing training context with a deliberate emphasis on brevity and contextual relevance. Therefore, the instrument used context-specific items aligned with the study's construct definitions and research objectives. This approach is defensible in applied organizational research when (a) the intended operational

definition is narrower than common published scales, (b) the study requires context-specific language, and (c) the researcher transparently reports psychometric evidence and provides the full item set in an appendix for scrutiny and replication (Memon et al., 2023; Podsakoff et al., 2024).

After EFA refinement (reported in the Results section), the final item counts and reliability estimates used for hypothesis testing are reported below.

Training. Training was assessed using an initial pool of five items designed to capture employees' perceptions of training relevance and behavioral readiness in the production environment (e.g., training content usefulness, improved motivation, goal focus, and responsibility development). Consistent with EFA recommendations, items showing conceptual overlap or weak psychometric performance were removed prior to mediation testing (Howard, 2023; Rogers, 2022). The final scale retained four items and demonstrated acceptable internal consistency (α = 0.724). Composite scores were created by averaging the retained items.

Perceived Pay Outcomes. Perceived pay outcomes were initially assessed using five items that captured employees' perceptions of whether training translates into economically meaningful outcomes (e.g., pay adequacy to meet needs and perceived improvement in pay outcomes following training). Because pay perceptions can be sensitive to wording and can overlap with broader job attitudes, the EFA step was used to retain only the items that most cleanly represented the construct as operationalized in this study (Howard, 2023). The final scale retained two items and showed acceptable reliability (α = 0.708). Final scores were computed as an average of the retained items.

Work Involvement. Work involvement was measured with five initial items intended to reflect stronger psychological and behavioral engagement with one's work role after training (e.g., readiness for advanced work tasks, role clarity, and greater willingness to take on job demands). Although "job involvement" is a well-established construct in the literature, widely associated with psychological identification with work, the present study operationalized work involvement specifically as post-training involvement in work demands within a manufacturing setting, necessitating context-aligned item wording rather than direct reuse of a classic full-length involvement scale (Kanungo, 1982; Memon et al., 2023). EFA refinement resulted in retaining four items. Internal consistency was near the conventional threshold (α = 0.698), which is considered defensible in early-stage or context-specific applied measurement when supported by factor evidence and transparent reporting (Howard, 2023; Rogers, 2022). A composite score was created by averaging the retained items.

Employee Efficiency. Employee efficiency was measured using five initial items that captured perceived efficiency gains from training (e.g., improved performance, better skill utilization, greater maturity in work execution, and expanded expertise). Because efficiency in operational roles is often assessed through objective indicators in ideal settings, but is commonly measured via self-report in survey-based organizational studies when performance records are inaccessible, the study relied on employee self-assessments while applying procedural and statistical rigor to reduce bias concerns (Podsakoff et al., 2024). EFA yielded 4 items, and reliability was strong (α = 0.840). A mean score was computed for hypothesis testing.

Common Method Bias. Because the data were self-reported and collected in a single survey, common method variance may be present. Anonymity, neutral wording, and psychometric screening were used to reduce this risk; however, it cannot be eliminated, and future studies should use time-lagged or multi-source designs (Memon et al., 2023; Podsakoff et al., 2024).

Data Analysis Strategy

Based on preliminary screening of the dataset (e.g., missingness patterns, distributional shape of item responses, and suitability for multivariate analysis), a staged approach was adopted to strengthen measurement quality before testing the hypothesized relationships. First, because the questionnaire combined context-specific items tailored to a manufacturing setting and the study

used composite scores for hypothesis testing, exploratory factor analysis (EFA) was applied to evaluate the underlying factor structure and to support defensible score construction. Sampling adequacy was assessed using the Kaiser–Meyer–Olkin (KMO) statistic and Bartlett's test of sphericity, and items with weak loadings or conceptual overlap were removed to improve construct clarity. Internal consistency reliability for each retained scale was then evaluated using Cronbach's alpha.

Second, the hypothesized model was tested using ordinary least squares regression-based parallel mediation, consistent with contemporary recommendations for estimating indirect effects in applied organizational research. Specifically, a parallel mediation model (PROCESS Model 4 logic) was estimated with 5,000 bias-corrected bootstrap resamples to obtain confidence intervals for indirect effects. Indirect effects were considered statistically significant when the 95% bootstrap confidence interval did not include zero. To strengthen inference and reduce omitted-variable concerns, gender, age group, and education level were included as control variables in all mediation equations. This approach allows the study to isolate the unique indirect effects of perceived pay outcomes and work involvement in explaining the association between training and employee efficiency, while avoiding reliance on covariance-based SEM in a context where measurement refinement and composite score modeling are central to the study's analytic design (Hayes, 2022).

Results

Descriptive Statistics and Sample Profile

The final sample comprised 150 employees in a manufacturing setup. The gender distribution was relatively balanced (54.7% male, 45.3% female). Most respondents were in the 21–30 age group (53.3%), followed by the 31–40 age group (14.0%) and those below 21 (12.0%). In terms of education, the majority held a bachelor's degree (64.0%), while 20.7% reported a master's degree, and a small proportion reported doctoral education (1.3%) (Table 1).

Table 1
Sample characteristics (N = 150)

Variable	Category	n	%
Gender	Male	82	54.7
	Female	68	45.3
Age group	Less than 21	18	12
	21-30	80	53.3
	31-40	21	14
	41-50	16	10.7
	Above 50	15	10
Education	High school	21	14
	Bachelors	96	64
	Masters	31	20.7
	Doctorate	2	1.3

Note. Percentages may not sum to 100 due to rounding

Descriptive Statistics, Reliability, and Zero-Order Correlations of the Measures

Table 2 presents the descriptive statistics, internal consistency estimates, and zero-order correlations among the study variables. Mean scores were generally above the scale midpoint, indicating favorable perceptions of training (M = 3.95, SD = 0.63), work involvement (M = 3.80, SD = 0.54), and employee efficiency (M = 4.04, SD = 0.61), while perceived pay outcomes were comparatively lower but still above the midpoint (M = 3.45, SD = 0.85). Reliability coefficients were acceptable for

all constructs (α = .70–.84), with work involvement slightly below the conventional .70 threshold. The correlation pattern was consistent with the proposed model: training correlated positively with employee efficiency (r = .73, p < .001) and with work involvement (r = .62, p < .001), suggesting that employees who reported stronger training experiences also reported higher involvement and efficiency. Perceived pay outcomes showed smaller but statistically significant correlations with the focal variables, including training (r = .37, p < .001) and efficiency (r = .24, p < .01). Work involvement was strongly associated with employee efficiency (r = .72, p < .001), providing preliminary support for its role as a key explanatory mechanism in the training-efficiency relationship.

Table 2
Descriptive Statistics, Reliability, and Zero-Order Correlations for Study Constructs

Variable	M	SD	α	1	2	3
1. Training	3.952	.634	.724			
2. Perceived pay outcomes	3.453	.852	.708	.368***		
3. Work involvement	3.803	.537	.698	.617***	.180*	
4. Employee efficiency	4.043	.612	.840	.733***	.237**	.720***

Note. M = mean; SD = standard deviation; α = Cronbach's alpha. Values in the diagonal are Pearson correlations. All variables were measured on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). *p < .05, ** p < .01, *** p < .001

Exploratory Factor Analysis

Table 3 shows that the retained item sets were suitable for factor analysis. KMO values ranged from .669 to .803, and Bartlett's tests were significant (p < .001), indicating factorable correlation matrices. One-factor solutions explained 53.8% to 67.8% of variance, supporting the intended unidimensional structure of each construct.

Table 3
EFA diagnostics by construct for retained items

Construct	KMO	Bartlett χ^2	p	Variance explained
Training (4 items)	0.669	146.78	< .001	55.80%
Work involvement (4 items)	0.709	114.22	< .001	53.80%
Employee efficiency (4 items)	0.803	237.18	< .001	67.80%

Note. Items were screened and retained based on one-factor solutions per construct. Perceived pay outcomes were retained as a two-item composite. Therefore, EFA diagnostics are not reported for this construct. Reliability and descriptive statistics are provided in Table 2.

Hypothesis Testing

Table 4 presents the parallel mediation results. Training had a strong positive total association with employee efficiency (B = .663, p < .001), supporting H1. Training also positively predicted perceived pay outcomes (B = .418, p < .001) and work involvement (B = .498, p < .001), supporting H2 and H3. In the final model, work involvement was positively related to efficiency (B = .462, p < .001), whereas perceived pay outcomes were not related to efficiency (B = -.015, p = .689). Consistent with this pattern, the indirect effect through work involvement was significant (indirect effect = 0.230, 95% CI [0.133, 0.359]), supporting H4b, while the indirect effect through pay outcomes was not significant (indirect effect = -0.006, 95% CI [-0.057, 0.033]), failing to support H4a. The direct effect remained significant (direct

effect = 0.440, p < .001), indicating partial mediation.

Discussion

In manufacturing settings where productivity and error reduction depend heavily on employees' day-to-day execution, organizations invest in training with the expectation of measurable efficiency gains. Yet, training outcomes are often uneven, making it important to clarify how training translates into efficiency rather than only whether it does. The current study tested whether organizational training predicts employee efficiency through two parallel mechanisms: perceived pay outcomes and work involvement. Results provided strong support for the overall training-efficiency link (H1). Training also predicted both mediators (supporting H2 and H3). However, the mediation results showed a clear contrast between the mechanisms: the indirect effect through work involvement was statistically significant, whereas that through pay outcomes was not.

Table 4

Regression Path and Parallel Mediation Results

Regression path estimates				
Path	**B**	**SE**	**t**	**p**
Training → Pay Outcomes	.418	.116	3.595	< .001
Training → Work Involvement	.498	.062	8.002	< .001
Training → Efficiency (Total Effect)	.663	.06	11.018	< .001
Training → Efficiency (Direct Effect)	.44	.067	6.606	< .001
Pay outcomes → Efficiency	-.015	.039	-.401	0.689
Work involvement → Efficiency	.462	.072	6.392	< .001
Bootstrapped indirect, direct, and total effects (5,000 samples)				
Effect	**Point estimate**	**Lower Bound**	**Upper Bound**	**Decision**
Indirect via Pay Outcomes	-0.006	-0.057	0.033	Not supported
Indirect via Work Involvement)	0.23	0.133	0.359	Supported
Total Indirect Effect	0.224	0.115	0.355	Supported
Total Effect	0.663	0.55	0.775	-
Direct Effect	0.44	0.285	0.581	-

Note. Unstandardized coefficients are reported. Controls (gender, age group, and education) were included in all equations. Indirect effects are significant when the 95% bootstrap confidence interval does not include zero.

The significant work involvement pathway aligns with human capital theory and transfer-of-training research. Training appears to strengthen employees' capabilities and readiness, as reflected

in higher involvement-related behaviors, such as taking on tougher tasks and clarifying job roles. When employees apply training to their job and experience role clarity, efficiency indicators such as improved performance and better skill use become more likely (Aguinis & Kraiger, 2009; Salas et al., 2012). The pattern is also consistent with social exchange logic, in which training may be interpreted as an organizational investment, prompting employees to reciprocate with greater involvement and responsibility (Blau, 1964).

In contrast, perceived pay outcomes did not exhibit a significant indirect effect on efficiency. Two plausible explanations are relevant within manufacturing contexts. Firstly, the rigidity of pay structures may dampen employees' expectations that training will translate into substantial pay increases. Secondly, even when employees perceive their pay as adequate, operational efficiency may be determined more by factors such as operational constraints, supervisory practices, and alignment of work systems than by perceptions of compensation alone. This finding does not diminish the importance of pay; rather, it implies that perceptions of pay might influence efficiency through alternative mechanisms, such as employee satisfaction or turnover intention, or act as a moderator rather than a direct mediator.

Practical Significance

For manufacturing firms that prioritize employee training, the findings highlight three strategic imperatives. First, frame training as a transfer-oriented intervention rather than a singular classroom experience. This can be achieved by creating immediate opportunities for application through well-defined task assignments and role expectations, facilitating the integration of newly acquired skills into routine operations (Blume et al., 2022). Second, establish accountability for supervisors in sustaining post-training engagement. This approach is essential because it offers a more reliable pathway to greater efficiency. Implementing periodic follow-up check-ins, strategic delegation, and constructive feedback will reinforce the application of skills in real production scenarios (Sijbom et al., 2024). Lastly, enhance the clarity and credibility of reward-related communications linked to training initiatives. Avoid ambiguous assurances regarding pay improvements stemming from training; instead, provide clear guidelines detailing the tangible impacts of training, such as eligibility for progression, skill-based allowances, incremental performance rewards, and promotion criteria. This transparency will help manage expectations and foster trust, particularly in environments where immediate financial incentives are limited (Klindžić, 2025).

Limitations and Guidelines for future

The study presents several limitations that inform future research directions. Firstly, the cross-sectional design precludes establishing temporal ordering and causal relationships; therefore, future investigations would benefit from adopting time-lagged or longitudinal methodologies to elucidate the progression of training effects over time (Mehner et al., 2025; O'Neill, 2025). Additionally, reliance on single-source self-reports may introduce common-method bias, despite assurances of anonymity and neutral survey wording; subsequent studies should aim to incorporate multi-source evaluations or use objective operational measures (Podsakoff et al., 2024). Furthermore, the external validity of the findings is constrained by the sample's origin in a single manufacturing context and by the use of convenience sampling. To enhance generalizability, replication of the study across diverse subsectors, geographical regions, and organizational sizes is essential (Mehner et al., 2025). The operationalization of perceived pay outcomes as a two-item composite, even after measurement refinement, may not adequately capture the full spectrum of compensation perceptions; hence, future research should employ more comprehensive, validated measures and provide pertinent reliability evidence for two-item composites (Eisinga et al., 2012). Lastly, the partial mediation observation suggests that additional mediators and boundary conditions may be influential. Investigating potential moderators, such as supervisory support and the opportunity to utilize acquired skills, is crucial in understanding the conditions under which

training effectively translates into enhanced efficiency (Sijbom et al., 2024).

Conclusion

Our analysis indicates that organizational training is positively correlated with employee efficiency within the manufacturing sector. Notably, this correlation is predominantly influenced by behavioral and motivational determinants rather than purely economic factors. Training initiatives enhance efficiency primarily by increasing employee engagement and their willingness to fulfill job requirements; conversely, perceived compensation provides little insight into the training-efficiency relationship. To achieve significant efficiency gains, organizations should adopt a holistic approach to training. This entails treating training as an integrated part of subsequent task assignments, providing avenues for employees to apply their newly acquired competencies, and fostering engagement through supportive supervision and well-defined role expectations. In summary, our findings underscore that employee involvement is the principal mechanism by which training investments translate into improved operational efficiency in manufacturing environments.

References

Aguinis, H., & Kraiger, K. (2009). Benefits of training and development for individuals and teams, organizations, and society. Annual Review of Psychology, 60, 451–474. https://doi.org/10.1146/annurev.psych.60.110707.163505

Blau, P. M. (1964). Exchange and power in social life. Wiley.

Blume, B. D., Huang, J. L., Wang, Z., & Ford, J. K. (2022). Promoting transfer of hybrid training: Interaction of task-contingent conscientiousness and supervisor support. Human Resource Development Quarterly. https://doi.org/10.1002/hrdq.21473

Chen, Y., Zhang, Z., Zhou, J., Liu, C., Zhang, X., & Yu, T. (2023). A cognitive evaluation and equity-based perspective of pay for performance on job performance: A meta-analysis and path model. Frontiers in Psychology, 13, Article 1039375. https://doi.org/10.3389/fpsyg.2022.1039375

Eisinga, R., te Grotenhuis, M., & Pelzer, B. (2012). The reliability of a two-item scale: Pearson, Cronbach, or Spearman–Brown? International Journal of Public Health, 58(4), 637–642. https://doi.org/10.1007/s00038-012-0416-3

Garavan, T., McCarthy, A., & Carbery, R. (2021). Training and organisational performance: A meta-analysis of temporal, institutional and organisational context moderators. Human Resource Management Journal, 31(1), 93–110. https://doi.org/10.1111/1748-8583.12284

George, B., & van der Wal, Z. (2023). Does performance-related pay work? Recommendations for practice based on a meta-analysis. Policy Design and Practice, 6(3), 299–312. https://doi.org/10.1080/25741292.2023.2205756

Government of Pakistan, Finance Division, Economic Adviser's Wing. (2023). Pakistan Economic Survey 2022–23.

Hayes, A. F. (2022). Introduction to mediation, moderation, and conditional process analysis: A regression-based approach (3rd ed.). The Guilford Press.

Howard, M. C. (2023). A systematic literature review of exploratory factor analyses in management. Journal of Business Research, 164, 113969. https://doi.org/10.1016/j.jbusres.2023.113969

Hussain, A. (2025). Digital transformation and workforce skills strategy for Pakistan's manufacturing sector. Asian Productivity Organization. https://doi.org/10.61145/JTUD9520

Kanungo, R. N. (1982). Measurement of job and work involvement. Journal of Applied Psychology, 67(3), 341–349

Klindžić, M. (2025). Salary communication policy and its impact on employee attitudes. Ekonomska misao i praksa, 34(1), 213–230. https://doi.org/10.17818/EMIP/2025/13

Mehner, L., Rothenbusch, S., & Kauffeld, S. (2025). How to maximize the impact of workplace training: A mixed-method analysis of social support, training transfer and knowledge sharing. European Journal of Work and Organizational Psychology. https://doi.org/10.1080/1359432X.2024.2319082

Memon, M. A., Thurasamy, R., Cheah, J.-H., Ting, H., Chuah, F., & Cham, T.-H. (2023). Addressing common method bias, operationalization, sampling, and data collection issues in quantitative research: Review and recommendations. Journal of Applied Structural Equation Modeling, 7(2), i–xiv. https://doi.org/10.47263/JASEM.7(2)01

Neuber, L., Englitz, C., Schulte, N., Forthmann, B., & Holling, H. (2022). How work engagement relates to performance and absenteeism: A meta-analysis. European Journal of Work and Organizational Psychology, 31(2), 292–315. https://doi.org/10.1080/1359432X.2021.1953989

O'Neill, A. (2025). Transfer of workplace e-learning: A systematic literature review. Social Sciences & Humanities Open, 12, 101407. https://doi.org/10.1016/j.ssaho.2025.101407

Podsakoff, P. M., Podsakoff, N. P., Williams, L. J., Huang, C., & Yang, J. (2024). Common method bias: It's bad, it's complex, it's widespread, and it's not easy to fix. Annual Review of Organizational Psychology and Organizational Behavior, 11, 17–61 https://doi.org/10.1146/annurev-orgpsych-110721-040030

Rogers, P. (2022). Best practices for your exploratory factor analysis: A factor tutorial. Revista de Administração Contemporânea, 26(6), e210085

Salas, E., Tannenbaum, S. I., Kraiger, K., & Smith-Jentsch, K. A. (2012). The science of training and development in organizations: What matters in practice. Psychological Science in the Public Interest, 13(2), 74–101. https://doi.org/10.1177/1529100612436661

Sijbom, R. B. L., Koen, J., Peijen, R., & Preenen, P. T. Y. (2024). The impact of workplace changes and supervisor support on employee learning: A nonlinear perspective. Human Resource Development International. https://doi.org/10.1080/13678868.2024.2401302