

Training and organizational performance of manufacturing firms in Rivers State, Nigeria

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Abstract

The aim of this study was to investigate the relationship between training and organizational performance of manufacturing firms in Rivers State, Nigeria, specifically focusing on how employee skill development and continuous learning influence operational and productivity performance. A cross-sectional survey research design was adopted for the investigation. The accessible population consisted of 580 employees drawn from selected manufacturing firms in Rivers State, from which a sample size of 237 respondents was determined using the Taro Yamane (1967) formula. A stratified random sampling technique was utilized to ensure balanced representation across the firms. Data collection was executed using structured questionnaire, yielding 212 validly retrieved copies, which represents an 89.5% response rate. Partial Least Squares Structural Equation Modelling (PLS-SEM) was employed as the methods of data analysis. The empirical findings revealed that employee skill development exerts a strong, positive, and statistically significant relationship with both operational performance and productivity performance. Similarly, continuous learning has a positive and significant influence on operational performance and productivity performance. Together, these dimensions explain 55.3% of the variance in operational performance and 61.9% of the variance in productivity performance. The study concludes that training is a critical, non-negotiable driver of organizational performance, confirming Human Capital Theory premises that transforming raw labour into highly specialized human assets directly mitigates production inefficiencies. Consequently, it is recommended that manufacturing firms should institute mandatory floor-level workshops focusing on advanced machinery operations and strict quality control protocols.

Keywords: Training; Employee Skill Development; Continuous Learning; Organizational Performance; Operational Performance; Productivity Performance

1. Introduction

Organizational performance remains a critical indicators of business sustainability, competitiveness, and long-term growth, particularly in the manufacturing sector. Manufacturing firms play a significant role in the economic development through employment generation, industrial expansion, value creation, and contribution to the state's internally generated revenue. In a highly competitive business environment characterized by technological advancements, changing consumer demands, globalization, and operational complexities, manufacturing firms are under constant pressure to improve their operational efficiency and productivity performance. Organizational performance therefore becomes a strategic concern because it determines the extent to which firms achieve their objectives, maintain profitability, optimize resources, and sustain market relevance (Richard et al., 2009; Taouab & Issor, 2019). In Rivers State, where manufacturing firms contribute significantly to industrial development, improving organizational performance has become increasingly important due to rising production costs, infrastructure challenges, and growing competition from both local and international firms.

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Among the various human resource strategies available to organizations, training has emerged as one of the most effective mechanisms for improving employee capabilities and organizational outcomes. Training refers to a systematic process through which employees acquire new knowledge, skills, competencies, and attitudes necessary for effective job performance (Noe, 2020). Through training initiatives, employees become better equipped to adapt to technological changes, solve workplace problems, improve efficiency, and contribute meaningfully to organizational objectives. Organizations that invest in employee training often experience improvements in productivity, quality service delivery, innovation, and operational effectiveness (Aguinis & Kraiger, 2009).

Empirical evidence from both developed and developing economies has consistently demonstrated the positive influence of training on organizational performance. For example, Khan et al. (2011) found that employee training significantly improves employee productivity and organizational effectiveness in manufacturing organizations. Similarly, Elnaga and Imran (2013) reported that organizations that prioritize employee development achieve higher operational performance and increased productivity. In the Nigerian context, studies by Falola et al. (2014), Akinyemi and Abiddin (2013), and Nwachukwu and Chladkova (2017) established that training contributes significantly to employee effectiveness, productivity improvement, and organizational growth across various sectors. Furthermore, research conducted within manufacturing firms revealed that employee skill enhancement and continuous learning positively influence production efficiency, quality improvement, and operational effectiveness (Otoo et al., 2019).

Despite the substantial body of literature linking training and organizational performance, several gaps remain evident. First, many existing studies have focused broadly on employee performance, job satisfaction, or organizational effectiveness without specifically examining the dimensions of employee skill development and continuous learning in relation to operational and productivity performance. Second, most Nigerian studies have concentrated on sectors such as banking, telecommunications, education, and public administration, with relatively limited empirical attention devoted to manufacturing firms in Rivers State (Falola et al., 2014; Nwachukwu & Chladkova, 2017). Third, the rapidly evolving manufacturing environment characterized by technological transformation and increased operational complexity necessitates further investigation into how training dimensions influence organizational performance outcomes. Therefore, this study seeks to address these gaps by examining the relationship between training and organizational performance of manufacturing firms in Rivers State, Nigeria, with particular emphasis on employee skill development, continuous learning, operational performance, and productivity performance.

1.1. Statement of the Problem

Manufacturing firms in Rivers State operate in an increasingly competitive and dynamic environment characterized by technological advancements, changing customer expectations, production complexities, rising operational costs, and globalization. These challenges require organizations to maintain high levels of operational efficiency and productivity in order to remain competitive and achieve sustainable growth. However, many manufacturing firms continue to experience performance-related challenges such as low productivity levels, operational inefficiencies, poor resource utilization, quality deficiencies, and inability to adapt quickly to changing market demands (Nwachukwu & Chladkova, 2017). These issues have raised concerns among organizational leaders, policymakers, and researchers regarding the factors responsible for declining organizational performance within the manufacturing sector.

One of the major factors contributing to these performance challenges is inadequate investment in employee training and development. In many manufacturing organizations, employees are often expected to operate sophisticated machinery, utilize modern production technologies, and adapt to evolving operational procedures without sufficient opportunities for skill enhancement and continuous learning. This situation frequently results in skill gaps, reduced productivity, operational errors, and inefficient work processes (Noe, 2020). Where training initiatives exist, they are sometimes irregular, poorly structured, or disconnected from organizational performance objectives, thereby limiting their effectiveness.

Although previous studies have reported positive relationships between training and organizational performance (Elnaga & Imran, 2013; Falola et al., 2014; Otoo et al., 2019), there remains insufficient empirical evidence regarding how specific dimensions of training, particularly employee skill development and continuous learning, influence operational performance and productivity performance within manufacturing firms in Rivers State. Most existing studies have either examined training as a unidimensional construct or focused on other sectors of the economy, thereby creating contextual and conceptual gaps in the literature. Consequently, the problem confronting this study is the limited understanding of how employee skill development and continuous learning contribute to operational performance and productivity performance among manufacturing firms in Rivers State, Nigeria. Addressing this gap is necessary because a clearer understanding of these relationships will provide managers and policymakers with evidence-based strategies for enhancing organizational performance through effective training practices.

2. Literature Review

This work is founded on The Human Capital Theory. The Human Capital Theory posits that investments in employee knowledge and skills improve individual productivity and contribute to organizational effectiveness (Becker, 1993). The theory suggests that employees represent valuable organizational assets whose capabilities can be developed through training and education. When organizations invest in employee development, they increase the productive capacity of their workforce, thereby improving operational efficiency and organizational performance. Consequently, training is not merely an organizational expense but a strategic investment capable of generating substantial returns.

2.1. Conceptual Framework

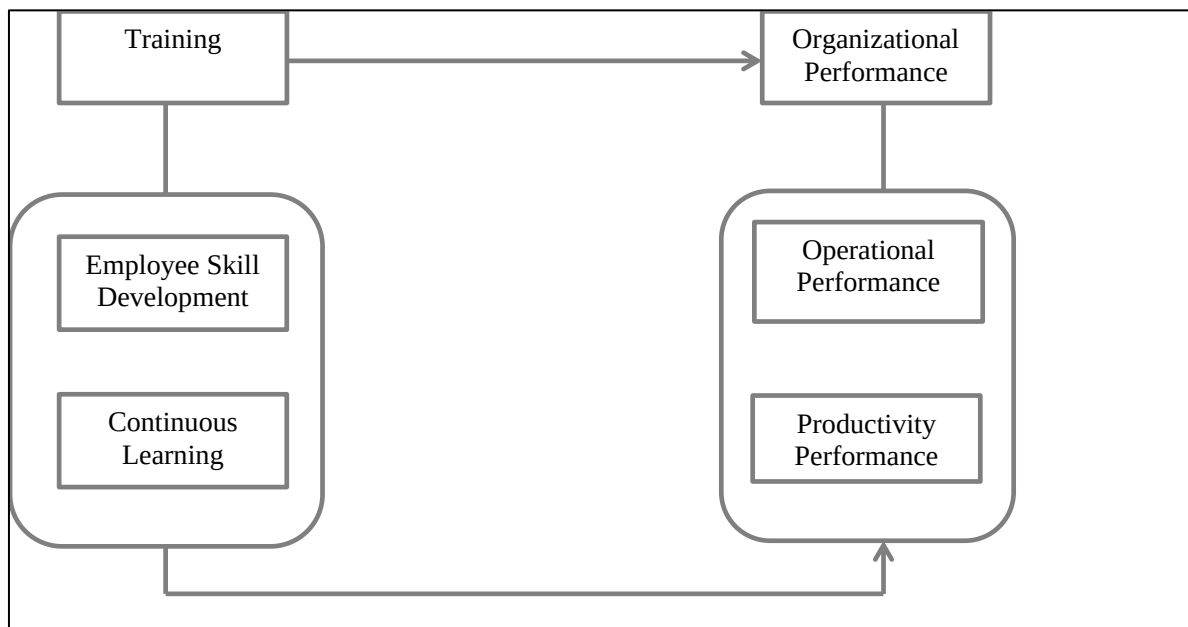


Figure 1 Conceptual Framework

Source: The dimensions of Training were adapted from Khan, Khan, and Mahmood (2024), while the measures of Organizational Performance were adapted from Alola and Akinwale (2024)

2.1.1. Training

Training is widely recognized as a cornerstone of human resource development, serving as a deliberate organizational effort to enhance employee competencies and align them with strategic objectives. Traditionally, training was perceived as a corrective measure to address skill gaps; however, contemporary scholarship emphasizes its strategic role in fostering adaptability, innovation, and resilience (Noe & Kodwani, 2018). Training is conceptualized as a deliberate, systematic, and structurally organized human resource intervention designed to modify an individual's knowledge, technical skills, behavioral patterns, and cognitive orientations to achieve alignment with strategic corporate objectives (Indabawa, Bukar & Mohammed, 2025). Within modern human resource management literature, training is recognized not as an isolated operational luxury, but as a critical strategic mechanism that bridges the gap between high-level organizational vision and the day-to-day execution capacity of the workforce (Indabawa et al., 2025). Training encompasses structured programs designed to improve technical proficiency, managerial capabilities, and interpersonal skills, thereby equipping employees to meet evolving organizational demands. In knowledge-driven economies, training is increasingly integrated into organizational culture, creating continuous learning environments where employees refine existing skills while acquiring new ones. This strategic orientation underscores training as an investment in human capital, yielding returns in productivity, innovation, and organizational competitiveness (Tan, 2014).

2.1.2. Employee Skill Development

Employee skill development extends beyond formal training to encompass the deliberate cultivation of both technical and soft skills essential for organizational effectiveness. Technical skills ensure employees can perform job-specific tasks efficiently, while soft skills such as communication, leadership, and problem-solving foster collaboration and

innovation (Sung & Choi, 2014). Skill development initiatives empower employees to take ownership of their roles, enhance engagement, and contribute meaningfully to organizational goals. Moreover, organizations that prioritize skill development often experience higher retention rates, as employees perceive opportunities for growth and advancement. This dynamic reinforces the Human Capital Theory's assertion that investments in people yield tangible organizational benefits, positioning skill development as a critical driver of organizational resilience and adaptability (Becker, 2011). In the contemporary knowledge-based corporate ecosystem, skill development extends far beyond the historical mastery of routine manual tasks or standard operating procedures. Contemporary scholarship operationalizes skill development as a sophisticated configuration of technical capabilities, data analytics proficiency, complex cognitive processing, and advanced individual decision-making skills (Jaiswal et al., 2021). The core conceptual objective of skill development is upskilling and cross-skilling, which fundamentally recalibrate the employee's internal resource value to handle technical disruptions, such as automation and artificial intelligence integrations (Jaiswal et al., 2021).

2.1.3. Continuous Learning

Continuous learning represents a paradigm shift in organizational development, emphasizing lifelong learning and adaptability as essential for sustaining competitiveness. Unlike episodic training, continuous learning is embedded in organizational culture, fostering environments where knowledge sharing, reflection, and experimentation are routine (Marsick & Watkins, 2015). Organizations that promote continuous learning cultivate innovation and agility, enabling employees to respond effectively to emerging challenges and opportunities. This construct highlights the importance of creating learning organizations where employees are encouraged to engage in self-directed learning, collaborative problem-solving, and knowledge exchange. Continuous learning not only enhances individual competencies but also builds collective organizational intelligence, ensuring that human capital remains dynamic and responsive to change (Ellinger et al., 2015). Within highly dynamic industrial environments, initial formal education and front-loaded corporate orientation programs depreciate at an accelerating velocity due to technological shifts and institutional evolutions (Kim & Park, 2020). Continuous learning represents the operationalization of a comprehensive learning culture wherein skill training is integrated directly into daily workflows, digital learning management systems, and collaborative team dynamics (Kim & Park, 2020). This construct prioritizes the constant renewal of both complex cognitive abilities and non-cognitive socio-emotional skills, such as creative problem-solving and critical thinking (Kim & Park, 2020).

Organizational Performance

Organizational performance is a multidimensional construct that reflects the outcomes of investments in human capital and strategic initiatives. It encompasses both financial and non-financial indicators, capturing efficiency, effectiveness, innovation, and stakeholder satisfaction (Venkatraman & Ramanujam, 1986). Performance is not merely a measure of output but a reflection of how well organizations utilize resources, adapt to environmental changes, and achieve strategic objectives. The conceptualization of organizational performance has evolved from a historical reliance on financial metrics to an inclusive equilibrium that integrates both financial indices and non-financial performance indicators, including quality compliance, customer satisfaction, innovation behavior, and organizational learning capabilities (Suparwadi, 2024). It is structurally understood as the aggregate manifestation of human outputs, technological configurations, and managerial decisions working in unison. Measuring this construct requires advanced, reliable performance measurement systems capable of tracking how successfully internal competencies and operational inputs are transformed into sustainable, value-driven market outcomes (Serbinenko & Letina, 2025). Within the Human Capital Theory framework, organizational performance is directly linked to employee development initiatives, as investments in training, skill development, and continuous learning enhance the productive capacity of individuals and, by extension, the organization (Delaney & Huselid, 1996).

Operational Performance

Operational performance focuses on the efficiency and effectiveness of organizational processes, emphasizing quality, timeliness, and resource utilization. It reflects the organization's ability to deliver products and services that meet customer expectations while minimizing waste and maximizing efficiency (Venkatraman & Ramanujam, 1986). Investments in employee development directly influence operational performance by equipping employees with the skills and knowledge necessary to optimize processes, reduce errors, and enhance service delivery. Organizations that prioritize operational performance through continuous improvement initiatives often achieve higher levels of customer satisfaction and competitive advantage, underscoring the strategic importance of human capital in driving process excellence (Sung & Choi, 2014). Operational performance captures the internal functional health and process-level efficiency of an enterprise, focusing specifically on non-financial milestones such as output quality, waste minimization, lead-time reduction, and workflow precision. This dimension of performance evaluates the mechanical execution of

corporate strategies within the production or service delivery lines, reflecting how effectively the firm mitigates transactional friction and workflow bottlenecks. Conceptualizations of operational excellence demonstrate that structured quality management systems and streamlined logistics processes are essential determinants of high operational performance (Wei, 2025). When an organization optimizes its operational performance, it successfully achieves a high degree of service reliability and compliance, thereby establishing a stable structural baseline that allows the enterprise to absorb external environmental shocks and maintain market relevance.

Productivity Performance

Productivity performance highlights the tangible returns of human capital investments, focusing on output relative to input. It measures the extent to which organizations achieve profitability, growth, and competitiveness through efficient resource utilization (Delaney & Huselid, 1996). Productivity performance represents the quantitative and qualitative ratio of an enterprise's generated outputs relative to the total inputs consumed, serving as a fundamental barometer of resource transformation efficiency (Suparwadi, 2024). Within the paradigm of strategic management, productivity performance is treated as the direct operational manifestation of human capital utility, measuring how efficiently aggregate workforce intelligence and physical labor are converted into gross value added, corporate profitability, and market yields (Portovedo et al., 2024). Employee development initiatives such as training, skill development, and continuous learning enhance productivity by improving employee competencies, fostering innovation, and increasing engagement. Productivity performance thus serves as a critical indicator of organizational success, reflecting the effectiveness of human capital strategies in generating sustainable value. Within the Human Capital Theory framework, productivity performance underscores the economic rationale for investing in people, as enhanced human capital translates into measurable organizational gains (Tan, 2014). High productivity performance signals that an organization has successfully aligned its human resource capabilities with its technological infrastructure, thereby eliminating systemic redundancies and optimizing labor inputs. Ultimately, productivity performance functions as a core indicator of organizational competitiveness and economic sustainability, illustrating the direct, value-adding return on human capital investments within competitive industrial landscapes (Indabawa, 2025; Portovedo et al., 2024).

2.2. Empirical Review

Emeti (2015) assessed the effects of training and development on the performance of paint manufacturing firms in Rivers State. The study aimed to determine whether employee skill development improved operational performance. A cross-sectional survey design was adopted, with the entire 312 operational staff of three paint manufacturing firms sampled. Data were collected using structured questionnaires and analysed with Pearson product moment correlation via SPSS. Findings revealed that firms investing substantially in training and development survived operational difficulties and improved efficiency, while discriminatory nomination of workers for training hindered overall performance. The conclusion emphasized that inclusive skill development programs are essential for sustaining operational performance in Rivers State manufacturing firms.

Amah (2014) examined sustained knowledge acquisition and organizational effectiveness in 32 manufacturing firms in Rivers State. The aim was to evaluate how continuous learning practices influence operational performance. The study employed a triangulation of methodologies, combining nomothetic survey methods with ideographic interviews. Managers were purposively sampled, and data were analysed using correlation and thematic analysis. Findings revealed a significant relationship between sustained knowledge acquisition and organizational effectiveness, showing that continuous learning improved productivity, profitability, and market share. The conclusion stressed that continuous learning is indispensable for operational performance and long-term survival of manufacturing firms in Rivers State.

Badom and Girigiri (2021) investigated training and development and productivity of workers in Nigeria Agip Oil Company, Port Harcourt. The aim was to establish whether skill development initiatives improved productivity performance. A cross-sectional survey design was used, with a sample size of 316 determined via Taro Yamane's formula from a population of 1,500 employees. Data were collected through questionnaires and analysed using chi-square statistics. Findings revealed significant relationships between on-the-job training, off-the-job training, managerial development, and productivity. The conclusion emphasized that skill development significantly enhances productivity performance, recommending regular training and managerial development to sustain competitiveness.

Popoola, Adebola, and Adeoti (2023) analysed firm learning and productivity in Nigeria's manufacturing sector, including Rivers State. The aim was to investigate how continuous learning practices affect productivity performance. Using data from the Enterprise Survey Panel (2007–2015), the study employed dynamic panel models with OLS and GMM techniques. Case studies of selected firms were also included. Findings revealed that skills training and continuous learning significantly increased productivity, with learning variables lagged by one period showing strong positive

effects. The conclusion emphasized that both formal and informal learning mechanisms are critical for sustaining productivity performance in manufacturing firms.

3. Methodology

This study adopted a cross-sectional survey research design. The study utilized a quantitative approach because the variables under investigation are measurable and require statistical analysis to establish the nature and strength of their relationships. The population of this study comprised employees of selected manufacturing firms operating within Rivers State, Nigeria. The accessible population consisted of 580 employees drawn from selected manufacturing firms in Rivers State. The sample size for the study was determined using the Taro Yamane (1967) formula. Therefore, the sample size for the study was 237 respondents. The study employed a stratified random sampling technique. Data were collected through the use of a structured questionnaire. Data collected from the respondents were coded and analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) with the aid of SmartPLS Version 4.0 software. The variables are: Training (TRN), Employee Skill Development (ESD), Continuous Learning (COL), Organizational Performance (ORP), Operational Performance (OPP), Productivity Performance (PRP).

Table 1 Reliability Test

	Cronbach's Alpha	Composite Reliability
Employee Skill Development	0.907	0.912
Continuous Learning	0.807	0.851
Operational Performance	0.881	0.882
Productivity Performance	0.898	0.907

Table 1 presents the reliability test results, specifically displaying the Cronbach's Alpha and Composite Reliability (CR) coefficients for the constructs under study. Because all reported coefficients comfortably surpass the standard conservative benchmark of 0.70, the instruments used to measure these constructs are deemed highly reliable and internally consistent.

Table 2 Validity Test

	AVE	COL	ESD	OPP	PRP
COL	0.584	0.764			
ESD	0.731	0.285	0.855		
OPP	0.678	0.228	0.332	0.823	
PRP	0.710	0.168	0.274	0.333	0.843

Table 2 presents the construct validity results, confirming that all variables satisfy the necessary criteria for both convergent and discriminant validity. Convergent validity is established because the Average Variance Extracted (AVE) for every construct comfortably exceeds the standard 0.50 benchmark. Additionally, discriminant validity is achieved because the square root of the AVE for each construct along the diagonal is consistently higher than its correlation coefficients with the other latent variables in the corresponding columns and rows. Therefore, the data proves that the measurement scales are highly valid, distinct from one another, and fully suitable for structural model testing.

4. Analysis and Discussion

Out of the 237 copies distributed to the participants, 212 valid questionnaires were successfully retrieved, while 25 copies were unretrieved or discarded due to mutilation. This constitutes an 89.5%.

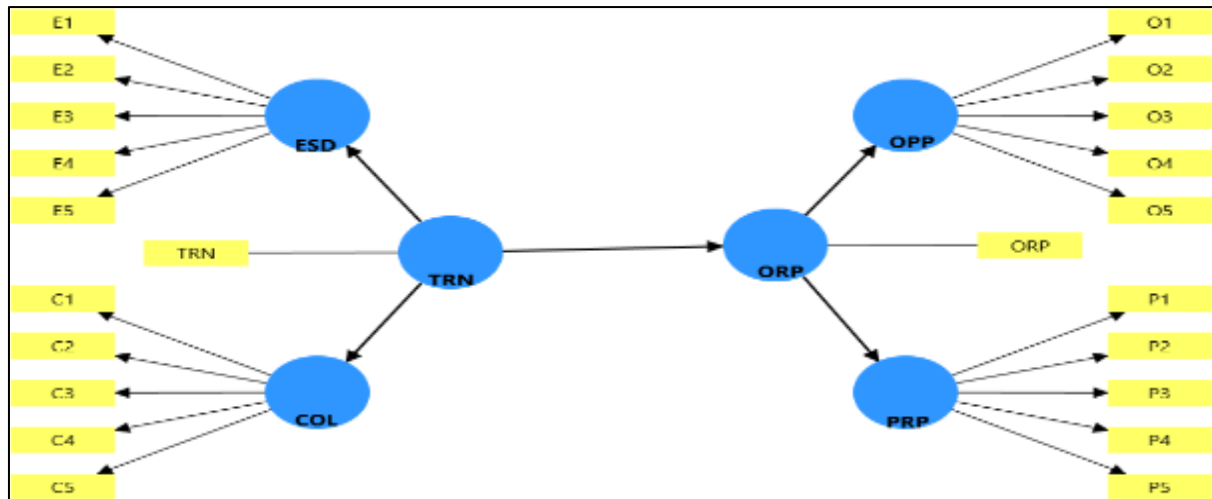


Figure 2 Research Model

Figure 2 presents the structural equation modeling (SEM) framework for the research model, mapping out the pathways between the study's latent constructs and their observed indicators. The independent variable side conceptualizes Training (TRN) as having distinct sub-dimensions: Employee Skill Development (ESD), which is reflectively measured by indicators E1 through E5, and Continuous Learning (COL), measured by indicators C1 through C5. Correspondingly, the dependent variable side depicts Organizational Performance (ORP) encompassing Operational Performance (OPP), measured by indicators O1 through O5, and Productivity Performance (PRP), measured by indicators P1 through P5.

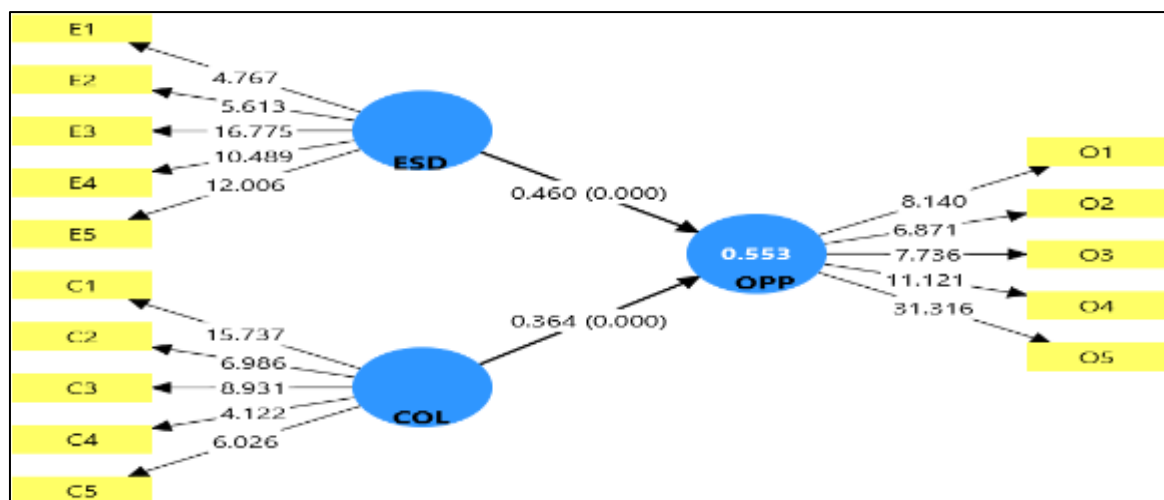


Figure 3 Hypotheses 1 and 2

- H₀₁: There is no significant relationship between employee skill development and operational performance of manufacturing firms in Rivers State, Nigeria.
- H₀₂: There is no significant relationship between continuous learning and operational performance of manufacturing firms in Rivers State, Nigeria.

Figure 3 presents the structural model path analysis and bootstrapping results used to evaluate Hypotheses 1 and 2. The empirical data reveals that Employee Skill Development (ESD) exerts a positive and statistically significant influence on Operational Performance ($\beta = 0.460$, $p = 0.000$), resulting in the rejection of the first null hypothesis. Similarly, Continuous Learning (COL) exhibits a positive and statistically significant relationship with Operational Performance ($\beta = 0.364$, $p = 0.000$), meaning the second null hypothesis is also rejected. Furthermore, the model depicts an R^2 value of 0.553 inside the destination construct, which demonstrates that Employee Skill Development and Continuous Learning jointly account for 55.3% of the total variance in the Operational Performance (OPP) of manufacturing firms in Rivers State, Nigeria.

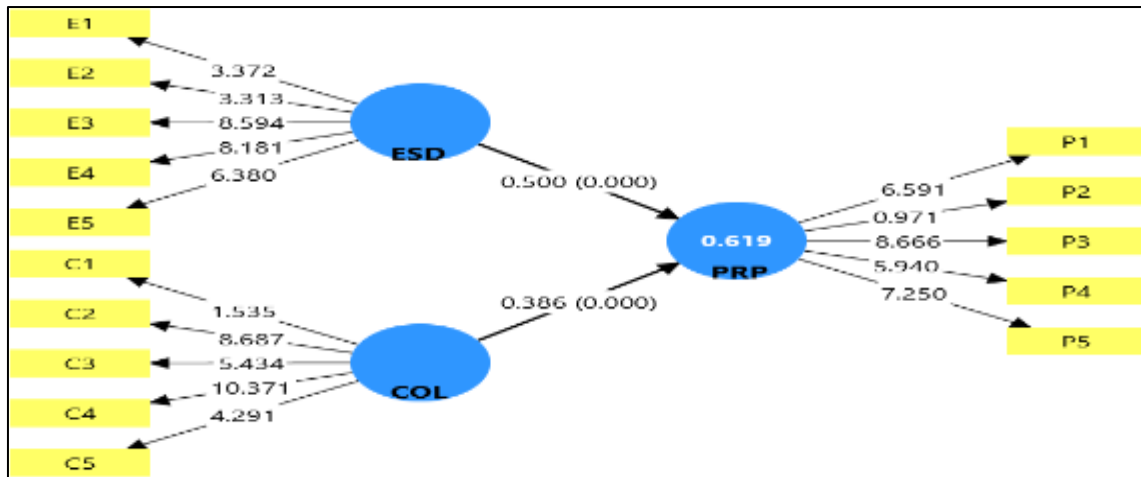


Figure 4 Hypotheses 3 and 4

Ho₃: There is no significant relationship between employee skill development and productivity performance of manufacturing firms in Rivers State, Nigeria.

Ho₄: There is no significant relationship between continuous learning and productivity performance of manufacturing firms in Rivers State, Nigeria.

Figure 4, as illustrated in image_990442.png, presents the structural model path analysis and bootstrapping results utilized to evaluate Hypotheses 3 and 4. The empirical results demonstrate that Employee Skill Development (ESD) has a positive and statistically significant relationship with Productivity Performance ($\beta = 0.500$, $p = 0.000$), leading to the rejection of the third null hypothesis. Similarly, Continuous Learning (COL) exerts a positive and statistically significant influence on Productivity Performance ($\beta = 0.386$, $p = 0.000$), which means the fourth null hypothesis is also rejected. Furthermore, the model displays an R^2 value of 0.619 within the destination construct, proving that Employee Skill Development and Continuous Learning jointly account for 61.9% of the total variance in the Productivity Performance (PRP) of manufacturing firms in Rivers State, Nigeria.

5. Discussion of Findings

5.1. Employee Skill Development and Operational Performance

The result of the first null hypothesis revealed a strong, positive, and statistically significant relationship ($\beta = 0.460$, $p = 0.000$). Because the p-value falls well below the standard 0.05 alpha threshold, the null hypothesis is rejected, demonstrating that intentional investments in upgrading employee technical and manual competencies yield direct operational improvements. This outcome directly aligns with the work of Emeti (2015), who demonstrated that firms investing heavily in training and development effectively survived severe operational difficulties and substantially optimized their floor efficiency. When manufacturing firms implement inclusive and targeted skill development, they build a structurally resilient workforce capable of driving superior operational performance.

5.2. Continuous Learning and Operational Performance

The result of the second null hypothesis shows a positive and statistically significant path coefficient ($\beta = 0.364$, $p = 0.000$). Consequently, the null hypothesis is rejected, proving that establishing an environment of ongoing knowledge acquisition and information sharing is a vital determinant of floor-level operational success. Collectively, as shown in the model, Employee Skill Development and Continuous Learning account for a substantial 55.3% of the total variance in Operational Performance. This finding heavily corroborates the empirical study by Amah (2014), who discovered a powerful relationship between a firm's continuous learning orientation and its overall operational effectiveness and long-term survival. A continuous learning culture is absolutely indispensable for sustaining day-to-day operational execution.

5.2.1. Employee Skill Development and Productivity Performance

The result of the third null hypothesis displays a highly potent, positive, and statistically significant impact ($\beta = 0.500$, $p = 0.000$). Because this path coefficient is exceptionally strong, the null hypothesis is confidently rejected. This confirms that targeted, individual technical upskilling serves as the single strongest structural driver of volume, speed, and output optimization within the studied firms. This result is highly consistent with the findings of Badom and GiriGiri (2021) who established that on-the-job training, off-the-job training, and managerial development programs are positively and significantly linked to heightened worker productivity. Individual skill development exerts a profound, unyielding influence on total productivity performance.

5.2.2. Continuous Learning and Productivity Performance

The result of the fourth null hypothesis yields a positive and statistically significant path relationship ($\beta = 0.386$, $p = 0.000$). The rejection of this fourth null hypothesis underscores that institutional productivity is not merely a product of isolated mechanical skills, but is heavily driven by an adaptive, learning-oriented workplace ecosystem. Taken together, Employee Skill Development and Continuous Learning explain an impressive 61.9% of the total variance in corporate Productivity Performance. This path relationship strongly aligns with the insights provided by Popoola, Adebola, and Adeoti (2023) who found that continuous learning practices and skills training profoundly escalate long-term manufacturing productivity. Notably, their study highlighted that continuous learning variables lagged by one period continue to manifest as strong, positive drivers of output. Formal and informal continuous learning mechanisms are critical pillars for driving the productivity performance of manufacturing firms in Rivers State, Nigeria.

6. Conclusion

Based on the empirical findings of this study, it is concluded that training is a critical, non-negotiable driver of organizational performance for manufacturing firms in Rivers State, Nigeria. The structural equation modeling confirms that investments in Employee Skill Development (ESD) and Continuous Learning (COL) significantly enhance both Operational Performance (OPP) and Productivity Performance (PRP). These findings strongly validate Human Capital Theory, proving that transforming raw labor into highly specialized, adaptable human assets directly solves the issues of high error rates, machine downtime, and output waste. For manufacturing firms to survive and remain competitive within the Rivers State industrial landscape, training must be treated as a strategic capital investment rather than an operational expense.

Recommendations

The following recommendations are provided:

- i. To eliminate assembly line downtime and minimize material waste, manufacturing firms should institute mandatory floor-level workshops focusing on advanced machinery operations and strict quality control protocols. These skill acquisition initiatives must be highly inclusive to prevent workforce friction.
- ii. Manufacturing organizations should intentionally break away from rigid, static working environments. Firms should establish formal knowledge-sharing platforms, weekly operational reviews, and post-project debugging sessions. Fostering this environment ensures that employees can adapt flexibly to sudden supply chain disruptions or automated workflow shifts.
- iii. Manufacturing executives should aggressively fund dual-layered training programs. Management should partner with industrial training institutes to deliver a robust mix of on-the-job technical mentoring and off-the-job specialized certifications. This directly expands the manual dexterity and diagnostic capacities of production workers, maximizing output per man-hour.
- iv. Manufacturing firms should institutionalize both formal and informal learning mechanisms. Management should implement performance-tied incentives that reward operators who complete digital training modules, master multi-machine interfaces, or propose innovative waste-reduction techniques. Keeping the firm's total human capital dynamically aligned with evolving industrial standards guarantees sustained competitive output.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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