



Assessing the Mediating Role of Project Management Training on the Nexus between Job Satisfaction and Project Performance in the Nigerian Construction Industry

Ademola Samuel Sajuyigbe¹, Olusegun Samuel Ogundare², Bolanle Mistura Sanusi³, Abiola Olubunmi Akinbobola⁴, Adeniran Rahman Tella⁵ and Nwoye James Obi⁶

^{1,3 & 4}Department of Business Administration Osun State University, Okuku Campus, Nigeria

²Department of Business Administration, Centre for Part-Time Studies, Ajayi Crowther University Oyo, Nigeria

⁵Department of Business Administration, Faculty of Art, Social & Management Sciences, Atiba University Oyo, Nigeria

⁶Department of Business Administration, Caleb University, Lagos

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Abstract

This study fills a critical gap in behavioral science by exploring the mediating role of project management training (PMT) in the relationship between job satisfaction (JS) and project management performance (PMP) within Nigeria's construction industry—a context rarely examined in prior research. Using a non-probabilistic sample of 250 professionals, with 208 valid responses, data were analyzed through structural equation modeling to test both direct and indirect effects. Results show that JS has a significant positive effect on PMP ($\beta = 0.250$; $p = 0.003$), while PMT strongly predicts PMP ($\beta = 0.833$; $p = 0.000$). Indirect effects analysis confirms that PMT partially mediates the JS–PMP relationship ($\beta = 0.295$; $p = 0.000$), meaning job satisfaction still enhances performance even when training is accounted for. This mediating role represents the study's key novelty, demonstrating that training amplifies but does not replace the influence of employee satisfaction on project outcomes. The findings emphasize that improving job satisfaction alone is insufficient for optimal project results. Targeted PMT equips workers to manage complex construction demands, boosting engagement and overall performance. Practically, the study provides actionable insights for managers and policymakers: integrating structured training programs with initiatives to enhance job satisfaction is essential for stronger project delivery and sustainable development within Nigeria's construction sector.

Keywords: Project management training, job satisfaction, project management performance, construction industry.

1. Introduction

The construction industry (CI) is a cornerstone of economic sustainability worldwide, generating vast employment opportunities for both skilled and unskilled workers and contributing significantly to national GDP. Globally, it underpins economic growth and infrastructure development (Al-Nabae & Sammani, 2021; Picciotto, 2020). For example, the sector accounts for about 7% of the UK's GDP and over 5% of the US GDP, employing roughly 8 million workers annually, or about 5% of the U.S. workforce. In Canada, it adds more than \$140 billion to the economy each year, representing 8% of GDP (Anderson & Lannon, 2019). India's construction industry employs

around 35 million people, generates assets worth about \$250 billion, and contributes over 5% of GDP (Mahalingam & Nagarajan, 2018). In South Africa, it supports nearly 2 million jobs and contributes over \$7.5 billion to GDP (South African Construction Industry Report, 2022). Kenya's sector provided about 6% of GDP in 2023, with around 245,000 formal jobs and extensive informal employment, representing 15.6% of national employment (Civil Engineering Market Reports, 2025). These figures highlight the construction industry's pivotal role in economic development, job creation, and infrastructure growth, making it a key driver of sustainable national and global economies.

¹ Corresponding Author

Email address: sajuyigbeademola@yahoo.com

In Nigeria, the construction industry is a vital driver of economic growth and job creation, contributing over 4.5% to the country's Gross Domestic Product (GDP) (Emmanuel et al., 2020). In comparison, education contributes approximately 2.17%, manufacturing around 9%, and the financial sector, a key component of the services industry, accounts for over 50% of GDP. Micro, Small, and Medium Enterprises (MSMEs) contribute approximately 49–50% and are responsible for generating about 84% of national employment, highlighting their essential role in economic sustainability (Emmanuel et al., 2020). The construction sector's steady contribution reflects its central role in infrastructure development and urban expansion. Its performance directly affects multiple sectors, such as manufacturing, transportation, and real estate, making it a critical enabler of Nigeria's broader economic development goals.

The Nigerian construction industry is a vital engine of economic development, providing essential housing, infrastructure, and public works. Yet it faces a complex mix of risks and constraints that threaten productivity and worker safety. Bejide and Iyagba (2015) observe persistent shortages of skilled labour and heavy reliance on untrained workers, which reduce quality and cause delays. Regulatory bottlenecks, weak enforcement of building codes, and slow permitting further drive up costs and extend timelines. Financial pressures—high interest rates, inflation, and currency volatility frequently stall projects midstream. Supporting infrastructure such as power, transport, and water remains inadequate, complicating material delivery and site operations (Ekung & Adewuyi, 2018). Quality-control failures and substandard materials heighten the likelihood of structural collapse and workplace accidents. Corruption and political interference in contract awards inflate costs and erode investor confidence (Adeleke et al., 2020), while land-tenure disputes create additional delays. Many firms are slow to adopt modern construction technologies or sustainable practices, and the migration of skilled professionals abroad deepens the labour deficit.

These systemic weaknesses also endanger workers. Abrey and Smallwood (2014) report that over 40 % of work-related fatalities occur on construction sites, and Al-Sadi and Khan (2018) highlight high injury risks across the sector. COVID-19 amplified these problems, worsening labour shortages and disrupting projects worldwide (Emmanuel et al., 2020). Globally, over 80 % of construction projects fail before execution (Harrington & Frank, 2015), and industry leaders warn of a looming shortage of 100,000 skilled workers by 2029 (Çelik & Oral, 2021). In Nigeria, these pressures have contributed to job dissatisfaction, limited career growth, and declining project management performance (Yahaya, 2021).

Job satisfaction (JS) has been a central focus of research

for decades across both developed and developing nations and is widely acknowledged as a key motivator influencing project management performance (PMP) (Masood et al., 2020). It plays a critical role in human resource management, shaping the attitudes and behaviors of construction site workers (Şimşek & Gürler, 2019). Usukhbayar and Choi (2020) found that satisfied project managers are more likely to foster a positive work environment that enhances PMP. Additionally, project management training (PMT) is identified in HR literature as a powerful motivational tool that can significantly influence project outcomes (Çelik & Oral, 2021). PMT equips professionals with the necessary competencies, tools, and methodologies to meet project requirements and deliver results on time and within budget (Ni et al., 2022). Zhao et al. (2020) further emphasize the impact of diverse project management skills on overall project success.

The integration of PMT and JS is vital for the construction industry's role in achieving the Sustainable Development Goals (SDGs), particularly those related to sustainable urban development and inclusive opportunities by 2030 (Zhao et al., 2020; Daoor et al., 2020; Akhund et al., 2019). Hutajulu (2020) underscores the importance of both PMT and JS for maintaining a competitive edge in the construction sector. Moreover, similar correlations between education, job satisfaction, and performance have been observed in other sectors, including education (Mase, 2020), manufacturing (Sony & Mekoth, 2016), finance (Bakoti, 2016), and small and medium enterprises (Pagan, 2011), highlighting the universal importance of these factors across industries

Empirical literature indicates that job satisfaction (JS) significantly influences project management performance (PMP) (Masood et al., 2020), as JS plays a crucial role in human resource management by shaping the attitudes and behaviors of construction site workers (Şimşek & Gürler, 2019; Usukhbayar & Choi, 2020). Similarly, studies have shown that project management training (PMT) positively impacts PMP (Çelik & Oral, 2021). In particular, the acquisition of diverse project management skills by project managers and team members has been found to enhance PMP significantly (Zhao et al., 2020). Furthermore, strong associations between education, job satisfaction, and performance have been established in several sectors, including education (Vila & Garcia-Mora, 2005), manufacturing (Sony & Mekoth, 2016), finance (Bakoti, 2016), and small and medium enterprises (Pagan, 2011). Most of the reviewed studies were conducted outside Nigeria, and their findings may not be fully applicable to the Nigerian context due to significant differences in political, economic, and environmental conditions (Pinnington & Mir, 2014; Pancasila et al., 2020; Ni et al., 2022; Zhao et al., 2020; Zhang et al., 2024; Yahaya, 2021). Furthermore, a number of existing studies including those by Anderson

and Lannon (2019), Okechukwu (2017), Huang (2019), Hwang et al. (2019), and Muntazeri and Indrayanto (2018) did not conceptualize or empirically examine the mediating role of Project Management Training, which is a key focus of the present study. In addition, while previous research on Job Satisfaction (JS) and Project Management Performance (PMP) has largely drawn upon theories such as Expectancy Theory (Oktavia, 2020), Theory of Planned Behavior (Ni et al., 2022), Transformational Leadership Theory (Fareed et al., 2022), and Human Capital Theory (Mustafa et al., 2021), this study introduces the Path-Goal Theory as an additional theoretical lens. Unlike prior studies that primarily relied on basic statistical techniques such as Ordinary Least Squares (OLS) (Bitamba & An, 2020), this study employs a more sophisticated analytical approach Path Analysis using Structural Equation Modelling (PA-SEM) to yield deeper and more robust insights. PA-SEM, is particularly suited for testing complex theoretical models that include multiple interrelated dependent and independent variables and latent constructs measured by several indicators. Path analysis, as a special case of SEM, allows simultaneous estimation of direct, indirect, and total effects, enabling researchers to uncover mediating mechanisms that conventional regression cannot fully capture (Kline, 2023; Hair et al., 2022).

Considering the documented links between project management training (PMT) and project management performance (PMP), as well as between job satisfaction (JS) and PMP, it is reasonable to propose that PMT could act as a mediator in this relationship. To address this gap, this study aims to explore the potential mediating effect of PMT on the relationship between job satisfaction and project management performance. Accordingly, the research is guided by the following questions: How does job satisfaction influence project management performance within Nigeria's construction industry? What effect does project management training have on project management performance? And does project management training mediate the relationship between job satisfaction and project management performance?

2. Literature Review

2.1. Theoretical Framework

The theoretical framework underpinning this study is the Path-Goal Theory, originally developed by Martin Evans in 1970. This theory explains how project supervisors can effectively motivate construction workers to achieve established goals by aligning leadership behaviours with workers' needs and the demands of the task. In the context of the construction industry, the theory emphasizes a supervisor's ability to recognize employee needs, deploy a range of skills, tools, and methodologies, and inspire subordinates to meet project objectives delivering outcomes on time and within budget. Path-Goal Theory positions project

management training (PMT) as a key motivational instrument that significantly influences project management performance (PMP) (Hutajulu, 2020). This perspective aligns with Pinnington and Mir's (2014) findings that the availability of relevant project management techniques, skills, and tools to construction workers directly enhances their performance and supports successful project delivery. The theory also posits that construction workers experience greater job satisfaction when supervisors engage them through regular consultation, adopt up-to-date practices, invite feedback, involve them in decision-making, ensure their well-being, maintain equitable treatment, and express confidence in their abilities (Khahro et al., 2024).

Supporting this view, Masood et al. (2020) found that construction workers are more committed to project success when supervisors provide clear and unobstructed communication of project goals. Similarly, Zhang et al. (2024) echo the theory's assertion that project supervisors can influence workers' long-term engagement and reduce turnover by equipping them with key project management techniques and fostering self-confidence. In the same vein, Hailu, and Tshela (2024) affirm that effective guidance from project supervisors enables construction workers to complete complex tasks beyond their initial capacity. Path-Goal Theory emphasizes that leaders enhance subordinate performance by clarifying goals, removing obstacles, and matching leadership style to employee needs (Northouse, 2022). Construction supervisors routinely confront heterogeneous teams and dynamic site conditions, conditions in which adaptive leadership behaviours—directive, supportive, participative, and achievement-oriented—are critical for sustaining productivity and safety.

2.2. Job Satisfaction

Job satisfaction is the positive feeling employees have when their job meets their needs for fair pay, good conditions, respect, and growth, leading to motivation and productivity, while low satisfaction causes stress, poor performance, and higher turnover (Çelik & Oral, 2021). Job satisfaction in the construction industry is the degree of contentment and well-being that workers, ranging from labourers to project managers, feel about their jobs. It reflects how secure, valued, and fulfilled they are, shaped by factors such as site safety, fair wages, supportive supervision, growth opportunities, and the physical work environment (Zhao et al., 2020; Mustafa et al., 2021). Because construction involves demanding conditions, frequent site changes, and physical risks, satisfaction depends heavily on safety measures, proper equipment, and fair compensation, including benefits and overtime pay (Karaman, 2022). Effective leadership, clear communication, and career development opportunities further strengthen morale (Magazi & Kikwasi, 2022). High job satisfaction promotes productivity, quality work, strong safety

behavior, and employee loyalty, while dissatisfaction, often caused by long hours, harsh conditions, low pay, or poor team relations, leads to absenteeism, accidents, turnover, and conflict (Johari & Jha, 2020).

2.3. Project Training

Project Management Training (PMT) grew out of the broader field of project management, which became formalized in the mid-20th century to meet the demands of increasingly complex industrial, military, and construction projects (Kuria & Kimutai, 2020). PMT is a structured approach to developing the knowledge, tools, and skills needed to plan, execute, and control projects effectively (Akhund et al., 2019; Cremers & Houwerzijl, 2021). It covers core areas such as scheduling, budgeting, risk management, team leadership, and the use of project management software (Daor et al., 2020). Training programs draw on standardized frameworks—like those of the Project Management Institute (PMI)—to help participants deliver projects on time, within budget, and to required quality standards (Sharma et al., 2018; Ivic & Ceric, 2023).

In the construction sector, PMT reflects this multidimensional evolution through flexible formats such as in-person workshops, online courses, on-the-job training, and professional certification programs (Daor et al., 2020). As Bitamba and An (2020) note, PMT improves project success by strengthening planning, budgeting, and risk control, ensuring efficient use of resources, and fostering clear communication and leadership. It promotes consistent, standardized practices, supports professional growth through certifications, and equips practitioners to manage complex projects while reducing errors and enhancing overall quality (Zhao et al., 2020).

2.4. Project Management Performance

The concept of Project Management Performance (PMP) in the construction industry originates from the broader development of project management as a formal discipline that emerged in the mid-20th century (Johari & Jha, 2020). PMP measures how effectively a project meets its objectives for scope, time, cost, and quality by assessing the efficiency of planning, execution, and control (Hailu & Tshella, 2024). High performance indicates that a project finishes on schedule, within budget, and to required standards while satisfying stakeholders. Yahaya (2021) adds that PMP captures the extent to which objectives, including scope, time, cost, quality, safety, and stakeholder expectations, are achieved. Unlike outcome-focused evaluations, it emphasizes both the project's process and the manager's competence in navigating constraints from initiation to closure (Usukhbayar & Choi, 2020). PMP also covers communication and stakeholder management, including conflict resolution, collaboration, and satisfaction tracking, all vital for successful delivery in construction settings (Khahro et

al., 2024; Karaman, 2022). Strong project management performance brings clear benefits: timely and cost-effective completion (Pancasila et al., 2020), efficient resource utilization (Kuria & Kimutai, 2020), effective risk control (Mahalingam & Nagarajan, 2018), higher team productivity, and a stronger organizational reputation that supports future opportunities (Ma & Fu, 2020).

2.5. Job Satisfaction and Project Management Performance

A substantial body of research in construction studies adopts the definition of job satisfaction (JS) as proposed by Locke (1976), who describes it as a psychological state reflecting an individual's perception and emotional response to their work. This definition has been widely accepted in the field (Johari & Jha, 2020; Vo et al., 2020; Bhardwaj et al., 2021). JS is often conceptualized as the degree of contentment employees feel about their jobs (Usukhbayar & Choi, 2020), or, as Robbins (2005) articulates, the extent to which individuals express a positive or negative attitude toward their occupations. Research indicates that JS is not an isolated phenomenon; rather, it is shaped by a range of organizational factors, including leadership quality, career development opportunities, and overall working conditions, all of which contribute to the organizational climate (Zhao et al., 2020; Magazi, & Kikwasi, 2022). JS has been found to significantly influence various aspects of construction workers' behaviour, such as motivation, commitment, and performance (Usukhbayar & Choi, 2020). Moreover, JS is strongly associated with employee retention and overall life satisfaction, reinforcing its relevance to successful project execution (Çelik & Oral, 2021; Karaman, 2022).

In construction settings, JS has been linked to several important work outcomes, including project manager productivity, workforce stability, and project management performance. For example, Mustafa et al. (2021) found that JS provides a foundation for achieving project management performance (PMP) by supporting goal attainment, cost control, and adherence to timelines. Similarly, Ni et al. (2022) identified JS as a significant predictor of PMP within China's construction industry, while Bhardwaj et al. (2021) confirmed that timely project delivery is closely tied to employee job satisfaction.

Further research supports these findings. For example, Ma and Fu (2020) identified a strong link between job satisfaction (JS) and project management performance (PMP), while Gębczyńska (2020) highlighted that positive employee attitudes significantly improve project outcomes. Similarly, Osama et al. (2023) emphasized the critical role of JS in influencing construction workers' engagement and effectiveness. Aligning with this, Shi et al. (2023) found that JS directly contributes to the timely and cost-effective

execution of construction projects.

2.6. The Mediating Effect of Project Training

Training is a critical component of human resource management, designed to enhance employee capabilities, ultimately leading to improved productivity and performance (Kuria & Kimutai, 2020). Within the construction industry, project management training (PMT) is recognized as a strong predictor of PMP (Sharma et al., 2018; Daoor et al. 2020). Bitamba and An (2020) emphasize that PMT has a direct link with PMP. In a similar vein, Akhund et al. (2019) assert that improving design management within the construction industry (CI) requires the integration of modern technologies that meet the evolving demands of project managers, particularly during the design phase. Project managers are

Project Management Training (PMT) is expected to mediate the link between Job Satisfaction (JS) and Project Management Performance (PMP) because satisfied employees are more willing to learn and apply new skills (Emmanuel et al., 2020). PMT equips them with essential competencies—such as planning, budgeting, risk control, and quality management—so their motivation translates into measurable project results (Zhao et al., 2020). Grounded in Path–Goal Theory, PMT acts as an “obstacle-removal” mechanism: supervisors clarify goals and provide training that converts positive attitudes into effective task execution (Hutajulu, 2020). Job satisfaction supplies the motivation, while PMT channels that motivation into higher efficiency, stronger coordination, and better project outcomes (Kuria & Kimutai, 2020). Evidence from other sectors shows that

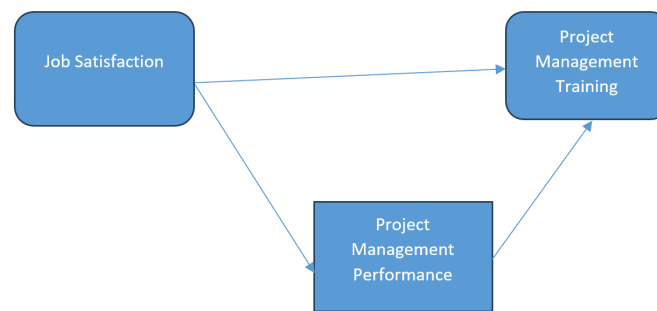


Figure 1: Conceptual Framework for the Study

increasingly supported in implementing innovative tools and practices that institutionalize new work methods within organizational processes (Ma & Fu, 2020; Zhao et al., 2020; Cremers, & Houwerzijl, 2021; Ivic, & Ceric, 2023). Consequently, research indicates that training encompasses a set of strategies aimed at increasing job satisfaction (JS) and improving the performance management of construction workers on-site (Magazi, & Kikwasi, 2022; Bamfo-Agyei, Thwala, & Aigbavboa, 2022). Bejide and Iyagba (2015) further note that training not only enhances JS but also boosts construction worker productivity. PMT fosters a positive workplace attitude by equipping workers with the competencies needed to perform effectively while minimizing exposure to occupational hazards, injuries, or fatalities.

Over the past decade, both JS and PMT have emerged as widely studied and positively correlated factors influencing project success. For example, Bamfo-Agyei, Thwala, and Aigbavboa (2022) found that PMT significantly predicts both JS and project management performance (PMP) in Ghana’s CI. Similarly, research conducted in Thailand by Matthew et al. (2021) highlight PMT as a powerful human resource tool that enhances both JS and PMP.

training often explains how positive job attitudes become performance gains (Bitamba & An, 2020). In short, job satisfaction creates readiness, but PMT provides the practical tools that transform that readiness into superior project performance, making it a logical mediator between JS and PMP (See Figure 1).

2.7. Hypotheses of the Research

Drawing from the examination of existing literature, we formulate four hypotheses:

- H1: JS is significantly associated with PMP.
- H2: JS is significantly associated with PMT.
- H3: PMT is significantly associated with PMP.
- H4: PMT mediates the relationship between JS and PMP.

3. Methodology

3.1. Participants

A non-probabilistic purposive sampling technique was employed to select 250 respondents from Julius Berger and Reynolds Construction Company. Julius Berger Nigeria Plc and Reynolds Construction Company (RCC) were selected not only for their historical presence in Nigeria before independence, but also for their transparency, as two of the few construction firms

listed on the Nigerian Stock Exchange. Both rank among the nation's top contractors in project scale, workforce, and capital, with a record of delivering major infrastructure such as highways, bridges, and airports. Their mature management structures, formal training programs, and robust human-resource policies provide strong conditions for examining how Project Management Training (PMT) mediates the link between Job Satisfaction (JS) and Project Management Performance (PMP). These qualities make them highly representative and data-rich cases for the study. A total of 208 completed structured, self-administered questionnaires consisting of closed-ended questions based on a 5-point Likert scale ranging from Strongly Disagree (SD) to Strongly Agree (SA) were collected and returned to the researchers over a three-month data collection period, from January 9 to April 10, 2023. Among these respondents, 70% identified as male, while 30% identified as female. The average age of the sampled individuals was 45 years. Regarding educational qualifications, 10% held master's degrees, 60% possessed bachelor's degrees or higher national qualifications, and 40% held professional certificates (practicing licence with council). In terms of work experience, 35% of participants had 5-10 years of experience, 45% had 11-20 years, and 20% had over 20 years of experience.

3.2. Measurements

A quantitative study was carried out using a structured questionnaire to test the hypothesis. Job satisfaction (JS), project management training (PMT), and project management performance (PMP) were assessed with validated scales from Ching-Gu et al. (2014), Diethelm et al. (2016), and Zhao et al. (2020). JS was examined through employee surveys covering safety, fair pay, work-life balance, promotion opportunities, and supervisor-coworker relations. PMT was evaluated by participants' reactions, knowledge gains from pre- and post-tests, on-site application of new skills, and outcomes such as fewer safety incidents or less rework. PMP was measured by project timeliness, budget adherence, quality standards, safety records, and stakeholder satisfaction.

The scale items are presented in a phrase format and are anchored to a 5-point Likert scale. To ensure the measurement model was psychometrically sound for Structural Equation Modeling (SEM), internal consistency and construct validity tests were conducted. Eigenvalues of Principal Components and the Percentage of Variance explained establish that the items cluster meaningfully and capture sufficient variance, supporting factor retention. The Kaiser-Meyer-Olkin (KMO) measure assesses sampling adequacy and verifies that correlations among variables are strong enough for factor analysis, a prerequisite for SEM. Finally, the Cronbach's alpha coefficient evaluates the internal consistency of each construct, confirming that the observed indicators reliably

measure the intended latent variables. Collectively, these tests demonstrate that the data meet the reliability and validity requirements for robust SEM analysis (Hair et al., 2022) (See Table 1 in Appendix 1).

From Table 1, The reliability and validity analysis confirm that the research instrument is both statistically sound and theoretically robust. All three constructs— Job Satisfaction ($\alpha = 0.872$), Project Management Training ($\alpha = 0.869$), and Project Performance Management ($\alpha = 0.867$), demonstrate high internal consistency. KMO values above 0.80 indicate sampling adequacy, and eigenvalues above 1 with over 79% variance explained confirm the unidimensionality of each scale. These results validate the questionnaire as a reliable tool for measuring the targeted constructs and support its use in further statistical analyses such as regression or SEM.

3.3. Data Analysis

The collected data were analyzed using Path Analysis within a Structural Equation Modelling (PA-SEM) framework to evaluate the hypothesized relationships among the study variables. The specified model paths were tested, and the findings were reported according to the statistical significance and magnitude of the observed relationships. The data were first screened for missing values, normality, and measurement reliability and validity using factor analysis and internal consistency tests. After confirming data quality, Path Analysis within a Structural Equation Modeling (SEM) framework was conducted to test the hypothesized relationships (Hair et al., 2022). Model fit was evaluated with standard SEM indices, and the path coefficients were estimated to assess the strength and statistical significance of each relationship.

3.4. Ethical Considerations

The study followed key research ethics to protect participants and maintain integrity. Respondents gave informed consent and participated voluntarily. Their identities remained anonymous, with all data securely stored and password protected. The survey posed minimal risk, avoided sensitive content, and allowed withdrawal at any time. Findings were reported honestly, with proper citation to prevent plagiarism. Finally, the research received prior approval from the appropriate institutional ethics committee, ensuring compliance with national and international ethical standards.

4. Results and Discussion

From Table 2, the results of the structural equations model of JS and PMT show that the coefficient of PMT is 0.8334. This indicates that the relationship between JS and PMT is:

$$\text{PMT} = 0.8334 \text{ js} \dots\dots\dots(i)$$

Table 2: Structural Equation Model of JS and PMP (Direct effects)

Path	B	Std. Err.	z-value	P-value	[95% Conf. Interval]	
PMP <- PMT	.3547205	.0654767	5.42	0.000**	.2263885	.4830525
PMP <- JBS	.2506959	.0857081	2.92	0.003**	.0827111	.4186807
PMT <- JBS	.8334266	.0701567	11.88	0.000**	.6959221	.9709311

Note. ** $p < .05$, β = coefficient value, Z = computed z-value

Equation (i) indicates that PMT accounts for 83.34% of the variation in PMP. The computed z statistic is 11.88 with an associated p-value ($p < 0.001$). Thus, the positive relationship between PMT and PMP is statistically significant. The implication is that PMT is a significant predictor of PMP. This study supports earlier findings that highlight project management training (PMT) as a key driver of project management performance (PMP). Kuria and Kimutai (2020) identify PMT as a strong predictor of PMP, while Sharma et al. (2018) report a significant positive association between the two. Likewise, Ma and Fu (2020) confirm that PMT is a major determinant of PMP. Zhao et al. (2020) add that PMT enhances skills in scheduling, budgeting, risk management, procurement, and quality control, critical areas for minimizing errors and delays. Ekung and Adewuyi (2018) emphasize that PMT enables managers to allocate labor, equipment, and materials more efficiently, thereby reducing waste and controlling costs. Similarly, Bamfo-Agyei et al. (2022) find that PMT improves accuracy and responsiveness to changing site conditions.

The results of the structural equations model (*direct effects*) of JS and PMP with PMT as the mediating variable indicate that the coefficients of PMT and JS are 0.3547 and 0.2507 respectively. This indicates that the model of JS and PMP with PMT as the mediating variable is:

$$.PMP = 0.3547 \text{ pmt} + 0.2507 \text{ js}$$

$$\dots \quad (ii)$$

Equation (ii) indicates that PMT and JS explain 35.47% and 25.07% of the variation in PMP respectively.

The calculated z values and the associated significant probabilities for PMT and JS are 5.42 ($p < 0.001$) and 2.92 (0.003) respectively. The findings indicate that both project management training (PMT) and job satisfaction (JS) have positive, statistically significant effects on project management performance (PMP). This aligns with Bamfo-Agyei et al. (2022) and Zhang and Fang (2019), who reported that PMT and JS enhance accuracy, adaptability to changing site conditions, motivation, and commitment, thereby improving PMP. Similarly, Adeleke et al. (2020) showed that PMT and JS exert both joint and independent influences on PMP. Collectively, these studies confirm that strong project management training and high job satisfaction are key drivers of superior project management performance in the construction industry.

Table 3 presents the findings on the mediating role of Project Management Techniques (PMT) in the relationship between Job Satisfaction (JS) and Project Management Performance (PMP). The direct model results indicate a significant and positive relationship between JS and PMP ($\beta = 0.250$; $p = 0.003$). PMT also demonstrates a strong association with PMP ($\beta = 0.354$; $p = 0.000$), indicating that both JS and PMT are significant predictors of PMP. Notably, the inclusion of PMT in the model enhances the effect of JS on PMP, as evidenced by an increase in the beta coefficient from 0.250 to 0.295 and a rise in the Z-value from 2.92 to 4.93. This provides empirical support for PMT's role as a mediating variable. The bootstrapping analysis ($0.354 * 0.833 = 0.29488$) further confirms the mediating effect of PMT. According to Baron and Kenny's (1986)

Table 3: Mediating Effect of PMT on JS and PMP

Path	Estimate	Std. Err.	z-value	P-value	Hypothesis	Remark
Direct Model						
PMP <- JS	.2506959	.0857081	2.92	0.003**	H ₁	Confirmed
PMT <- JS	.8334266	.0701567	11.88	0.000**	H ₂	Confirmed
PMP <- PMT	.3547205	.0654767	5.42	0.000**	H ₃	Confirmed
Indirect Model						
PMP <- PMT<- JBS	.2956335	.0599767	4.93	0.000**	H ₄	Partially Confirmed

Note. ** $p < .05$

mediation framework, partial mediation is established when both the independent variable (JS) and the mediator (PMT) significantly predict the dependent variable (PMP). The findings suggest that PMT partially mediates the relationship between JS and PMP.

The practical implication is that when construction workers are equipped with a broad range of project management skills and tools, especially those suited for managing fast-paced and complex projects, their attitude toward project performance improves. PMT enhances professionals' capabilities by providing up-to-date tools, techniques, and knowledge, which in turn increases job satisfaction. This elevated job satisfaction

in an equation or system jointly satisfy theoretical restrictions, thereby confirming the significance and validity of the estimated relationships. From Table 4, the equation-level goodness of fit test shows that the fitted and predicted variance in PMT is 0.48781 and 0.16922, resulting in a computed R-square value of 0.3564. This value indicates that thirty-four point-thirty-six per cent (35.64%) of the variation in the dependent variable in this particular model (PMT) is accounted for by variations in the explanatory variables (PJ and PMP). The correlation between the observed and predicted values is moderate, and the Bentler-Raykov reliability measure confirms these figures. Overall, the model provides a fair but not strong fit, indicating that other factors outside the model still

Table 4: Equation-level goodness of fit

Depvars	Variance		Residual	R-squared	Mc	mc2
	fitted	predicted				
Observed						
PMT	.4878219	.1692228	.332008	.356444	.59991	.352133
PMP	.5690409	.1693097	.380211	.318621	.56093	.319538
Overall	.350086					

mc = correlation between depvar and its prediction

mc2 = mc² is the Bentler-Raykov squared multiple correlation coefficient

leads to improved project performance, contributing to organizational success. Consequently, training construction workers in advanced project management techniques and simultaneously fostering job satisfaction can significantly enhance the industry's ability to meet the Sustainable Development Goals (SDGs) by 2030. These efforts will support the revitalization and development of inclusive cities and communities, promoting equitable opportunities for all. This study is consistent with the findings of Bamfo-Agyei et al. (2022), who reported that Project Management Techniques (PMT) significantly predict both Job Satisfaction (JS) and Project Management Performance (PMP). Likewise, a study by Matthew et

account for a substantial share of the outcomes.

The results of Wald's test (Table 5) show that the computed Chi-square and associated significant probabilities are 143.88 ($p < 0.01$) and 148.12 ($p < 0.01$) for PMT and PMP. The null hypothesis for Wald's test is that the coefficients, other than the intercepts, are 0. Thus, the Wald test results show that the predictors in each equation jointly have a strong and significant effect. For both project management training and project management performance, the very low p-values (less than 0.001) mean the variables included in the model explain the outcomes much better than a model with no predictors.

Table 5: Wald tests for equations

	chi2	Df	P
Observed			
PMT	143.88	2	0.0000
PMP	148.12	1	0.0000

al. (2021) in Thailand identified PMT as an effective human resource tool that enhances both JS and PMP.

Two goodness-of-fit tests were employed: the equation-level goodness-of-fit test and the Wald test for equations. The model-fit approach evaluates how well the overall model represents the data, while the equation-level test examines the extent to which each individual equation explains its dependent variable. The Wald test further assesses whether the coefficients

4.1. Discussion of Findings

The findings from the structural equation modeling (SEM) provide strong empirical evidence supporting the relationships among Job Satisfaction (JS), Project Management Techniques (PMT), and Project Management Performance (PMP).

4.1.1. Relationship between JS and PMT

From Table 2, the coefficient of 0.8334 indicates a strong and positive relationship between JS and PMT.

This suggests that improvements in job satisfaction significantly enhance the application and use of project management techniques among construction professionals. The high z-value (11.88) and the highly significant p-value ($p < 0.001$) confirm the robustness of this relationship. This suggests that job satisfaction is a key catalyst for the uptake of project management training (PMT). It supports Zhang and Fang (2019), who found that higher job satisfaction among project managers fosters stronger team cohesion and improved project outcomes. Likewise, Adeleke et al. (2020) reported a positive correlation between job satisfaction and construction project performance, driven by greater motivation and commitment. Kuria and Kimutai (2020) further identified job satisfaction as a major determinant of project management performance (PMP), while Sharma et al. (2018) confirmed a significant association between job satisfaction and PMP.

4.1.2. Direct Effects on PMP

Equation (ii) reveals that both PMT and JS have positive and statistically significant effects on PMP, with coefficients of 0.3547 and 0.2507, respectively. The corresponding z-values (5.42 and 2.92) and p-values (< 0.001 and 0.003) reinforce the strength and significance of these relationships. These results highlight that both technical competence (via PMT) and employee well-being (via JS) are crucial in driving project performance. This study aligns with Bamfo-Agyei et al. (2022), who found that project management training (PMT) is a significant predictor of both job satisfaction (JS) and project management performance (PMP). Similarly, Matthew et al. (2021) reported from a Thai context that PMT serves as an effective human resource strategy for improving both JS and PMP.

4.1.3. Mediating Role of PMT

Table 3 confirms the mediating role of PMT in the JS–PMP relationship. The inclusion of PMT in the model not only strengthens the predictive power of JS on PMP (as seen in the beta increase from 0.250 to 0.295 and Z-value from 2.92 to 4.93) but also aligns with Baron and Kenny's (1986) mediation framework. The bootstrapping analysis ($0.354 * 0.833 = 0.29488$) supports partial mediation, meaning that while JS directly affects PMP, part of its impact is transmitted through PMT. This study reinforces prior research by Bamfo-Agyei et al. (2022) and Matthew et al. (2021), both of which found PMT to be a vital determinant of JS and PMP. These consistent findings highlight the strategic value of PMT as both a technical and human resource development tool.

This finding suggests that human resource managers should view project management training (PMT) as a key strategic tool. Expanding and strengthening training programs magnifies the positive effect of job satisfaction on project performance, enabling

motivated employees to deliver higher results. Incorporating PMT into talent-development plans and monitoring its outcomes can build both workforce capability and organizational success. Moreover, improving project results requires more than boosting morale. Well-targeted PMT closes critical skill gaps, prepares employees for complex project demands, and enhances engagement, an urgent priority amid labour shortages and limited experienced personnel. The study therefore urges managers and policymakers to combine robust training initiatives with efforts to increase job satisfaction, ensuring a skilled and motivated workforce that can sustain strong performance in the construction sector.

5. Conclusion

This study examined how project management training (PMT) shapes the link between job satisfaction (JS) and project management performance (PMP) in Nigeria's construction sector. Using structural equation modeling with data from 208 industry professionals, it tested both direct and mediating effects. Results show that JS significantly boosts PMP, confirming earlier research. PMT also exerts a strong positive impact on PMP and partially mediates the JS–PMP relationship, indicating that training strengthens—but does not replace—the influence of job satisfaction on performance. The findings highlight that enhancing project outcomes requires more than improving employee morale. Targeted PMT equips workers to manage complex project demands, raises engagement, and improves overall performance. By providing evidence from an underexplored context, the study advances behavioral science literature and guides managers and policymakers: combining robust project management training with strategies to increase job satisfaction is essential for improving construction project delivery and supporting sustainable development goals.

5.1. Theoretical implications

Theoretical implications of this study are grounded in the Path-Goal Theory, originally proposed by Martin Evans in 1970. This study extends the application of Path-Goal Theory in the context of construction project management by highlighting how project supervisors can effectively motivate construction workers to meet project goals. The study reinforces the theoretical understanding that a supervisor's ability to recognize and address worker needs, utilize a diverse set of skills and tools, and align leadership behaviors with task demands is essential for achieving successful project outcomes. This study contributes to Path-Goal Theory by emphasizing the significant role of Project Management Training (PMT) as a motivational tool, which enhances Project Management Performance (PMP). By integrating PMT into the framework, the study supports the idea that providing construction workers with relevant skills, tools, and methodologies is central to improving performance and achieving

project objectives. The findings suggest that PMT is not only a means of enhancing technical abilities but also a driver of job satisfaction, as it fosters greater engagement, confidence, and competency among workers. Furthermore, the study affirms that the behaviors of project supervisors, such as consistent communication, shared decision-making, and confidence in workers' capabilities, align with the Path-Goal Theory's assertions about leadership's impact on employee satisfaction and performance. The findings strengthen the theory's premise that effective leadership and supportive training environments are critical for promoting positive worker attitudes and performance outcomes.

This study expands on the theoretical literature by illustrating how PMT mediates the relationship between Job Satisfaction (JS) and PMP. The results suggest that PMT not only influences PMP directly but also enhances the influence of JS on PMP, reinforcing the importance of comprehensive, integrated approaches to project management in the construction sector. In summary, the application of Path-Goal Theory in this study provides valuable insights into the link between leadership, training, job satisfaction, and project performance, offering a deeper theoretical understanding of how these elements interact to achieve successful project outcomes.

5.2. Practical Implications

This study presents important practical implications for the construction industry, employees, and policymakers. For the construction industry, the findings identify Project Management Training (PMT) as a critical driver of Project Management Performance (PMP). Given that PMT accounts for a substantial proportion of the variation in PMP, construction firms should prioritize ongoing training and capacity building in modern project management techniques. Such investments not only enhance the technical proficiency of workers but also lead to more efficient project execution, reduced delays, and improved organizational outcomes. Since both PMT and Job Satisfaction (JS) significantly influence PMP, companies are encouraged to adopt a comprehensive human resource strategy that combines technical

training with measures to improve workplace conditions and employee morale.

For employees, the study emphasizes the value of continuous learning and professional development. Increased access to training opportunities not only enhances technical skills but also contributes to greater job satisfaction and performance. Employees who are well-trained in current project management tools and methodologies are better equipped to navigate the complexities of modern construction projects, thereby strengthening their career trajectories and boosting their professional confidence. The positive interaction between JS and PMP suggests that satisfied and capable employees are more likely to thrive and receive recognition for their contributions.

For policymakers, the results support the development of policies that promote or require training and certification in project management within the construction sector. Incorporating PMT into national workforce development strategies can play a vital role in achieving long-term economic and infrastructure goals, including the Sustainable Development Goals (SDGs). By encouraging collaboration among government agencies, academic institutions, and industry stakeholders, policymakers can help mainstream project management training and ensure that the construction workforce is equipped to support sustainable, inclusive urban development.

5.3. Limitations and future research

This study is limited by its cross-sectional design, which restricts causal inference, and by data drawn from a single national context and a relatively small sample of construction professionals. Future research could adopt longitudinal or multi-country designs, include other sectors with similar HR challenges, and explore additional variables, such as technological adoption, leadership style, or organizational culture, that may strengthen or weaken the PMT–job satisfaction–performance–performance link. Such work would provide deeper insight into how targeted training and employee satisfaction interact to sustain high performance in diverse environments.

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Appendix 1**Table 1: Results of the Reliability of the Research Instrument Measurement**

Variable		Cronbach's alpha	KMO	Eigenvalue of the principal Component	% of the Variance
JBS Scale-Cronbach Alpha (JBS = 0.872)			0.827	3.025	79.59%
JBSQ 1	Praise for work in the field is encouraging.	0.832			
JBSQ 2	I am comfortable and productive working alone on construction sites.	0.831			
JBSQ3	I appreciate the respectful and supportive work environment created by the project manager.	0.789			
JBSQ 4	My project manager has excellent decision-making authority	0.814			
JBSQ 5	Satisfied with the implementation of the organization's policies	0.822			
JBSQ6	I am happy with the opportunity to try my method in the field.	0.838			
PTR Scale - Cronbach Alpha – (GTR= 0.869)			0.841	3.087	81.17%
PTRQ1	In my organization, we conduct annual managerial project training sessions.	0.816			
PTRQ2	We consistently assess the demand for project managerial training and communicate this to our construction workers	0.823			
PTRQ3	We are continually seeking to enhance our project management knowledge.	0.806			
PTRQ 4	We frequently arrange seminars and workshops on project managerial training for our construction workers.	0.820			
PTRQ 5	We consistently evaluate the performance of our managerial training programs.	0.794			
PTRQ 6	We regularly offer training courses to raise awareness of project performance among our construction workers.	0.807			
PPM Scale- Cronbach Alpha – (PPM = 0.867)			0.832	3.083	84.46%
PPMQ 1	With the full support of our staff, the project is always completed on time	0.824			
PPMQ2	The diversity of skills in each worker category leaves room to meet budgetary requirements.	0.789			
PPMQ3	Involving employees in task completion helps organizations meet project expectations.	0.822			
PPMQ 4	The value of work in terms of company performance has led to increased revenue.	0.798			