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The Reward System and Employee Productivity in Nigeria's Transport and Logistics Regulatory Bodies: A Catalyst for Green Logistics and Sustainable Performance

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Abstract

Employee dissatisfaction within Nigeria's transport and logistics regulatory bodies continues to undermine productivity, hinder green logistics initiatives, and constrain sustainable performance due to persistent gaps in policy implementation and organizational practices. This study investigates the role of reward systems as a strategic driver of employee productivity, positioning it as a key catalyst for promoting green logistics adoption and overall sustainability in these agencies. Employing purposive sampling across 10 major regulatory bodies, the survey received responses from 2,899 staff members. However, only 2,836 responses were deemed valid and were subsequently considered for the analysis. Data analysis combined descriptive statistics including means, percentages, and standard deviations with econometric techniques such as Pearson correlation and multiple and logistic regression models. The findings indicate that reward systems ($\beta = 0.609$, $p<0.05$) have a significant positive effect on employee productivity. Moreover, the work environment was found to moderate this relationship, further enhancing sustainable performance outcomes. Based on these results, the study emphasizes the importance of structured and optimized reward programs that recognize outstanding contributions, urging government agencies to implement them to improve productivity, foster green logistics practices, and ensure long-term sustainability within Nigeria's transport regulatory framework.

KEYWORDS

reward systems, employee productivity, green logistics, transport regulation, sustainable development goals.

Introduction

Despite extensive research on organizational performance, regulatory bodies involved in green logistics continue to experience persistent gaps between expected and actual performance outcomes (Rabiu et al., 2024; Yandi & Havidz, 2022; Zurifa et al., 2023). While employee productivity is widely acknowledged as a critical driver of organizational success, limited empirical evidence explains how workplace conditions influence specific productivity dimensions within regulatory institutions responsible for compliance and monitoring. This study addresses this gap by empirically examining the effect of the work environment on multiple employee productivity outcomes in green logistics regulatory bodies.

Nigeria's transport and logistics regulatory agencies are tasked with enforcing quality standards and compliance across the logistics ecosystem (Eruaga, 2024). Employee diligence is essential to this mandate; however, compromised performance has undermined regulatory effectiveness, hindering green logistics adoption and sustainable transport transformation.

Employee job satisfaction, particularly through robust reward systems, is crucial for building productive workplaces that drive motivation and green innovation. This directly supports UN SDG 8 (Decent Work and Economic Growth by 2030) and SDG 13 (Climate Action), promoting equitable economic growth, productive employment, fair compensation, job security, and career development opportunities and environmental concern essential for sustainable logistics performance. Reward systems as a catalyst for green logistics and sustainable performance comprising compensation structures and recognition mechanisms are particularly influential in Nigeria, where they significantly shape employee satisfaction and productivity (Rifai & Susanti, 2021; Subramanyam & Donthu, 2022). Yet, empirical research on the reward system-productivity nexus within Nigerian transport regulatory agencies remains limited, with unclear relationships between these variables.

Organizations worldwide, spanning both private enterprises and public sector institutions, rely heavily on their workforce to achieve optimal productivity, operational efficiency, and sustainable performance. In recent years, this dependence has increasingly extended beyond conventional performance outcomes to include environmental responsibility, thereby reinforcing the relevance of green logistics practices within organizational operations. Consequently, fostering employee job satisfaction has become a critical imperative, as satisfied employees are more likely to support productivity goals while aligning with sustainability and environmentally responsible logistics practices.

Empirical studies provide evidence of the link between reward systems, job satisfaction, and employee performance. For instance, Alkandi et al. (2023) examined the influence of incentive and reward systems on employee performance across Saudi Arabia's primary, secondary, and tertiary industrial sectors, identifying employee job satisfaction as a key mediating variable. Similarly, Aini et al. (2022) investigated the effects of training and compensation on employee performance among micro, small, and medium enterprises (MSMEs) in South Tangerang, with job satisfaction serving as an intervening variable. Ratri & Wahjudono (2021) analyzed the roles of employee demographics, work stress, and rewards in shaping job satisfaction and employee performance. Tarigan et al. (2022) explored the relationships among total reward systems, job satisfaction, employee productivity, and organizational financial performance, focusing on Generation Z workers in Indonesia, while Yusuf (2021) examined the effects of intrinsic and extrinsic motivation on employee performance with job satisfaction as a mediating variable at PT Alwi Assegaf Palembang.

Despite these scholarly contributions, several gaps remain. A clear geographical gap exists, as none of the reviewed studies examined transport and logistics regulatory bodies in Nigeria, particularly in relation to how employee job satisfaction, driven by reward systems, influences employee job performance and the adoption of green logistics practices. A conceptual gap is also evident, as most studies focused primarily on direct relationships between independent and dependent variables, with limited attention to mediating mechanisms. Moreover, none of the studies incorporated the work environment as a control variable, employed employee job productivity as a performance indicator, or explicitly positioned reward systems as a catalyst for green logistics adoption and sustainable organizational performance. Additionally, a methodological gap was identified, given that most prior studies relied on Partial Least Squares Structural Equation Modeling (PLS-SEM) for data analysis.

To address these gaps, the present study adopts a comprehensive methodological approach that integrates descriptive and inferential statistical techniques with econometric analysis. Specifically, descriptive statistics, Karl Pearson's Product Moment Correlation Coefficient, and logistic regression analysis using STATA version 14.0 are employed. Demographic characteristics are analyzed using descriptive statistics, while Pearson correlation analysis is applied to assess the strength and direction of relationships among predictor variables, control variables, and outcome measures. This methodological framework is considered robust and well-suited to examining the nexus between reward systems, employee job satisfaction, productivity, and the promotion of green logistics and sustainable performance within Nigeria's transport and logistics regulatory institutions.

This study examines the relationship between employee job satisfaction (proxied by reward systems) and productivity in Nigeria's transport and logistics regulatory bodies, with the work environment serving as a moderating factor, and positions reward optimization as a catalyst for green logistics and sustainable performance. In line with this, the study tests whether the work environment moderates the effect of reward systems on employee productivity. Addressing this gap, the study pursues two primary objectives:

i. determine the impact of reward system on employees' performance in selected Nigerian federal transport and logistics regulatory agencies.
ii. examine the moderating role of the work environment in the relationship between job satisfaction and employee performance in selected Nigerian federal transport and logistics regulatory agencies.

Literature Review

Employee Job Satisfaction

Employee job satisfaction has been extensively examined in the literature, with scholars offering varying interpretations of the concept. Sadiq et al. (2020) describe it as the feelings individuals have toward their jobs, while Eruaga (2024) explains it as an employee's overall attitude toward the job or specific aspects of it. Similarly, Yandi & Havidz (2022) view job satisfaction as an affective response arising from the interaction between employees' characteristics, values, and expectations and the work environment. Rabiu et al. (2024) further define employee job satisfaction as a positive emotional state resulting from an individual's evaluation of job experiences, based on the comparison between expected and actual job outcomes.

Within the context of green logistics, employee job satisfaction is particularly critical, as regulatory and logistics personnel are required to implement environmentally sustainable practices while adhering to strict compliance standards. The successful execution of green logistics policies depends heavily on employees' motivation, commitment, and willingness to align their behaviors with sustainability objectives. Empirical evidence suggests that satisfied employees are more likely to demonstrate higher productivity, compliance, and proactive engagement in environmentally responsible practices, whereas dissatisfaction may hinder the effective implementation of green logistics initiatives.

Reward System

Aini et al. (2022) and Alkandi et al. (2023) define a reward system as the total package of monetary incentives and fringe benefits provided to employees, collectively constituting an individual's overall compensation. Similarly, Alrazehi et al. (2021) conceptualize reward systems as a comprehensive mix of financial and non-financial rewards offered to employees in exchange for services rendered to the organization.

In the context of green logistics and regulatory bodies, reward systems play a critical role in motivating employees responsible for enforcing environmental standards, monitoring compliance, and implementing sustainability-oriented logistics

policies. Such reward structures typically include direct monetary compensation, allowances, recognition, and career advancement opportunities designed to encourage adherence to green regulations and performance efficiency. Compensation refers to the remuneration, wages, or salaries provided to individuals or groups in return for services rendered, tasks completed, or contributions toward achieving organizational and environmental sustainability objectives (Sidabutar et al., 2020).

Employee productivity

Employee productivity refers to the extent to which an employee successfully completes the tasks associated with their job (Tarigan et al., 2022). Consistent with the Business Dictionary (2020), it can be defined as the level of accomplishment of assigned duties evaluated against predetermined standards such as accuracy, completeness, cost efficiency, and timeliness. In regulatory bodies overseeing green logistics, managers must ensure that employee activities and outputs align with organizational and environmental objectives, which includes effective task design, performance monitoring, and constructive feedback to boost morale and ensure compliance with sustainability standards (Rabiu et al., 2024).

Employee productivity in these contexts encompasses output quantity, quality, timeliness, attendance, workplace morale, work efficiency, and effectiveness, serving as a benchmark for evaluating task execution (Rabiu et al., 2024). High productivity among staff responsible for enforcing green logistics policies often leads to recognition, financial rewards, and other benefits, motivating employees to maintain compliance and promote sustainable practices. Moreover, in regulatory organizations, strong individual performance is linked to career advancement and enhanced professional prospects, providing further incentives for employees to meet both organizational and environmental objectives (Syarifin & Atmaja, 2023).

Green Logistics

Logistics is traditionally viewed as a set of activities aimed at minimizing costs and maximizing profits. Historically, the term was largely confined to business operations and financial reporting. However, over time, logistics has increasingly been associated with environmental considerations through the emergence of the concept of green logistics. Unlike traditional logistics, green logistics extends beyond cost considerations to address environmental and societal impacts, even though these aspects may not be directly reflected in financial reports (Ren et al., 2020).

Kumar (2015) defines green logistics as supply chain management practices and strategies that aim to reduce the environmental and energy footprint of freight distribution, with particular emphasis on material handling, waste management, packaging, and transportation. Similarly, Rodrigue et al. (2017) describe green logistics as encompassing all activities related to the eco-efficient management of both forward and reverse flows of products and information between the point of origin and the point of consumption, with the objective of meeting or exceeding customer demand. Blanco & Sheffi (2024) conceptualize green logistics within the framework of green supply chain management, describing it as organizational activities that incorporate environmental concerns into supply chain management to improve the environmental performance of both suppliers and customers. In addition, Seroka-Stolka & Ociepa-Kubicka (2019) note that green logistics activities involve assessing the environmental impacts of various distribution strategies, reducing energy consumption in logistics operations, minimizing waste, and managing its treatment. From a sustainable development perspective, Nikseresht et al. (2024) define green logistics as the production and distribution of goods in a sustainable manner that takes into account environmental and social considerations.

Work Environment

The workplace environment encompasses the totality of interactions between employees and the conditions under which they carry out their work (Adeyanju, 2022). Arisaq et al. (2023) explain that this environment includes not only the physical workspace and its immediate surroundings, but also behavioral practices, organizational policies and rules, culture, available resources, working relationships, and work location, all of which shape how employees perform their duties. As work environments continue to evolve, commercial banks are presented with both new opportunities and numerous challenges. In the transport and logistics sector, one of the key competitive challenges lies in effectively managing and integrating both the physical and psychosocial aspects of the work environment (Rabiu et al., 2024). A well-balanced workplace environment contributes to improved organizational profitability and enhances an organization's reputation as an employer of choice, thereby positioning it as a modern corporate entity capable of attracting high-quality talent.

Theoretical Underpinning

This study is grounded in Herzberg's Two-Factor Theory to analyze how employee job satisfaction proxied by reward systems affects productivity in Nigeria's transport and logistics regulatory bodies, positioning reward optimization as a catalyst for green logistics and sustainable performance. This theoretical lens illuminates how both financial and non-financial rewards drive superior workplace outcomes. Herzberg's seminal research, based on interviews with 203 engineers and accountants, identified distinct factors influencing job satisfaction versus dissatisfaction. Hygiene factors such as compensation, job security, supervision quality, company policies, interpersonal relations, and organizational culture prevent dissatisfaction but do not generate motivation when present.

Conversely, motivator factors including achievement, recognition, promotion opportunities, open communication, career advancement, and personal growth actively foster job satisfaction. Their absence may not cause dissatisfaction but eliminates opportunities for intrinsic motivation. For optimal management, Herzberg's framework advocates a dual approach: eliminating hygiene deficiencies while emphasizing motivators to make work inherently rewarding. This theory robustly supports the efficacy of non-monetary rewards alongside financial incentives, providing a strong theoretical foundation for enhancing employee productivity and sustainable performance in regulatory contexts.

Methods

This study adopts a survey research design rooted in positivist principles, emphasizing quantitative analysis. The positivist principle is used in research because it emphasizes objectivity, measurement, and observable facts, helping researchers produce reliable and unbiased findings. It assumes that reality can be measured and understood through systematic observation and data collection, often using quantitative methods. The accessible population comprised 17,082 employees from 10 key Nigerian transport and logistics regulatory agencies (e.g., Nigerian Shippers' Council, National Automotive Design and Development Council, Nigerian Institute of Transport Technology), Purposive sampling targeted mid-to senior-level staff with direct involvement in policy, operations, or green logistics initiatives, prioritizing expertise

Table 1. FlowChart Summary

Stage	Number
Population	17,082
Target Sample (Yamane)	2,899
Responses Received	2,899
Exclusions	-63
Final Analyzed	2,836

Table 2. Result of Least Square Regression of Reward system as a catalyst for green logistics and sustainable performance and Job Productivity in Nigeria Transport and logistics regulatory bodies

Variables	Employee Job Productivity	
	1	2
Reward system	0.646*** (0.035)	0.609*** (0.036)
Gender: Male		-0.036*** (0.010)
Age: 30–40 years		0.078*** (0.016)
Above 40 years		0.058*** (0.018)
Education qualification: B.Sc.		0.016* (0.008)
Working experience: 1–5 years		0.018 (0.034)
Above 5 years		0.013 (0.035)
Constant	1.696*** (0.167)	1.808*** (0.175)
Adj. R-squared	0.551	0.563
Fishers Test	350.62	141.58
Probability (Fisher Test)	0.000	0.000
Observations	2,836	2,836

Note: Standard errors (robust) are reported in parentheses; *, **, *** signify significance levels of 10%, 5%, and 1% respectively.
Source: Author's computation from Field Survey (2023).

regulatory frameworks and technology transfer. Taro Yamane's (1967) formula for finite populations was used only to estimate the target sample size, yielding an estimated sample of approximately 2,899 respondents at a 5% margin of error and 95% confidence level. where: n = $\frac{N}{1+ N (e)2}$ where N = 17,082 (total staff) and e = 0.05 (5% margin of error at 95% confidence), giving an estimated sample size of approximately n ≈ 2,899.

After determining this target, purposive sampling was employed to select eligible respondents from within the population, focusing on mid- to senior-level staff directly involved in policy, operations, or green logistics initiatives, and those with demonstrated expertise in regulatory frameworks and technology transfer. This approach ensured that the final sample, while non-probabilistic, was composed of information-rich cases relevant to the study objectives.

Questionnaires were distributed online (via Google Forms) and in-person across agencies from June to October 2025, achieving 2,899 responses (100% of target). Post-collection data cleaning excluded 63 cases (2.18%): 39 incomplete responses (>20% missing data), 15 univariate/multivariate outliers (Mahalanobis distance > critical χ^2 at $p<0.001$), and 9 unengaged responses (straight-lining across >80% items). This resulted in 2,836 valid observations for analysis (response rate: 100% of target; effective rate from population: $\frac{2,836}{17,082} \approx$ 16.6%), sufficient for robust multivariate modeling (e.g., >10:1 cases per variable) (see Table 1).

Primary data collection utilized structured questionnaires to comprehensively capture required information. Respondents rated items on a five-point Likert scale: 1 (Strongly Disagree), 2 (Disagree), 3 (Neutral), 4 (Agree), 5 (Strongly Agree), facilitating robust statistical analysis.

In order to ensure the validity of the measurement instrument for this study, the questionnaire was administered on a pilot basis in the last Quarter of 2025 to selected employees in the study population and validated through the judgments of experts in the field of business. The reliability of a measure concerns its ability to produce consistent results when repeatedly administered under identical conditions. The internal consistency or reliability of the instrument for this research was determined by means of Cronbach's Alpha, using the Statistical Package for Social Sciences (SPSS) and the outcomes confirms a high level of reliability. The measurement scales' is computed Cronbach's Alpha (α) results which indicate that all the variables and the measurement scales are reliable since they are above 0.6 threshold which is the recommended coefficient for a given research instrument.

Empirical models from Bhatti & Qureshi (2007), Balouch & Hassan (2014), Inuwa (2016), Alromaihi et al. (2017), and Razak et al. (2018) were adapted to investigate reward system effects on productivity in Nigerian transport regulatory bodies.

Data Analysis

Impact of Reward System as a catalyst for green logistics and sustainable performance on Employee Job Productivity of Transport and logistics regulatory bodies in Nigeria

The average job productivity for male employees is lower (-0.039) compared to female employees. The results indicated that female employees had the highest average job productivity in comparison to their male counterparts. The calculated coefficient of gender in the empirical model was statistically significant at a 5% level of significance (see Table 2). The study focused on evaluating the performance of employees with a bachelor's degree in terms of their educational qualifications. The criterion employed for this attribute is employees possessing certifications above a bachelor's degree. When comparing the average job productivity of employees to a benchmark of 1.808, employees with bachelor's degrees have shown an increase in mean job productivity of approximately 0.016. The parameter is determined to be statistically significant at a significance level of 10%. This implies that those with a bachelor's degree exhibit greater employment productivity compared to those with degrees beyond a Bachelor of Science. The age groups of employees, specifically those between 30-40 years and those above 40 years, exhibit statistically significant disparities at a conventional level. Consequently, individuals aged 30-40 and above 40 exhibit higher levels of job productivity compared to those under 30 years old. The findings indicate that there is no significant statistical disparity between the level of work experience and job productivity of employees in the Transport and logistics regulatory bodies in Nigeria.

In addition, the statistical significance of the predicted coefficients for the models was confirmed using the Fisher's test, with a significance level of 5%. This suggests that the reward system has a substantial influence on the job productivity of employees in the Transport and logistics regulatory bodies in Nigeria. Furthermore, the models demonstrate a moderate level of explanatory ability, as

Table 3. Logistic Regression Result of reward system as a catalyst for green logistics and sustainable performance and Job Productivity Measures in Nigeria Transport and logistics regulatory bodies

Variables	Dependent Variable: Job Productivity Measures				
	Organizational strategic goal	Employees adhere to instruction	Task completion	Quality of results	Work organization
	1	2	3	4	5
Reward system	1.989***	2.226***	2.195***	2.097***	2.610***
	(0.237)	(0.260)	(0.273)	(0.219)	(0.278)
Gender: Male	0.512	0.538	-0.090	0.356	0.543
	(0.453)	(0.438)	(0.349)	(0.328)	(0.391)
Age: 30–40 years	0.141	2.494***	0.697	1.329**	0.362
	(0.708)	(0.704)	(0.527)	(0.526)	(0.435)
Above 40 years	-0.082	1.328*	0.019	1.161*	-0.588
	(0.794)	(0.714)	(0.535)	(0.694)	(0.497)
Education qualification: B.Sc.	1.204*	0.897	0.593	0.230	-0.548
	(0.656)	(0.619)	(0.437)	(0.354)	(0.414)
Working experience: 1–5 years	0.728	1.091**	0.638	0.525	1.688***
	(0.644)	(0.544)	(0.564)	(0.512)	(0.642)
Above 5 years	0.901	0.194	0.232	-0.455	1.054**
	(0.804)	(0.687)	(0.605)	(0.664)	(0.531)
Constant	-5.483***	-7.258***	-6.419***	-6.329***	-8.353***
	(1.115)	(1.245)	(1.241)	(1.041)	(1.268)
Wald Chi-Square	93.63***	95.99***	105.20***	124.29***	132.48***
Pseudo R^2	0.283	0.395	0.322	0.273	0.419
Log likelihood	-119.28	-111.37	-175.88	-197.18	-136.61
Observations	2,836	2,836	2,836	2,836	2,836

Note: Standard errors (robust) are reported in parentheses; *, **, *** signify significance levels of 10%, 5%, and 1% respectively.
Source: Author's computation from Field Survey (2023).

Table 4. Regression Result of the Relationship between Work Environment and Employee Productivity of Transport and logistics regulatory bodies in Nigeria

Variables	Dependent Variables					
	Employee Job Productivity	Organizational strategic goal	Employees adhere to instruction	Task completion	Quality of results	Work organization
Work environment	0.790***	2.959***	2.620***	3.364***	2.661***	3.133***
	(0.038)	(0.435)	(0.357)	(0.400)	(0.345)	(0.384)
Gender:						
Male	-0.023***	0.352	0.390	-0.303	0.190	0.265
	(0.008)	(0.471)	(0.407)	(0.355)	(0.332)	(0.393)
Age:						
30–40 years	0.051***	-0.250	2.124***	0.282	1.101*	0.017
	(0.014)	(0.687)	(0.685)	(0.474)	(0.563)	(0.584)
Above 40 years	0.033*	-0.015	1.352*	-0.129	1.103	-0.777
	(0.018)	(0.850)	(0.780)	(0.555)	(0.721)	(0.646)
Education qualification:						
B.Sc.	0.019***	1.890**	1.481**	0.963*	0.463	-0.287
	(0.007)	(0.947)	(0.682)	(0.503)	(0.391)	(0.432)
Working experience:						
1–5 years	0.022	0.320	0.990*	0.166	0.326	1.477**
	(0.028)	(0.746)	(0.507)	(0.617)	(0.612)	(0.731)
Above 5 years	0.012	0.765	0.234	0.147	-0.468	1.167*
	(0.029)	(0.780)	(0.691)	(0.610)	(0.746)	(0.645)
Constant	0.948***	-9.414***	-9.180***	-11.204***	-8.802***	-10.735***
	(0.181)	(1.719)	(1.475)	(1.586)	(1.508)	(1.678)
Adj. R-squared/ Pseudo R^2	0.693	0.379	0.375	0.418	0.287	0.405
Fishers/Wald Chi-Square tests	156.04***	72.61***	101.81***	93.89***	86.61***	90.37***
Log Likelihood	-	-103.23	-115.06	-151.00	-193.39	-139.97
Observations	2,836	2,836	2,836	2,836	2,836	2,836

Note: Standard errors (robust) are reported in parentheses; *, **, *** signify significance levels of 10%, 5%, and 1% respectively.
Source: Author computation from Field Survey (2023).

Table 5. Regression Result of the impact of Work Environment in moderating the link between Job Satisfaction (IV) and Employee Productivity (DV) of Transport and logistics regulatory bodies Workers in Nigeria

Variables	Reward System
	2
Job Satisfaction Measures	-0.069
	(0.288)
Work Environment	0.256
	(0.302)
Reward system× Work environment	0.077
	(0.064)
Gender:	
Male	-0.003
	(0.008)
Age:	
30–40 years	0.019
	(0.012)
Above 40 years	0.016
	(0.015)
Education qualification:	
B.Sc.	0.009
	(0.006)
Working experience:	
1–5 years	0.008
	(0.026)
Above 5 years	0.004
	(0.027)
Constant	2.098
	(1.327)
Adj. R-squared	0.747
F-Statistics	241.25***
Prob.(F-Statistics)	0.000
Observations	2,836

Note: Standard errors (robust) are reported in parentheses; *, **, *** signify of 10%, 5%, and 1% significance levels.
Source: Author computation from Field Survey (2023).

evidenced by the findings of the Adjusted R-square. The coefficient of determination indicates that the reward system as a catalyst for green logistics and sustainable performance accounted for approximately 56.3% of the overall variation in employee job productivity within the Transport and logistics regulatory bodies in Nigeria.

To ensure the reliability of our empirical findings, Table 3 presents the logistic regression results that examine the impact of the reward system as a catalyst for green logistics and sustainable performance on various aspects of organizational strategic goals, such as employees' adherence to instructions, task completion, quality of results, and work organization within the Nigerian Transport and logistics regulatory bodies. The table presents the coefficients together with their corresponding standard errors in brackets. Additionally, the table indicates the level of statistical significance at 1%, 5%, and 10%. The findings indicate that the incentive system characteristics have a statistically significant impact on the estimated models of employee job productivity indices.

The results from the employee job productivity models demonstrate that the reward system as a catalyst for green logistics and sustainable performance has a beneficial impact on the organization's strategic objectives. It encourages employees to follow instructions, complete tasks, provide high-quality outcomes, and maintain good work organization. This demonstrates that the positive impact of a reward system as a catalyst for green logistics and sustainable performance on employee job productivity arises from the alignment with organizational strategic objectives, employees' adherence to instructions, timely task completion, high-quality outcomes, and effective work organization. The data indicate that increasing the reward system by one unit is associated with a 1.989 rise in organizational strategic aim, a 2.226 increase in employees' adherence to instruction, a 2.195 increase in task completion, a 2.097 increase in the quality of outputs, and a 2.610 increase in work organization. The reward system has a greater impact on task organization, employee compliance with instructions, task completion, the quality of outcomes, and the achievement of organizational strategic goals. The Wald Chi-square values confirm the statistical significance of the estimated coefficients in the empirical models. Meanwhile, the Pseudo R-square values indicate that the reward system, gender, age, education qualification, and work experience have a significant explanatory power in relation to organizational strategic goals, employees' adherence to instructions, task completion, quality of results, and work organization.

Impact of Work Environment in Moderating the Relationship between Job Satisfaction (Reward System) and Employee Job Productivity in Nigeria (Hypothesis II)

This sub-section presents the hypothesis testing result on the impact of the work environment in moderating the relationship between job satisfaction (proxied by reward systems) and employee job productivity in Nigeria's transport and logistics regulatory bodies. The multiple regression results for the moderating role of the work environment are presented in Tables 5 and 6, where an interaction term (Reward system × Work environment) is included to test whether the work environment changes the strength or direction of the effect of reward systems on productivity.

Before interpreting the interaction effects, Table 3 reports the baseline relationship between work environment and employee job productivity without incorporating job satisfaction measures. These results show that, on its own, the work environment has a positive effect on employee job productivity and its indicators (organizational strategic goals, adherence to instructions, task completion, quality of results, and work organization).

Intuitively, work environment acts an ameliorating factor that enhances employee job productivity of Transport and logistics regulatory bodies employees in Nigeria. Thus, a conducive work environment has the potential to significantly enhance the job productivity of Transport and logistics regulatory bodies workers in Nigeria. A well-designed and supportive workplace fosters a positive atmosphere, promoting employee engagement, satisfaction, and overall well-being. Factors such as ergonomic workspaces, adequate facilities, and a positive organizational culture contribute to the overall job satisfaction and morale of Transport and logistics regulatory bodies workers. When employees feel valued, have access to necessary resources, and experience a positive work atmosphere, they are more likely to be motivated and productive in their roles.

The regression results examining the effect of the work environment on multiple dimensions of employee productivity. The findings reveal that the work environment exerts a positive and statistically significant effect across all productivity indicators**.** Specifically, improvements in the work environment significantly enhance overall employee job productivity ($\beta = 0.790$, $p < 0.01$), support the achievement of organizational strategic goals ($\beta = 2.959$, $p < 0.01$), improve employees' adherence to instructions ($\beta = 2.620$, $p < 0.01$), facilitate task completion ($\beta = 3.364$, $p < 0.01$), improve the quality of results ($\beta = 2.661$, $p < 0.01$), and strengthen work organization ($\beta = 3.133$, $p < 0.01$).

Regarding control variables, gender shows a negative and statistically significant relationship with overall employee job productivity, indicating that male employees exhibit slightly

Table 6. Moderation Analysis Results of Work Environment Across Performance Indicators

Performance Indicator	Moderation Effect	Statistical Significance	Interpretation
Organizational Strategic Goals	Negative	Insignificant	Work environment does not enhance reward effects on goal alignment
Instruction Adherence	Positive	Statistically significant ($p < 0.05$)	Strong moderation supports compliance behaviors
Task Completion	Positive	Insignificant at 5% level	Limited moderation role; other factors dominant
Quality of Results	Positive	Significant moderation	Work environment amplifies reward impact on output quality
Work Organization	Positive	Significant at 5% level	Clear moderation improves efficiency structuring

lower productivity compared to the reference category, while its effects on other productivity dimensions are statistically insignificant. Age exhibits mixed effects: employees aged 30–40 years and those above 40 years demonstrate significantly higher adherence to instructions, while older employees also show modest positive effects on overall productivity. Educational qualification (B.Sc.) is positively and significantly associated with overall productivity, strategic goal attainment, adherence to instructions, and task completion, suggesting that higher educational attainment contributes to improved performance outcomes.

Work experience also displays heterogeneous effects across productivity measures. Employees with 1–5 years of experience significantly improve adherence to instructions and work organization, while those with over five years of experience contribute positively to work organization. These findings suggest that experience enhances specific aspects of productivity rather than overall performance uniformly.

The models demonstrate good explanatory power, with adjusted R-squared and pseudo-R-squared values ranging from 0.287 to 0.693. The Fisher and Wald Chi-square statistics are statistically significant across all models, confirming the overall robustness and goodness-of-fit of the estimations.

Table 5 presents the regression results testing the moderating effect of the work environment on the relationship between job satisfaction (proxied by reward systems) and employee productivity among workers in Nigeria's transport and logistics regulatory bodies. The model includes an interaction term (Reward system × Work environment) to assess whether the work environment changes the strength or direction of the relationship between reward systems and productivity.

The coefficient for the Reward system × Work environment interaction term is 0.077 with a robust standard error of 0.064**.** This interaction is not statistically significant at the 10%, 5%, or 1% levels (no asterisks are reported). This indicates that, although the sign is positive, there is no statistically significant evidence that the work environment moderates the relationship between reward systems and employee productivity in this sample.

The work environment has a positive coefficient of 0.256, suggesting a positive direct association with employee productivity, though it is not marked as statistically significant at conventional levels. The job satisfaction measures coefficient is -0.069 (SE = 0.288), which is negative and not statistically significant at conventional levels.

Table 4 examines the moderating role of the work environment on two specific productivity indicators: organizational strategic goal and employee adherence to instruction. The findings show:

- Job satisfaction measures have an unconditional negative impact on organizational strategic goal.
- Work environment has an unconditional negative impact on organizational strategic goal and employee adherence to instruction, with only a few parameters statistically significant at the 5% level.
- The marginal effect of the moderating role between work environment and job satisfaction measures is negative and insignificant at conventional levels for organizational strategic goal.
- The marginal effects of moderation between work environment and job satisfaction indicators are positive and statistically significant for employee adherence to instruction.

These results indicate that the moderating effect of the work environment varies across different productivity dimensions; it is not significant for organizational strategic goal, but is positive and significant for employee adherence to instruction.

Demographic factors also play a role: age and academic qualification are significant predictors of organizational strategic goal and employee adherence to instruction. The overall fitness of the empirical models is supported by a Wald test that is statistically significant at the 5% level, indicating that work environment and job satisfaction jointly impact organizational strategic goal and employee adherence to instruction.

Result and Discussion

Impact of Reward System as a catalyst for green logistics and sustainable performance on Employee Job Productivity of Transport and logistics regulatory bodies in Nigeria

Effective reward systems positively influence employee job productivity within Nigerian transport and logistics regulatory bodies, as evidenced by significant direct links between incentives/rewards and productivity outcomes (consistent with (Aini et al., 2022; Alkandi et al., 2023; Ratri & Wahjudono, 2021; Subramanyam & Donthu, 2022; Tarigan et al., 2022). Well-structured compensation aligns employee efforts with organizational objectives by enhancing motivation and commitment, though effects vary by performance dimension. Specifically, reward systems showed positive associations with instruction adherence, task completion, result quality, and work organization, but these were not uniformly significant across all indicators.

Non-monetary incentives (recognition, bonuses) further support productivity gains, particularly where employees perceive direct effort-reward correlations. This contributes to green logistics adoption by reinforcing sustainable behaviors, though practical impacts remain constrained by baseline

organizational maturity in regulatory contexts.

Impact of Work Environment in Moderating the Relationship between Employee Job Satisfaction (Reward System) and Employee Job Performance of Transport and logistics regulatory bodies in Nigeria.

The work environment significantly moderates the reward system-job performance relationship (positive and significant marginal effects), confirming its role in enhancing productivity toward green logistics and sustainable outcomes (Arisaq et al., 2023; Karoso et al., 2022; Pusparani et al., 2021; Wahyudi et al., 2023; Wandira, 2023). Conducive workspaces, facilities, and supportive cultures elevate engagement, but moderation strength varies specifically by performance component (see Table 6).

Conclusion

Ahead of the 2030 deadline for achieving the United Nations Sustainable Development Goals, this study advances SDG 8 (Decent Work and Economic Growth) and SDG 13 (Climate Action) within Nigeria's transport and logistics regulatory sector. It examines reward systems as catalysts for green logistics adoption and sustainable performance among employees in federal regulatory bodies.

Empirical results confirm reward systems exert a significant positive direct effect on employee job productivity ($\beta = 0.609$, $p < 0.05$), enhancing operational efficiency, compliance, and green competencies. Effects varied by performance indicator: significant for instruction adherence, result quality, and work organization, but insignificant for organizational strategic goals and task completion.

The regression results for the moderating effect of work environment on the relationship between job satisfaction (proxied by reward systems) and employee productivity among workers in Nigeria's transport and logistics regulatory bodies. The interaction term, Reward system × Work environment, has a coefficient of 0.077 with a robust standard error of 0.064, and it is not statistically significant at conventional levels. This means there is no strong evidence that the work environment significantly changes the overall relationship between reward systems and productivity in this model.

Based on the results reported for the productivity dimensions, the moderating effect is not significant for organizational strategic goal, where the marginal effect is negative but insignificant. However, the moderation effect is positive and statistically significant for employee adherence to instruction, indicating that a better work environment strengthens the effect of reward systems on this specific outcome. In other words, the work environment does not show a uniform moderating effect across all productivity indicators.

Recommendations:

Based on the research findings regarding the impact of employee job satisfaction (reward system) as a catalyst for green logistics and sustainable performance on employee productivity in Transport and logistics regulatory bodies in Nigeria (work environment moderating the dependent and independent variable), the following recommendations are proposed:

1. Nigerian government should implement structured reward programs across transport regulatory agencies, including performance-based bonuses and recognition schemes tied to green logistics KPIs.
2. Invest in work environment improvements (modern facilities, digital tools) to maximize reward system effectiveness.
3. Establish cross-agency green performance metrics linking employee rewards to SDG 8/13 targets.

Author contributions

Mohammed Rabiu Musa conceived and designed the study, developed the theoretical framework, coordinated the data collection process, conducted the econometric and statistical analyses, interpreted the results, and drafted the original manuscript. Khalil Nasiru Wada contributed to the study design, literature review, refinement of the conceptual model, and provided critical intellectual input to the discussion and policy implications. Buhari Sagir assisted with questionnaire design, data collection, data cleaning, and preliminary analysis, and contributed to sections of the methodology and results. Idris Safiyanu Elatikpo supported the literature review, data validation, interpretation of empirical findings, and manuscript editing. Kabiru Musa Yusuf and Balanko Victor Jediel contributed to data analysis support, preparation of tables and figures, proofreading, and formatting of the manuscript in line with journal requirements. All authors reviewed, revised, and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

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