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Effects of Safety Risk Factors on Labour Productivity in Construction Sites in Bauchi State, Nigeria

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Abstract

Construction labour productivity is a critical determinant of project success and economic development; however, it remains suboptimal in many developing regions, including Nigeria, where the construction sector records approximately 100 serious accidents annually. In Bauchi State, safety risk factors are prevalent, yet their specific effects on productive output remain insufficiently examined. This study assessed the effects of safety risk factors on labour productivity at construction sites in Bauchi State by identifying predominant safety risks, evaluating productivity indicators, and determining statistical and perceived relationships between safety and performance. A quantitative cross-sectional survey was conducted using a structured questionnaire administered to 205 construction professionals across six project sites. Of these, 191 questionnaires were analysed, representing a 93.2% response rate. Data were analysed using descriptive statistics and regression analysis. The findings identified absence of regular inspections ($M = 3.91$), inadequate training ($M = 3.81$), improper use of personal protective equipment ($M = 3.81$), and weak regulatory enforcement ($M = 3.75$) as the most prevalent safety risks. Workers demonstrated strong attendance ($M = 4.13$) and task efficiency ($M = 4.08$), whereas high rework rates constituted a critical productivity weakness ($M = 1.51$). The regression model was statistically significant ($F = 10.631$, $p = .001$) but explained only 5.3% of productivity variance ($R^2 = .053$). Furthermore, the perceptual grand mean of 1.86 indicates that practitioners perceive safety's influence on productivity as very low, revealing a substantial perceptual disconnect. The study concludes that safety risks measurably affect productivity, but their influence is substantially underestimated, potentially normalising unsafe conditions and contributing to underinvestment in safety. Mandatory competency-based training, strict PPE enforcement, enhanced supervision to minimise rework, industry-wide sensitisation campaigns, and strengthened regulatory enforcement are recommended to improve safety and productivity.

Keywords

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Background of the Study

Globally, the construction industry is a cornerstone of economic development, vital for infrastructure, investment, and job creation. In developing economies like Nigeria, it is especially crucial for industrialization and national progress (Babatunde, 2015). Paradoxically, this sector is also among the world's most hazardous, suffering a disproportionately high rate of workplace accidents, injuries, and fatalities (Ogunbayo & Aigbavboa, 2024). The inherently risky nature of construction work involving heights, heavy machinery, and hazardous materials creates a dynamic risk environment demanding rigorous safety management (Nassar, 2021; Ogunbayo & Aigbavboa, 2024).

In Nigeria, this contradiction is severe. The industry reports approximately 100 serious accidents annually, causing an estimated 50 fatalities and 150 injuries (Shan-Shin et al., 2024). Prevalent incidents like falls, electrocutions, and structural failures (Shan-Shin et al., 2024; Ogunbayo & Aigbavboa, 2024) lead to tragic loss of life, disability, and environmental harm (Kawuwa et al., 2018; Kadiri et al., 2014), while also incurring major economic costs through delays, overruns, and litigation (Kadiri et al., 2014; Nassar, 2021). Bauchi State in northeastern Nigeria exemplifies these systemic issues within a distinct local context. The region faces socio-economic vulnerabilities, including a literacy rate of about 34.1%, which hinders effective safety communication (Kawuwa et al., 2018). Workers in Bauchi Metropolis are routinely exposed to hazards (Kawuwa et al., 2018) due to widespread non-compliance with safety standards, a lack of training and awareness (Horan et al., 2023), inadequate Personal Protective Equipment (PPE) (Reddy et al., 2018), poor site supervision (Reddy et al., 2018), and weak regulatory enforcement (Kawuwa et al., 2018; Reddy et al., 2018). This signifies a profound absence of an ingrained safety culture (Kawuwa et al., 2018).

Beyond the ethical imperative (Møller et al., 2020), such safety failures severely undermine labour productivity, a key determinant of project success. Research confirms a strong inverse relationship between safety performance and productive output (Nassar, 2021). Productivity is influenced by a multitude of factors spanning workforce, management, and safety domains (Murali & Gopal, 2016). Nigerian studies highlight key determinants like worker health, site relationships, and managerial planning (Usman et al., 2024; Murali & Gopal, 2016). The specific mechanism linking safety to productivity is critical. Safety factors like a "lack of labour safety" rank among the top ten adverse influences on productivity (Murali & Gopal, 2016).

In Bauchi, "poor safety measures" are a primary demotivator, directly impairing worker morale and output (Mohammed, 2023), while safe conditions enhance engagement and efficiency (Mohammed, 2023). The cascading effects of accidents stoppages, investigation time, low morale, absenteeism, and turnover collectively degrade productive capacity (Kadiri et al., 2014; Nassar, 2021), creating an economic case for safety investment, with returns of \$2-\$3 for every dollar spent (Al-Nuaimi et al., 2022). Despite growing literature, a significant research gap persists for Bauchi State. Existing work outlines general safety challenges (Kawuwa et al., 2018) and discrete productivity factors (Luka, 2023; Mohammed, 2023), but lacks an integrated, empirical study.

Missing is a systematic investigation of the causal pathways and magnitude through which specific safety risks affect labour productivity within Bauchi's unique context. This gap is worsened by an over-reliance on managerial perspectives, lacking crucial frontline worker insights (Alomari et al., 2020). The absence of localized evidence has significant practical implications. Without data to justify preventative investment, stakeholders in

Bauchi perceive safety as a mere compliance cost (Haelterman, 2022) instead of a strategic driver for efficiency. This study directly addresses this gap by examining how safety risks affect construction labour productivity locally. It seeks to produce empirical evidence to guide effective interventions, influence policy, and promote safety as essential for sustainable productivity.

2.0 RESEARCH METHODOLOGY

2.1 Introduction

This section discussed the sources of data collection and measurement of analytical techniques used in the research. Furthermore, the chapter explained the research design, population and sampling methods adopted for the study. It also contained a detailed explanation of the instrument method of data collection for the study. The data analysis and presentation method were also explained.

2.2 Research Design

The study adapts descriptive and exploratory design because it will use objective methods to uncover facts about its background and problems. The most appropriate approach for this study is quantitative, as numerical data will be collected and analyzed. This research adopted a Survey strategy using a questionnaire as an instrument of data collection. Hence, in accordance with a study by Inuwa (2014), this research design is mainly quantitative (exploratory and descriptive).

2.3 Research Approach

The study adopted a quantitative approach because it will use objective methods to uncover facts about

its background and problems. The most appropriate approach for this study is quantitative, as numerical and qualitative data have been collected and analyzed.

2.4 Research Strategy

This research adopted a Survey strategy using a questionnaire as an instrument of data collection. The Questionnaire includes instructions for completion, response alternatives where appropriate and specific means for recording responses (Frazer & Lawley, 2000). The questionnaire was developed based on the stated objectives of the research. The opinions of the relevant various staff and labour were collected and scaled with scores ranging from 1-5, popularly called the Likert scale.

2.5 The Study Population

A population is all the individuals or units of interest; typically, there is no available data for almost all individuals in a population (Schmidt-Catran, Fairbrother & Andre, 2019). The study population is the target respondents to study that meet the requirement to provide information (data). For this study, the population are professionals in the Bauchi state construction industry.

2.6 Sample Frame

It is a list consisting of the units of population. The sample frame is the total number of items of the study population. The sample frame of this study is the total number of professionals in the construction industry in Bauchi State, Nigeria, which is 205 professionals.

Table 2.1: Sample frame of the study

S/N	Professionals	Sample frame
1	Builders	55
2	Quantity surveyors	35
3	Architects	45
4	Civil Engineers	40
5	Others	30
	Total	205

2.7 Sample size

The sample size for this research, Krejcie and Morgan's table of determining sample size was adopted. Since the population size of this study area is 205, as shown in the sample frame, 191 were

adopted for questionnaire administration. This is to enable the collection of adequate data for the study. The sample frame for the study is clearly explained in the table below;

Table 2.2: Sample size of the study

S/N	Professionals	Sample frame	Sample Size
1	Builders	55	51
2	Quantity surveyors	35	33
3	Architects	45	43
4	Civil Engineers	40	38
5	Others	30	26
	Total	205	191

2.8 Sample Techniques

The sampling techniques adopted for this research is proportionate and simple random sampling technique. The reason for adopting simple random sampling is that it gives an equal chance of selecting all the internally displaced people in the study area.

3.0 RESULTS AND DISCUSSION

3.1 Questionnaire Distribution

Two hundred and five (205) questionnaires were distributed to construction professionals across six selected project sites in Bauchi State, Nigeria: Wunti Flyover, Central Market Flyover, ATBU Gubi Campus, Federal University of Health Sciences

Azare (FUHSA), Teaching Hospital Azare, and Federal College of Education (FCE) Jamma'are. One hundred and ninety-one (191) questionnaires were returned and found suitable for analysis, representing a response rate of 93.2%. The fact that 191 out of the 205 distributed questionnaires were used in the analysis indicates a high level of engagement from the construction professionals. This robust response rate enhances the reliability and generalizability of the study's findings. The high response rate can be attributed to the purposive selection of respondents and the structured administration of the questionnaires through site engineers and project managers.

Table 3.1: Questionnaire Response Rates

Questionnaire	Number	Response Rate (%)
Administered	205	100
Returned	191	93.2
Analysed	191	93.2

3.2 Information of Respondents

The demographic data of the respondents was gathered; frequency and percentage analyses were performed. The findings are displayed in Table 4.2

to illustrate the respondents' demographics. This count shows how many respondents fall into each category of a particular demographic variable.

Table 3.2: Demographic Data of the Respondents (n = 191)

S/N	Questions	Options	Frequency	Percentage (%)
1	Professional Personnel	Architect	43	22.5
1	Professional Personnel	Builder/Construction Manager	51	26.7
1	Professional Personnel	Civil Engineer	38	19.8
	Professional personnel	Quantity surveyor	33	17.2
	Professional personnel	Others	26	13.6
1	Professional Personnel	Total	191	100
2	Age Distribution	Under 30 years	41	21.5
2	Age Distribution	30-39 years	82	42.9
2	Age Distribution	40-49 years	51	26.7
2	Age Distribution	50-60 years	13	6.8
2	Age Distribution	Above 60 years	4	2.1
2	Age Distribution	Total	191	100
3	Gender	Male	185	97
3	Gender	Female	6	3
3	Gender	Total	191	100
4	Educational Qualification	Diploma	82	42.9
4	Educational Qualification	Bachelor's Degree	103	53.9
4	Educational Qualification	Master's Degree	4	2.1
4	Educational Qualification	PhD/Doctorate	2	1.1
4	Educational Qualification	Total	191	100
5	Type of Organization	Client/Government Agency	10	5.2
5	Type of Organization	Consultant	51	26.7
5	Type of Organization	Contractor	130	68.1

S/N	Questions	Options	Frequency	Percentage (%)
5	Type of Organization	Total	191	100
6	Years of Experience	Less than 5 years	41	21.5
6	Years of Experience	5-10 years	86	45.0
6	Years of Experience	11-15 years	31	16.2
6	Years of Experience	16-20 years	29	15.2
6	Years of Experience	Above 20 years	4	2.1
6	Years of Experience	Total	191	100
7	Current Construction Site	Wunti Flyover	33	17.3
7	Current Construction Site	Central Market Flyover	33	17.3
7	Current Construction Site	ATBU Gubi Campus	39	20.4
7	Current Construction Site	FUHSA Azare	32	16.8
7	Current Construction Site	Teaching Hospital Azare	27	14.1
7	Current Construction Site	FCE Jamma'are	27	14.1
7	Current Construction Site	Total	191	100

Table 3.2 presents the demographic characteristics of the respondents involved in the study based on professional personnel, age distribution, gender, educational qualification, type of organization, years of experience, and current construction site. The results show that builder/ construction manager constitute the largest group of respondents with 51 participants (26.7%), indicating their prominent involvement in construction-related activities within the study area. This is followed by Architects with 43 respondents (22.5%) and reflecting a diverse professional background among the participants. Civil engineers for 38 respondents (19.8%), while quantity surveyor represents 33 respondents (17.2%), showing balanced professional

representation. The dominance of Builders and Architect in the sample is consistent with the nature of construction projects in Bauchi State, where these professionals are typically the most involved in site operations and safety management.

In terms of age distribution, the majority of respondents (42.9%) were aged 30-39 years, indicating a predominantly mid-career workforce with substantial professional experience. This is followed by respondents aged 40-49 years (26.7%) and under 30 years (21.5%). Only 6.8% of respondents were aged 50-60 years, while 2.1% were above 60 years. The age profile suggests that the construction workforce in Bauchi State is

relatively young to middle-aged, which aligns with the physically demanding nature of construction work.

Regarding gender, the construction workforce in the sampled sites is overwhelmingly male (97%), with only 3% female respondents. This stark gender disparity reflects the broader trend in the Nigerian construction industry, where women are significantly underrepresented due to cultural norms, physical demands, and historical gender roles in the sector.

In terms of educational qualification, the majority of respondents hold a Bachelor's degree with 103 respondents (53.9%), suggesting a high level of formal education among the participants. Respondents with Diploma qualifications account for 82 (42.9%), reflecting the presence of technically trained personnel who may have gained practical experience through polytechnic education. Additionally, 4 respondents (2.1%) possess a Master's degree or higher, reflecting advanced academic and professional competence. The high level of formal education among respondents is encouraging and suggests that the sampled professionals are well-equipped to provide reliable assessments of safety and productivity issues.

Regarding type of organization, the majority of respondents (68.1%) work for contractors, reflecting the operational focus of the study and the fact that contractors are typically the largest employer of construction professionals on site. Consultants account for 26.7% of respondents, while client/government agency employees

represent only 5.2%. The dominance of contractor-affiliated respondents ensures that the data reflect the realities of on-site construction operations.

Regarding working experience, 86 respondents (45.0%) have 5-10 years of experience, representing the largest experience group. This is followed by 41 respondents (21.5%) with less than 5 years of experience, 31 (16.2%) with 11-15 years, 29 (15.2%) with 16-20 years, and only 4 (2.1%) with above 20 years of experience. The predominance of respondents with 5-10 years of experience suggests that the construction industry in Bauchi State has a solid base of experienced professionals who are still in their prime working years. This experience level is particularly valuable for the study as these professionals have sufficient exposure to construction site operations and safety issues to provide meaningful insights. Overall, the frequencies and percentages indicate that the respondents are adequately qualified and experienced, making them suitable for providing reliable data for the study.

3.3 Extent Safety Risk Factors on Labour Productivity in Construction Sites within Bauchi State

Objective one is to evaluate major safety risk factors on labour productivity in construction sites within Bauchi State, Nigeria, in which descriptive statistics using mean ranking was used to assess the prevalence of safety risk factors. Respondents rated the prevalence of 15 safety risk factors on a 5-point scale (1 = Very Low, 5 = Very High).

Table 3.3: Extent of Safety Risk Factors

Rank	Safety Risk Factor	Mean	Std. Deviation	Decision Rule
1	Absence of regular safety inspections and audits	3.91	0.842	High
2	Lack of adequate safety training for workers	3.81	0.935	High
3	Non-use or improper use of PPE by workers	3.81	0.924	High
4	Weak regulatory enforcement by authorities	3.75	0.982	High
5	Insufficient safety awareness among workers	3.43	1.124	Moderate
6	Poor safety supervision and management	3.42	1.013	Moderate
7	Inadequate fire prevention and emergency preparedness	3.38	0.987	Moderate
8	Inadequate provision of PPE	3.36	1.021	Moderate
9	Lack of proper hazard identification and risk assessment	3.28	1.145	Moderate
10	Workers working under fatigue or stress	3.25	1.087	Moderate
11	Poor safety culture within the organization	2.82	1.098	Moderate-Low
12	Non-compliance with safety guidelines	2.74	1.134	Moderate-Low
13	Poor housekeeping and site organization	2.11	1.042	Low
14	High worker turnover/casualization	2.11	1.056	Low
15	Language barriers affecting safety communication	1.93	1.021	Low
	Grand Mean	3.17	1.03	Moderate

Scale: Very Low (1.00 - 1.49); Low (1.50 - 2.49); Moderate (2.50 - 3.49); High (3.50 - 4.49); Very High (4.50 - 5.00)

Table 3.3 reports the prevalence of safety risk factors on construction sites in Bauchi State. The grand mean score of 3.17 indicates a moderate level, suggesting that although safety risks are present, they are not perceived as critical. Nevertheless, several highly rated factors warrant attention. Absence of regular safety inspections and audits ranked first (mean = 3.91; SD = 0.842), followed by inadequate safety training (mean = 3.81; SD = 0.935), non-use or improper use of

personal protective equipment (PPE) (mean = 3.81; SD = 0.924), and weak regulatory enforcement (mean = 3.75; SD = 0.982). These findings align with Adebayo (2020), Oladipo (2019), Mushayi et al. (2018), Horan et al. (2023), and Kawuwa et al. (2018). Bauchi State's low literacy rate (approximately 34.1%) complicates safety communication, requiring context-specific training. PPE non-compliance, as noted by Reddy et al. (2018) and Usman et al. (2024), threatens worker health and productivity.

The least prevalent factors were poor housekeeping and site organization (mean = 2.11; SD = 1.042), high worker turnover/casualization (mean = 2.11; SD = 1.056), and language barriers (mean = 1.93; SD = 1.021), ranked thirteenth to fifteenth. Poor safety culture (mean = 2.82) and non-compliance with safety guidelines (mean = 2.74) were moderate-low, indicating that guideline existence is less problematic than enforcement and training. These results reinforce Kawuwa et al. (2018) and Shan-Shin et al. (2024), indicating that safety interventions in Bauchi State should prioritize training capacity and regulatory enforcement.

3.4 Challenge of Labour Productivity Indicators on Construction Sites in Bauchi State

Objective two is to assess the impact of labour productivity in the construction site, in which descriptive statistics using mean ranking was used to assess labour productivity indicators. Respondents rated ten productivity indicators on a 5-point scale (1 = Very Poor, 5 = Very High/Excellent).

Table 3.4: Labour Productivity Indicators

Rank	Indicator	Mean	Std. Deviation	Decision Rule
1	Worker attendance and punctuality	4.13	0.821	High
2	Efficiency of task completion	4.08	0.845	High
3	Quality of workmanship	4.04	0.798	High
4	Worker motivation and morale	4.03	0.812	High
5	Daily work output per worker	3.90	0.897	High
6	Optimal utilization of labour resources	3.78	0.924	Moderate-High
7	Effective teamwork and coordination	3.62	0.987	Moderate-High
8	Timely completion of daily work targets	3.33	0.956	Moderate
9	Adherence to project schedule	3.20	1.021	Moderate
10	Minimal rework due to errors	1.51	0.743	Very Poor
	Grand Mean	3.46	0.88	Moderate-High

Scale: Very Low (1.00 - 1.49); Low (1.50 - 2.49); Moderate (2.50 - 3.49); High (3.50 - 4.49); Very High (4.50 - 5.00).

Table 3.4 presents labour productivity indicators on construction sites in Bauchi State. The grand mean of 3.46 indicates a moderate-high level, suggesting generally satisfactory but improvable productivity. Highly ranked indicators were worker attendance and punctuality (mean = 4.13, SD = 0.821), efficiency of task completion (4.08, SD = 0.845), quality of workmanship (4.04, SD = 0.798), worker motivation and morale (4.03, SD = 0.812), and daily work output per worker (3.90, SD = 0.897). High attendance may reflect construction work as a livelihood source, consistent with Mohammed (2023), though attendance alone does not guarantee productivity. These findings also align with Usman et al. (2024).

4.5 Effect of Safety Risk Factors on Labour Productivity

Objective three sought to determine the effects of safety risk factors on labour productivity in construction sites within Bauchi State. To accomplish this objective, inferential statistics using multiple regression analysis was employed to examine the relationship between safety risk factors and labour productivity. This analytical approach enabled the determination of the nature, direction, and magnitude of the effect of safety risk factors on labour productivity, providing a robust statistical basis for understanding the safety-productivity nexus within the study area.

However, timely completion of daily targets (3.33) and adherence to project schedules (3.20) were moderate. Minimal rework due to errors ranked very poor (1.51, SD = 0.743), indicating substantial rework and quality-control problems that waste resources and reduce productivity. Optimal labour utilization (3.78) and effective teamwork (3.62) were moderate-high, suggesting coordination deficits possibly linked to poor safety supervision. The results support Nassar (2021), Reddy et al. (2018), Murali and Gopal (2016), and Usman et al. (2024), indicating that although workers possess foundational productive attributes, rework and management issues constrain overall labour productivity in Bauchi State.

3.5.1 Regression Model for Safety Risk Factors and Labour Productivity

A multiple regression analysis was conducted to determine the effect of safety risk factors on labour productivity. The analysis examined the relationship between the composite prevalence of safety risk factors (independent variable) and the composite perceived impact on labour productivity (dependent variable). The results of the regression analysis are presented in Table 4.5a.

Table 3.5a: Model Summary - Effect of Safety Risk Factors on Labour Productivity

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig.
1	0.231 ^a	0.053	0.048	0.96635	10.631	0.001 ^b

a. Predictors: (Constant), Safety Risk Factors Prevalence

b. Dependent Variable: Labour Productivity Impact

Table 3.5a presents the regression model summary for the effect of safety risk factors on labour productivity. The model presents an R-value of 0.231 and an R-Square value of 0.053 with an F-statistics value of 10.631, which was significant as indicated by the p-value of 0.001. Therefore, approximately 5.3% of the variance in labour

productivity impact is explained by the prevalence of safety risk factors.

Interpretation of Model Summary: The correlation coefficient (R = 0.231) indicates a weak positive relationship between safety risk prevalence and perceived impact on labour productivity. R-squared (0.053) shows that approximately 5.3% of variance in productivity impact is explained by safety risk prevalence, leaving 94.7% attributable to other

factors. The F-statistic (10.631) and p-value (0.001) confirm the model is statistically significant, though the relationship is weak. Adjusted R-squared (0.048) supports model stability. Thus, safety risk prevalence has a genuine but limited predictive effect on labour productivity impact.

3.5.2 Coefficients of the Regression Model
The regression coefficients provide detailed information about the specific contribution of the independent variable to the dependent variable. The results of the coefficients analysis are presented in Table 3.5b.

Table 3.5b: Coefficients - Regression Analysis Results

Independent Variable	Unstandardized Coefficient (B)	Std. Error	Standardized Coefficient (Beta)	t-value	p-value
(Constant)	1.053	0.178	-	5.914	0.000
Safety Risk Factors	0.255	0.078	0.231	3.260	0.001

Dependent Variable: Labour Productivity Impact
R² = 0.053 | Adjusted R² = 0.048 | F = 10.631 | p = 0.001
N = 191 | p < 0.05 (Significant)

Independent Variable	Unstandardized Coefficient (B)	Std. Error	Standardized Coefficient (Beta)	t-value	p-value	Decision
Safety Risk Factors	0.255	0.078	0.231	3.260	0.001	Significant

Independent Variable: Safety Risk Factors
The standardized predicted values versus standardized residuals showed that the data met the assumption of homogeneity of variance and the residuals were approximately normally distributed. The beta coefficient shows that safety risk factors are a significant determinant of labour productivity impact, as indicated by the standardized beta coefficient of 0.231 and t-statistic of 3.260, which is significant at p = 0.001.

Interpretation of Coefficients:

Unstandardized coefficient (B = 0.255) indicates that each one-unit increase in safety risk prevalence raises perceived labour productivity impact by 0.255 units statistically significant but practically small. Standardized beta (β = 0.231) confirms that a one-standard-deviation increase in safety risks produces a 0.231-standard-deviation increase in productivity impact. The t-statistic (3.260) and p-value (0.001) establish statistical significance. The constant (1.053) represents the theoretical baseline productivity impact when safety risk prevalence is zero.

3.5.3 Regression Equation
Based on the coefficients presented in Table 4.5b, the regression equation for predicting the impact of safety risk factors on labour productivity can be expressed as:
Labour Productivity Impact = 1.053 + 0.255 (Safety Risk Factors Prevalence)

This equation indicates that for every unit increase in the prevalence of safety risk factors, the perceived impact on labour productivity increases by 0.255 units. The constant term (1.053) represents the baseline level of perceived productivity impact when safety risk prevalence is at zero.

3.5.4 Discussion of Regression Findings.

The regression analysis identified a statistically significant but weak relationship between safety-risk prevalence and perceived labour productivity in Bauchi State construction sites ($R^2 = 0.053$; $\beta = 0.231$; $p = 0.001$). Despite prevalent unsafe conditions, respondents perceived limited productivity consequences, indicating a compliance-oriented safety culture, weak awareness, and underprioritized safety investment. Targeted training is therefore essential to bridge this critical perceptual gap.

4.2 Conclusions

Based on the empirical findings and discussions, the following conclusions are drawn: Systemic Safety Deficiencies Persist: Construction sites in Bauchi State are afflicted by substantial and recurring safety risk factors that stem primarily from weak organizational controls, inadequate training regimes, and deficient regulatory oversight. Safety management on most sites remains predominantly reactive addressing incidents after they occur rather than proactively preventing them. Workforce Capacity is Undermined by Management Failures:

While construction workers possess the intrinsic capacity to perform productively as evidenced by strong attendance, punctuality, and workmanship this potential is severely undermined by poor planning, inadequate supervision, and weak quality assurance. The exceptionally high rework rate confirms that productivity losses are less attributable to worker incapacity and more to systemic deficiencies in site organization and

managerial competence. The Perceptual Disconnect is a Critical Barrier: The most consequential conclusion of this study is the deep-seated perceptual gap regarding the impact of safety on productivity. Despite the statistical significance of the regression model ($p = 0.001$), the low R^2 value (0.053) and the perceptual grand mean (1.86) collectively indicate that construction professionals do not intuitively link safety failures to productive inefficiencies.

This cognitive disconnect weakens the business case for safety investments, leading to the normalization of unsafe conditions and the underestimation of indirect productivity drains such as rework, delays, absenteeism, and diminished morale. Safety is a Strategic Productivity Determinant: The study concludes that sustainable productivity in Bauchi State's construction sector cannot be achieved without a deliberate paradigm shift. Safety must be reconceptualized not as a regulatory compliance burden or an ancillary cost but as a strategic, non-negotiable determinant of project performance, cost efficiency, and workforce well-being.

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