

INDUSTRIAL PARTICIPATION, EMPLOYMENT OPPORTUNITIES, TECHNICAL SKILLS UTILIZATION AND ECONOMIC OUTCOMES AMONG TECHNICAL COLLEGE GRADUATES IN NASARAWA STATE, NIGERIA

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ABSTRACT

Industrial development is important for employment creation, income generation, and poverty reduction among technical college graduates. However, unemployment, underemployment, and inadequate utilization of technical skills continue to constrain their economic contributions in Nigeria. This study examined the relationship between industrial development and poverty reduction among technical college graduates in Nasarawa State, Nigeria. Specifically, it assessed industrial participation, examined employment opportunities within industrial sectors, and determined the relationship between technical skills utilization and income generation. A correlational survey research design was adopted. The population comprised technical college graduates, technical instructors, and industrial employers or supervisors. A sample of 280 respondents was selected using a multistage sampling procedure, and 267 valid questionnaires were returned, representing a 95.4% response rate. Data were collected using a structured questionnaire validated by three experts, with an overall Cronbach's alpha coefficient of .86. Data were analysed using mean, standard deviation, and Pearson product-moment correlation at the .05 significance level. Findings indicated moderate industrial participation ($M = 3.07$) and moderate employment opportunities ($M = 3.16$). Technical skills utilization was positively related to income generation, $r = .684$, $p < .001$. Industrial development was also positively related to poverty reduction, $r = .684$, $p < .001$, as were industrial employment opportunities, $r = .591$, $p < .001$. The findings suggest that stronger industry linkages, expanded employment opportunities, and effective utilization of technical skills are associated with more favourable economic outcomes among technical college graduates.

Keywords: industrial development, industrial participation, employment opportunities, technical skills utilization, poverty reduction, technical college graduates

Introduction

Industrial development is widely recognized as an important driver of economic transformation, employment generation, technological advancement, productivity, enterprise development, and poverty reduction. It promotes value addition, innovation, productive capacity, and opportunities for decent work. In Nigeria, contemporary industrial-development initiatives emphasize economic diversification, skills development, productive enterprises, industry–institution linkages, and technological upgrading (UNIDO, 2025). These priorities underscore the importance of developing technically competent human resources capable of contributing effectively to productive economic activities.

Technical and vocational education and training (TVET) provides an important pathway for developing occupational competencies and facilitating transitions into employment and self-employment. Contemporary industries require practical skills, technological knowledge, problem-solving abilities, adaptability, digital competence, and entrepreneurial capabilities. UNESCO (2024) therefore emphasizes work-based learning, industry–institution partnerships, employability, entrepreneurship, and labour-market alignment. Evidence from North-Central Nigeria similarly indicates the need for stronger practical, entrepreneurial, and emerging technology competencies in technical education (Aluwong & Nungse, 2023).

However, possessing a technical qualification does not automatically guarantee productive employment or sustainable income. Studies in Nigeria have identified challenges in translating technical training into meaningful employment opportunities. Abiona and Akinwumi (2021), for instance, examined technical college graduates in Oyo State and highlighted the importance of technical skills and job-creation strategies for employability. Similarly, Abiamuwe et al. (2025) reported that skills-acquisition programmes can support TVET graduates' employability, although financial and programme-related constraints may limit participation in further skills development. In North-Central Nigeria, Aloba et al. (2023) found concerns regarding entrepreneurship competencies and self-employability, while Ogbuanya and Nungse (2017) reported inadequacies in entrepreneurial preparation within technical college curricula.

Industrial participation is an important mechanism through which technical competencies can be converted into productive capacity. It encompasses industrial employment, apprenticeship, internship or industrial attachment, workplace training, and technical enterprise activities. Such experiences enable graduates to apply theoretical knowledge, develop occupational competence, gain workplace experience, and adapt to industrial technologies. Supporting this position, Tyav et al. (2026) reported a significant relationship between industry-based training and employability skills among automobile technology students in North-Central Nigeria.

Technical skills utilization and graduate entrepreneurship are also important economic outcomes. Graduates may apply their competencies through formal employment, private workshops, self-employment, and small enterprises where wage employment is limited. Dambatta (2025) reported that TVET-acquired competencies could support self-employment and economic sustainability. In Nasarawa State, Usman et al. (2024) found that entrepreneurship curriculum and educators' competence influenced graduate business start-ups, while Mamman et al. (2021) highlighted the relevance of entrepreneurial skills for graduate self-employment. Studies by Ombugus and Ogbuanya (2014) and Ombugus and Umaru (2016, 2017) also indicate continuing concerns about occupational skills acquisition and assessment in technical colleges in Nasarawa State.

These issues are particularly relevant to Nasarawa State because of its technical and vocational institutions, emerging enterprises, agricultural and mineral resources, and proximity to the Federal Capital Territory. Recent government initiatives involving vocational training, technical institutions, industrial placements, and enterprise support further demonstrate policy interest in connecting skills development with employment and economic participation. Nevertheless, employment alone may not guarantee poverty reduction because graduates may experience informal, insecure, irregular, or poorly remunerated work. Consequently, technical skills utilization, entrepreneurship, and income generation are important indicators of graduates' economic outcomes.

Human Capital Theory (Becker, 1964) provides a useful framework for explaining how education and skills may enhance productivity, employment, and earning potential. However, these benefits depend partly on opportunities to apply acquired competencies productively. Despite existing Nigerian research on TVET, employability, entrepreneurship, and skills acquisition, limited empirical attention has simultaneously examined industrial participation, employment opportunities, technical skills utilization, and income generation among technical college graduates in Nasarawa State. Therefore, this study investigates the relationship between industrial development and poverty reduction among graduates of technical colleges in Nasarawa State, Nigeria, with particular attention to these dimensions.

Statement of Problems

Industrial development is expected to promote employment, income generation, entrepreneurship, and poverty reduction. However, technical college graduates may face skills mismatch, limited employment opportunities, weak industry–institution linkages, and inadequate opportunities to utilize acquired technical skills productively (ILO, 2023b; World Bank, 2026). Although TVET promotes employment and entrepreneurship, graduates may experience difficulties securing relevant industrial employment, establishing viable enterprises, and converting technical competencies into sustainable livelihoods (UNESCO et al., 2025). In Nasarawa State, opportunities for vocational training, entrepreneurship, and industrial participation are expanding, yet empirical evidence on graduates' economic outcomes remains limited. Consequently, there is a need to examine industrial participation, TVET employment opportunities, technical skills utilization, and income outcomes among technical college graduates. The study therefore investigates these relationships to provide evidence for strengthening industry–institution linkages, employment pathways, entrepreneurship support, and productive utilization of technical skills among graduates in Nasarawa State and improving their economic and livelihood outcomes.

Purpose of the Study

The main purpose of this study is to examine the relationship between industrial development and poverty reduction among graduates of technical colleges in Nasarawa State, Nigeria. Specifically, the study seeks to:

1. determine the level of industrial participation among graduates of technical colleges in Nasarawa State;
2. examine the employment opportunities available to graduates of technical colleges within industrial sectors; and
3. determine the relationship between technical skills utilization and income generation among graduates of technical colleges in Nasarawa State.

Research Questions

The following research questions guide the study:

1. What is the level of industrial participation among graduates of technical colleges in Nasarawa State?
2. What employment opportunities are available to graduates of technical colleges within industrial sectors?
3. What relationship exists between technical skills utilization and income generation among graduates of technical colleges in Nasarawa State?

Research Hypotheses

The following null hypotheses were tested at the 0.05 level of significance:

H₀₁: There is no significant relationship between industrial participation and poverty reduction among graduates of technical colleges in Nasarawa State.

H₀₂: There is no significant relationship between industrial employment opportunities and poverty reduction among graduates of technical colleges in Nasarawa State.

H₀₃: There is no significant relationship between technical skills utilization and income generation among graduates of technical colleges in Nasarawa State.

Methodology

The study adopted a correlational survey research design because it sought to examine the relationships among industrial development, poverty reduction, industrial participation, employment opportunities, technical skills utilization, and income generation without manipulating the study variables. The study was conducted in Nasarawa State, Nigeria. The population comprised 1,250 technical college graduates, 85 technical instructors, and 65 industrial employers or supervisors, giving a total population of 1,400 respondents. A multistage sampling procedure was used to select 280 respondents. At the first stage, technical colleges within Nasarawa State were identified and selected to provide coverage of the technical college population in the study area. At the second stage, technical college graduates were selected from the identified institutions, resulting in 230 graduates. At the third stage, technical instructors and industrial employers or supervisors were selected as supplementary respondents because of their knowledge of technical education, graduate employability, workplace participation, and industrial employment opportunities. This produced a sample of 25 technical instructors and 25 industrial employers or supervisors, giving a total sample of 280 respondents. Of the 280 questionnaires distributed, 267 were properly completed and returned, representing a 95.4% response rate. The 267 valid questionnaires constituted the final dataset for analysis. Data were collected using a structured questionnaire titled *Industrial Participation, Employment and Economic Outcomes Questionnaire (IPEEOQ)*. The questionnaire was organized into sections covering demographic information, industrial participation, industrial employment opportunities, technical skills utilization, income generation, industrial development, and poverty-reduction outcomes. Items were measured using a five-point Likert-type scale ranging from 5 = Very High to 1 = Very Low.

The industrial participation scale measured graduates' involvement in industrial employment, apprenticeship, industrial attachment or internship, technical enterprise activities, workplace training, use of technical skills, industrial contacts, and career advancement. The employment-opportunity scale assessed the availability of opportunities in automobile, construction, manufacturing, private workshops, small and medium-scale industries, public-sector establishments, industrial entrepreneurship, internships, skills upgrading, and permanent employment.

Industrial development was operationalized as a composite construct based on relevant items measuring graduates' participation in industrial activities and access to industrial

employment opportunities. Poverty reduction was operationalized using relevant items measuring graduates' economic outcomes, particularly income generation and other indicators of improved livelihood and reduced economic hardship included in the IPEEQ. For each construct, item scores were aggregated by calculating the mean of the valid items constituting the respective scale. Higher composite mean scores indicated higher levels of the construct. The composite scores were subsequently used in the Pearson Product-Moment Correlation analysis.

Three experts reviewed the IPEEQ for face and content validity. A pilot study involving 30 respondents from a neighbouring state outside the study area was conducted to determine the internal consistency of the instrument. Cronbach's alpha coefficients were 0.84 for Industrial Participation, 0.87 for Employment Opportunities, and 0.88 for Technical Skills Utilization and Income Generation, with an overall reliability coefficient of 0.86. These coefficients indicated satisfactory internal consistency of the instrument.

Data were analysed using IBM SPSS Statistics, Version 27. Mean and standard deviation were used to answer Research Questions One and Two concerning industrial participation and employment opportunities. Pearson Product-Moment Correlation was used to determine the relationships between industrial development and poverty reduction, industrial employment opportunities and poverty reduction, and technical skills utilization and income generation. The hypotheses were tested at the 0.05 level of significance. A p-value less than .05 was considered statistically significant.

For interpretation of the five-point mean ratings, the following decision rule was adopted: 4.50–5.00 = Very High; 3.50–4.49 = High; 2.50–3.49 = Moderate; 1.50–2.49 = Low; and 1.00–1.49 = Very Low.

Results

Research Question One

What is the level of industrial participation among graduates of technical colleges in Nasarawa State?

Table 1: Mean and Standard Deviation Analysis of Industrial Participation among Graduates

S/N	Industrial Participation Indicators	M	SD	Decision
1	Graduates secure employment in manufacturing industries	3.18	0.91	Moderate
2	Graduates participate in industrial apprenticeship programmes	3.42	0.84	Moderate
3	Graduates establish technical enterprises related to their training	3.26	0.88	Moderate
4	Industries regularly employ technical college graduates	2.71	0.96	Moderate
5	Graduates receive industrial support after graduation	2.68	0.93	Moderate
6	Graduates participate in industrial attachment or internship programmes	3.35	0.86	Moderate
7	Graduates utilize their technical skills in industrial workplaces	3.29	0.89	Moderate
8	Graduates participate in industry-related training and workshops	3.17	0.92	Moderate
9	Graduates maintain regular contact with industrial organizations	2.83	0.94	Moderate
10	Graduates obtain opportunities for career advancement in industries	2.76	0.97	Moderate
Grand Mean		3.07		Moderate

Table 1 shows that the overall level of industrial participation among graduates of technical colleges in Nasarawa State was moderate ($M = 3.07$). The highest-rated indicator was participation in industrial apprenticeship programmes ($M = 3.42$, $SD = 0.84$), followed by participation in industrial attachment or internship programmes ($M = 3.35$, $SD = 0.86$) and utilization of technical skills in industrial workplaces ($M = 3.29$, $SD = 0.89$). The lowest-rated indicators were receipt of industrial support after graduation ($M = 2.68$, $SD = 0.93$) and regular industrial employment ($M = 2.71$, $SD = 0.96$). The finding suggests that graduates had moderate opportunities for industrial exposure and participation but comparatively limited access to sustained post-graduation industrial support, regular employment, and career advancement.

Research Question Two

What employment opportunities exist for graduates of technical colleges within industrial sectors?

Table 2: Mean and Standard Deviation of Employment Opportunities Available to Technical College Graduates

S/N	Employment Opportunity Indicators	<i>M</i>	<i>SD</i>	Decision
1	Automobile industries employ technical college graduates	3.21	0.87	Moderate
2	Construction industries provide employment opportunities	3.36	0.82	Moderate
3	Manufacturing industries absorb technical college graduates	2.94	0.95	Moderate
4	Industries provide internship opportunities for graduates	3.18	0.90	Moderate
5	Graduates have access to industrial entrepreneurship opportunities	3.41	0.79	Moderate
6	Small and medium-scale industries employ technical graduates	3.27	0.86	Moderate
7	Private workshops provide employment opportunities for graduates	3.54	0.76	High
8	Public-sector establishments employ technical college graduates	2.81	0.98	Moderate
9	Industries provide opportunities for graduates to upgrade their skills	3.16	0.91	Moderate
10	Graduates have access to permanent industrial employment	2.73	0.96	Moderate
Grand Mean		3.16		Moderate

Table 2 indicates that employment opportunities available to technical college graduates within industrial sectors were moderate ($M = 3.16$). Private workshops recorded the highest mean rating ($M = 3.54$, $SD = 0.76$), followed by industrial entrepreneurship opportunities ($M = 3.41$, $SD = 0.79$) and employment opportunities in construction industries ($M = 3.36$, $SD = 0.82$). The comparatively lower ratings were recorded for permanent industrial employment ($M = 2.73$, $SD = 0.96$), public-sector employment ($M = 2.81$, $SD = 0.98$), and manufacturing-industry absorption ($M = 2.94$, $SD = 0.95$). Overall, the result suggests that graduates experienced moderate employment opportunities, with private workshops and entrepreneurial activities

providing more noticeable opportunities than permanent industrial and public-sector employment.

Research Question Three

What relationship exists between technical skills utilization and income generation among graduates?

Table :3 Pearson Correlation Between Technical Skills Utilization and Income Generation

Variables	N	Mean	SD	R	p	Decision
Technical Skills Utilization	267	3.85	0.62	.684	< .001	Significant
Income Generation	267	3.71	0.68			

Significant at 0.05 level.

Table 3 shows a strong, positive, and statistically significant relationship between technical skills utilization and income generation among graduates of technical colleges, $r(265) = .684$, $p < .001$. This indicates that graduates who reported higher utilization of their technical skills also tended to report higher levels of income generation. The result establishes an association between the two variables; however, because the study employed a correlational design, the finding should not be interpreted as evidence that technical skills utilization caused higher income generation.

Hypothesis One

H₀₁: There is no significant relationship between industrial development and poverty reduction among graduates of technical colleges in Nasarawa State.

Table 4: Pearson Product-Moment Correlation between Industrial Development and Poverty Reduction

Variables	N	r	P	Decision
Industrial development and poverty reduction	267	.684	< .001	Reject H ₀₁

Significant at $p < .05$.

Table 4 shows a statistically significant positive relationship between industrial development and poverty reduction, $r(265) = .684$, $p < .001$. Since $p < .05$, H₀₁ was rejected. This indicates that there is a statistically significant relationship between industrial development and poverty reduction among graduates of technical colleges in Nasarawa State.

Hypothesis Two

H₀₂: There is no significant relationship between industrial employment opportunities and poverty reduction among graduates of technical colleges in Nasarawa State.

Table 5: Pearson Correlation between Industrial Employment Opportunities and Poverty Reduction

Variables	N	r	p	Decision
Industrial Employment Opportunities and Poverty Reduction	267	.591	< .001	Reject H ₀₂

Significant at $p < .05$.

Table 5 shows a statistically significant positive relationship between industrial employment opportunities and poverty reduction among technical college graduates ($r(265) = .591$, $p < .001$). Since $p < .05$, the null hypothesis was rejected. This indicates that greater access to industrial employment opportunities is associated with better poverty-reduction outcomes among graduates.

Hypothesis Three

H₀₃: There is no significant relationship between technical skills utilization and income generation among graduates of technical colleges in Nasarawa State.

Table: 6 Test of the Null Hypothesis on the Relationship Between Technical Skills Utilization and Income Generation

Variables	N	r	P	Decision
Technical skills utilization and Income generation	267	.684	< .001	Reject H ₀₃

Table 6 shows a positive and statistically significant relationship between technical skills utilization and income generation among graduates of technical colleges in Nasarawa State, $r(265) = .684, p < .001$. Since the obtained p value is less than the .05 significance level, the null hypothesis, H₀₃, is rejected. The correlation represents an association and does not establish a causal relationship.

Discussion of Findings

The study found that industrial participation among technical college graduates was moderate. This suggests that graduates participate in industrial activities to some extent, but their integration into industrial sectors remains insufficient. The comparatively stronger ratings for apprenticeship, industrial attachment, technical enterprise development, and skills utilization suggest that graduates have opportunities to apply their competencies, although regular employment, post-graduation support, and career advancement remain constrained. The finding is consistent with the argument of Human Capital Theory that investment in education and skills can enhance productivity and earning capacity when opportunities exist for the application of acquired competencies (Becker, 1964). The study found that employment opportunities for technical college graduates were moderate. Private workshops, industrial entrepreneurship, and construction industries provided comparatively stronger opportunities, whereas permanent industrial and public-sector employment were comparatively limited. This pattern suggests that technical college graduates may depend substantially on small-scale and self-employment opportunities rather than stable formal industrial employment. The finding is consistent with the broader observation that skills development does not automatically translate into formal employment when industrial labour-market absorption is limited (ILO, 2023). Strengthening linkages between technical colleges and industries could therefore improve opportunities for workplace transition, apprenticeship, and sustained employment. The study found a significant positive relationship between technical skills utilization and income generation ($r = .684, p < .001$). This indicates that graduates who utilize their technical competencies more effectively tend to report higher income generation. It also supports the experiential learning perspective of Kolb (1984), which emphasizes the value of applying knowledge through practical experience. However, because the present study employed a correlational design, the finding should be interpreted as an association rather than proof that skills utilization causes higher income. Overall, the findings indicate that industrial participation and employment opportunities among technical college graduates remain moderate, while effective utilization of technical skills is positively associated with income generation. These results highlight the importance of creating stronger pathways between technical education, industrial participation, employment, and income-generating activities.

Conclusion

The study concludes that industrial participation and employment opportunities among technical college graduates in Nasarawa State are moderate. Graduates participate in

apprenticeship, industrial attachment, technical enterprise development, and other industry-related activities, but opportunities for regular employment, post-graduation support, career advancement, and permanent industrial employment remain limited. The study also established a significant positive relationship between technical skills utilization and income generation. Industrial development and industrial employment opportunities were also positively related to poverty reduction ($r = .684$ and $r = .591$), although poverty was measured by graduates' opinions and not by income data. The findings provide evidence of an association between technical skills utilization and income generation and highlight the potential relevance of stronger industry linkages and graduate employment pathways to improved economic outcomes.

Recommendations

Based on the findings, the following recommendations are made:

1. Technical colleges should strengthen formal partnerships with industries through structured industrial attachment, apprenticeship, workplace training, and graduate placement arrangements.
2. Government and private-sector organizations should expand graduate placement and enterprise support in Nasarawa State, because permanent industrial employment ($M = 2.73$) and post-graduation support ($M = 2.68$) were rated lowest.
3. Technical college curricula should be regularly reviewed to align graduates' competencies with current industrial requirements and emerging technologies.
4. Technical colleges should strengthen entrepreneurship and enterprise-development support to help graduates convert technical competencies into sustainable income-generating activities.
5. Industries and relevant government agencies should establish graduate transition and career-support mechanisms that facilitate movement from technical college training into productive employment.

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