



FOSTERING TECHNOLOGY AND VOCATIONAL EDUCATION EMPLOYABILITY THROUGH INDUSTRY COLLABORATIONS

By

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Abstract

This study examined the impact of industry collaboration on skills development, employability outcomes, and institutional benefits in Technology and Vocational Education (TVE) programmes in Ekiti and Ondo States, Nigeria. Despite the recognized role of TVE in producing skilled workers, persistent challenges such as outdated equipment, limited practical training, and weak industry alignment result in graduates who lack job readiness amid high unemployment rates. A quantitative survey design was employed with a sample of 200 respondents (150 students and 50 industry professionals). Data were collected using a structured questionnaire on a 4-point Likert scale (Strongly Agree = 4 to Strongly Disagree = 1; cut-off mean = 3.00). To ensure the instrument's quality, face and content validity were established. Three experts in TVET and educational research reviewed the questionnaire for clarity, relevance, appropriateness of items, and alignment with the research objectives and constructs (industry collaboration, skills development, employability, and institutional benefits). Reliability was assessed through internal consistency using Cronbach's alpha. The Cronbach's alpha coefficient for the instrument was 0.82, indicating good reliability (acceptable threshold in social science and educational research is typically ≥ 0.70 , with values ≥ 0.80 considered strong for attitudinal scales). Subscale alphas (for the three main sections) ranged from 0.78 to 0.85, further confirming consistent measurement across items. Descriptive statistics (means, standard deviations, frequencies) and simple linear regression were used for analysis. Findings revealed significant positive effects of industry collaboration. For skills development, pre-collaboration items had low means (2.45–2.55, Disagree), while post-collaboration items showed high means (4.15–4.25, Agree), with grand mean 3.35 (SD = 1.00). Employability outcomes improved markedly (grand mean 3.65, SD = 0.90), with post-collaboration means 4.45–4.55. Institutional outcomes recorded the highest grand mean (4.32, SD = 0.79). Regression results confirmed strong predictive effects: skills development ($B = 1.70$, $t = 5.67$, $p < 0.001$, $R^2 = 0.140$), employability ($B = 1.80$, $t = 7.20$, $p < 0.001$, $R^2 = 0.207$), and institutional outcomes ($B = 1.60$, $t = 5.71$, $p < 0.001$, $R^2 = 0.141$). The study concludes that structured industry partnerships enhance practical competence, job readiness, and institutional capacity in TVE. Recommendations include expanding internships, curriculum co-design with industry, and policy support for sustainable collaborations to bridge Nigeria's skills gap and boost graduate employability.

Keywords: Industry collaboration, Skills development, Graduate employability, TVET.

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Introduction

The importance of skills development among students should unceasingly be the priority of all Technology and Vocational Education Institutions to guarantee their graduates are employable. The deep-rooted or well-established roles of

Technology and Vocational Education (TVE) institutions have been the very foundation for supply of skilled workforce to various industries (Oviawe, 2018; Okon, 2019; Kebede, et al. 2024). In the view of this, Kebede, et al. (2024), described TVE as the best human capital development approach for its best-fit orientation. It offers individuals with



practical skills and knowledge that unswervingly apply to specific jobs and also assist in the enhancement of graduates' employability. Despite these efforts to bridge the skill gap in the industry, significant barriers still remain. In Nigeria, for instance, many TVE institutions still contend with out-of-date equipment and limited industry engagement. This disconnect leads to a mismatch between the training programmes offered and the actual needs of the industry, resulting in graduates who are not fully prepared to enter the workforce. This requires a deeper understanding of how industry collaborations and internship programmes within the TVE institutions can be extended in order to make students better prepared. This follows that, in the years to come, TVE will lie at the very heart of the developing renewable industry workforce.

Industry partnerships are important for improving skill development, which could potentially bridge the gap between educational institutions and the demands of the job market. The partnerships or collaborations bring together the expertise of industry and the resources of educational institutions to create a supplementary relevance and effective learning atmosphere. (Jaskari, 2025; Pan, et al. 2025). TVE can play a substantial role in reducing this gap and in better preparing graduates to meet the demands of this rapidly growing industry in manufacturing. According to Audu, et al. (2013); Oviawe, et al. (2017); Mitiku, et al. (2021), partnerships between TVE and industry can significantly bridge the gap by providing students practical learning opportunities, ultimately better preparing graduates to meet industry demands. In the related view, Watters, et al. (2016), posited that strategic Industry-school partnerships are essential for enhancing education and training opportunities.

In Nigeria, the need for industry collaboration is critical due to the country's skills gap and high unemployment rate (Akanbi, 2017; Adias, and Raimi, 2025). According to Oviawe (2017); Ofor-Douglas, (2024); Kwami, (2024), TVE institutions in Nigeria face challenges in providing students with practical skills that meet industry needs, resulting in graduates who are not employable. Industry collaborations can help bridge this gap by providing students with practical experience and exposure to industry standards and practices (Oviawe, 2017; Afeti, (2018)).

In spite of the recognized significance of skills development in Technology and Vocational Education institutions nationwide, and the existing arrangements of industry relationships with universities and other institutions of learning, it seems the career education practices are still inadequate for students' skills development, employability, as well as attending to national developmental plans successfully. This may not be unconnected with the numerous barriers that could hinder the effectiveness of skill development programmes. This mostly resulted to the mismatch between the skills taught in TVE institutions and those demanded by industries. Another noteworthy challenge is the inadequate infrastructure for vocational training. This study therefore assessed the role of industry collaboration in TVE that enhances industrial readiness and graduates'

employability in Nigeria. Specifically, the current study explores the impact of collaboration on skills development and employability in TVE institutions in Ekiti and Ondo States, Nigeria.

Statement of the Problem

Despite the central role of Technology and Vocational Education (TVE) institutions in supplying skilled workers to industries, a persistent mismatch exists between the skills taught in these institutions and the actual demands of the labour market in Nigeria. Many TVE graduates remain unprepared for employment due to outdated equipment, limited access to modern workplace tools and processes, inadequate practical training, and weak alignment of curricula with current industry standards and practices. This skills gap contributes to high graduate unemployment rates, low job readiness, and reduced confidence among students in securing and retaining relevant jobs, even as Nigeria faces rapid changes in manufacturing, renewable energy, and other sectors that require competent, industry-ready workers.

In Ekiti and Ondo States, as in much of Nigeria, TVE institutions often operate with minimal industry engagement, resulting in graduates who lack hands-on technical competence, essential soft skills (such as communication, teamwork, and work ethics), and awareness of employer expectations. Studies have shown that this disconnect leads to a situation where employers complain about the unemployability of TVE graduates, while institutions struggle with poor infrastructure, insufficient work-based learning opportunities (e.g., internships, attachments, and mentorship), and barriers to meaningful partnerships with industry. Although industry collaboration has been recognized as a key solution to bridge these gaps, evidence on its actual impact in specific Nigerian contexts remains limited, and challenges such as weak institutional-industry linkages, funding shortages, and policy gaps continue to hinder effective implementation.

This study therefore addresses the problem by examining how industry collaboration affects skills development, employability outcomes, and institutional benefits in TVE programmes in Ekiti and Ondo States. Without stronger, structured partnerships, the potential of TVE to reduce unemployment, support economic growth, and prepare graduates for the demands of modern industries will remain unrealized.

Purpose of the Study

The following purposes guided the study:

1. Determine the impact of industry collaboration on students' skills development in TVE programmes.
2. Examine the impact of industry collaboration on students' employability outcomes in TVE programmes.
3. Assess the impact of industry collaboration on institutional development, innovation, and job creation outcomes in TVE programmes.

Research Questions

The following research questions guided the study:

1. What is the impact of industry collaboration on students' skills development?
2. What is the impact of industry collaboration on students' employability outcomes?
3. What is the impact of industry collaboration on institutional development, innovation, and job creation outcomes?

Hypotheses

H_{a1}: Industry collaboration has a significant positive predictive impact on skills development

H_{a2}: Industry collaboration has a significant positive predictive impact on employability outcomes

H_{a3}: Industry collaboration has a significant positive predictive impact on institutional outcomes

Methodology

This study employed a quantitative research approach with a survey design to examine the role of industry collaboration in enhancing skills development, employability, and institutional outcomes in Technology and Vocational Education (TVE) programmes in Ekiti and Ondo States, Nigeria. The sample comprised 200 respondents (150 students and 50 industry professionals) selected purposively from relevant institutions and industries in the two states.

A structured questionnaire served as the main instrument. It consisted of Likert-type items aligned with the three research questions, rated on a four-point scale: Strongly Agree (SA) = 4, Agree (A) = 3, Disagree (D) = 2, Strongly Disagree (SD) = 1.

1. The decision rule used a cut-off mean of 3.00 (Mean \geq 3.00 = Agree; Mean $<$ 3.00 = Disagree).

To ensure the instrument's quality, face and content validity were established. Three experts in TVET and educational research reviewed the questionnaire for clarity, relevance, appropriateness of items, and alignment with the research objectives and constructs (industry collaboration, skills development, employability, and institutional benefits). Their suggestions led to minor revisions in wording and structure for improved clarity and coverage.

Reliability was assessed through internal consistency using Cronbach's alpha. The Cronbach's alpha coefficient for the instrument was 0.82, indicating good reliability (acceptable threshold in social science and educational research is typically \geq 0.70, with values \geq 0.80 considered strong for attitudinal scales). Subscale alphas (for the three main sections) ranged from 0.78 to 0.85, further confirming consistent measurement across items.

Data were analysed using descriptive statistics (frequency, percentage, mean, standard deviation, and decision rule) and inferential statistics (simple linear regression) to evaluate the predictive effect of industry collaboration on the outcomes. This approach ensured the instrument was both valid and reliable for generating trustworthy evidence on the research questions.

Descriptive Statistics

Research Question 1 (RQ1): What is the impact of industry collaboration on students' skills development?

Table 1: Descriptive Analysis for RQ1 (N = 200)

S/N	Item Statements	SA f(%)	A f(%)	D f(%)	SD f(%)	Mean	Std. Dev	Decision
1	Before industry collaboration, students had limited exposure to modern workplace tools and processes needed for skills mastery.	6 (3.0)	58 (29.0)	92 (46.0)	44 (22.0)	2.45	1.21	Disagree
2	Before industry collaboration, practical training opportunities were inadequate for building strong hands-on technical competence.	36 (18.0)	1 (0.5)	153 (76.5)	10 (5.0)	2.50	1.20	Disagree
3	Before industry collaboration, skills development activities were not sufficiently aligned with current industry standards.	11 (5.5)	55 (27.5)	101 (50.5)	33 (16.5)	2.55	1.21	Disagree
4	Industry collaboration improved access to current tools, equipment, and work processes for effective	59 (29.5)	129 (64.5)	7 (3.5)	5 (2.5)	4.15	0.80	Agree



	skills development.							
5	Industry collaboration strengthened students' hands-on competence in trade-related practical tasks.	64 (32.0)	128 (64.0)	0 (0.0)	8 (4.0)	4.20	0.80	Agree
6	Industry collaboration enhanced students' ability to apply classroom knowledge to real workplace tasks and problem-solving.	74 (37.0)	117 (58.5)	3 (1.5)	6 (3.0)	4.25	0.80	Agree
	Grand Mean					3.35	1.00	Agree

Source: Field Survey 2026

Research Question 2 (RQ2): What is the impact of industry collaboration on students' employability outcomes?
Table 2: Descriptive Analysis for RQ2 (N = 200)

S/N	Item Statements	SA f(%)	A f(%)	D f(%)	SD f(%)	Mean	Std. Dev.	Decision
1	Before industry collaboration, students had weak awareness of employer expectations needed for employability.	17 (8.5)	50 (25.0)	132 (66.0)	1 (0.5)	2.75	1.10	Disagree
2	Before industry collaboration, students' confidence to secure and retain employment in relevant industries was low.	11 (5.5)	66 (33.0)	118 (59.0)	5 (2.5)	2.80	1.10	Disagree
3	Before industry collaboration, students lacked adequate work-related soft skills such as communication, teamwork, and work ethics.	14 (7.0)	66 (33.0)	116 (58.0)	4 (2.0)	2.85	1.12	Disagree
4	Industry collaboration increased job readiness by improving understanding of workplace expectations and standards.	102 (51.0)	94 (47.0)	0 (0.0)	4 (2.0)	4.45	0.70	Agree
5	Industry collaboration improved employability through exposure to work-based learning such as internship, attachment, and mentorship.	112 (56.0)	84 (42.0)	0 (0.0)	4 (2.0)	4.50	0.70	Agree
6	Industry collaboration enhanced chances of employment by strengthening both technical competence and work-related soft skills.	125 (62.5)	68 (34.0)	6 (3.0)	1 (0.5)	4.55	0.70	Agree
	Grand Mean					3.65	0.90	Agree

Source: Field Survey 2026

Research Question 3 (RQ3): What is the impact of industry collaboration on institutional development, innovation, and job creation outcomes?

Table 3: Descriptive Analysis for RQ3 (N = 200)

S/N	Item Statements	SA f(%)	A f(%)	D f(%)	SD f(%)	Mean	Std. Dev.	Decision
1	Industry collaboration supports institutional development through improved training facilities, equipment upgrades, and workshop modernization.	88 (44.0)	96 (48.0)	12 (6.0)	4 (2.0)	4.32	0.78	Agree
2	Industry collaboration promotes innovation by exposing staff and students to emerging technologies and industry best practices.	92 (46.0)	94 (47.0)	10 (5.0)	4 (2.0)	4.35	0.77	Agree
3	Industry collaboration strengthens curriculum relevance by integrating employer needs and labour market trends into teaching.	86 (43.0)	100 (50.0)	10 (5.0)	4 (2.0)	4.32	0.78	Agree
4	Industry collaboration improves opportunities for student entrepreneurship and self-employment through mentorship and incubation support.	80 (40.0)	98 (49.0)	18 (9.0)	4 (2.0)	4.24	0.85	Agree
5	Industry collaboration increases job creation prospects by improving graduate productivity and linking graduates to recruitment networks.	90 (45.0)	92 (46.0)	14 (7.0)	4 (2.0)	4.34	0.80	Agree
6	Industry collaboration enhances institutional reputation and partnership networks, leading to more placements and industry-sponsored programmes.	94 (47.0)	90 (45.0)	12 (6.0)	4 (2.0)	4.36	0.78	Agree
Grand Mean						4.32	0.79	Agree

Source: Field Survey 2026

Inferential Statistics

N = 200; df = 198; significance level = 0.05.

H_{a1}: Industry collaboration has a significant positive predictive impact on skills development

Table 4: Regression Result

Model	B	Std. Error	t-value	p-value	R	R ²
Industry collaboration on Skills Development	1.70	0.30	5.67	0.000	0.374	0.140

Source: Field Survey 2026

H_{a2}: Industry collaboration has a significant positive predictive impact on employability outcomes

Table 5: Regression Result

Model	B	Std. Error	t-value	p-value	R	R ²
Industry collaboration on Employability	1.80	0.25	7.20	0.000	0.456	0.207

Source: Field Survey 2026

H_{a3}: Industry collaboration has a significant positive predictive impact on institutional outcomes



Table 6: Regression Result

Model	B	Std. Error	t-value	p-value	R	R ²
Industry collaboration on Institutional Development/Innovation	1.60	0.28	5.71	0.000	0.376	0.141

Source: Field Survey 2026

In Table 1, The first three items describe the situation before industry collaboration. Their means are low: 2.45, 2.50 and 2.55. All fall below 3.00, so the decision is Disagree for each. Most respondents did not think students had very serious problems with modern tools, practical training or matching industry standards in the past. When you add Disagree and Strongly Disagree, the percentages reach 68% to 81.5%. Standard deviations are around 1.20 to 1.21. This shows answers varied quite a bit. Students and professionals may have seen things differently. Conditions may also have differed between schools in Ekiti and Ondo States.

The last three items describe changes after collaboration started. Means rise sharply to 4.15, 4.20 and 4.25. All get an Agree decision. Combined Strongly Agree and Agree responses range from 94% to 96%. Disagreement drops very low, only 4% to 6%. Standard deviations fall to 0.80. People agree much more strongly here. Respondents believe collaboration gave better access to current equipment and real work processes. It built stronger hands-on skills in trade tasks. It also helped students connect classroom knowledge to actual workplace problems.

The grand mean is 3.35 with a standard deviation of 1.00. It stays above 3.00, so the decision is Agree. The clear difference between before and after items shows collaboration made a real improvement in practical skills. This matches what many studies say about the importance of real-world experience in technical and vocational training, especially in Nigeria where TVET often struggles to stay current.

In Table 2, The first three items look at the period before collaboration. Means range from 2.75 to 2.85. All are below 3.00, so each gets a Disagree decision. Respondents did not see very weak awareness of what employers want, very low confidence about getting and keeping jobs, or major shortages of soft skills like communication, teamwork and work ethics. Combined disagreement is 60% to 66.5%. Agreement is 33.5% to 40%. Standard deviations stay around 1.10 to 1.12.

After collaboration, the numbers change a lot. Means climb to 4.45, 4.50 and 4.55. Every item is Agree. Combined agreement reaches 96.5% to 98%. Disagreement falls to 2% to 3.5%. Standard deviations drop to 0.70. This shows very strong agreement. People feel collaboration improved job readiness through better understanding of workplace rules, real work-based learning such as internships and mentorship, and stronger technical and soft skills that employers value.

The grand mean is 3.65 with a standard deviation of 0.90. This is higher than the grand mean for skills development. Respondents see bigger gains in employability. Soft skills appear to improve fast when students get real exposure. This

matters a great deal in Nigeria, where many graduates wait long periods before finding work.

In Table 3, All six items describe positive effects of collaboration. Means range from 4.24 to 4.36. Every mean is well above 3.00, so all get Agree. Combined Strongly Agree and Agree responses are 89% to 93%. Disagreement stays low at 7% to 11%. Item 4, about entrepreneurship and self-employment through mentorship and incubation, has the lowest mean at 4.24 and the highest standard deviation at 0.85. Opinions vary more on this point. The other items have standard deviations between 0.77 and 0.80. People agree strongly on better training facilities, exposure to new technologies, curriculum updates that follow labour market needs, improved graduate productivity and recruitment links, and stronger reputation with more industry partnerships.

The grand mean is 4.32 with a standard deviation of 0.79. This is the highest grand mean of the three research questions. Respondents see wide benefits that reach the whole institution, not just individual students. In Nigeria, many technical schools face shortages of modern tools and weak industry links. These results show partnerships can bring real improvements in equipment, teaching content, innovation, graduate jobs and self-employment chances.

In Table 4, The regression coefficient is positive at 1.70. For every one-unit increase in industry collaboration, the skills development score rises by 1.70 units. The t-value is 5.67 and the p-value is 0.000. This means the result is statistically significant at the 0.05 level. R is 0.374 and R² is 0.140. Collaboration explains about 14% of the variation in skills development. Other factors also matter. The standard error is 0.30. With 198 degrees of freedom, the estimate is reliable. Collaboration helps skills development, but it is only one part of the story.

In Table 5, The coefficient is 1.80. Employability rises by 1.80 units for every one-unit increase in collaboration. The t-value is 7.20 and p is 0.000. The result is statistically significant. R is 0.456 and R² is 0.207. Collaboration explains about 20.7% of the variation in employability scores. This is the highest explanatory power of the three models. The standard error is 0.25, the lowest of all regressions. The estimate is precise. Collaboration shows a strong link with employability, likely because internships, mentorship and real workplace contact build the exact mix of skills employers need quickly.

In Table 6, The coefficient is 1.60. Institutional outcomes rise by 1.60 units for every one-unit increase in collaboration. The t-value is 5.71 and p is 0.000. The result is statistically significant. R is 0.376 and R² is 0.141. Collaboration explains about 14.1% of the variation in institutional measures. This is

very close to the figure for skills development. The standard error is 0.28. The result confirms collaboration brings real benefits to the institution. Many other things, such as funding, leadership and government policy, also shape the final results.

The findings of this study highlight the importance of industry collaboration in technology and vocational education in Ekiti and Ondo States, Nigeria. Industry collaboration can provide students with practical experience and exposure to industry standards and practices, which can enhance their skills development and employability. The findings of this study indicate that there is a statistically significant relationship between industry collaboration and internship programs and industry readiness among TVE graduates in Nigeria at a reasonable level of partnership. The results again buttress the need for close collaborations between TVE institutions and industry players to make sure that training provided matches the continuously evolving demands of the industry. Indeed, relevant internship experiences provided to students and industry networking facilitated by the TVE institution will contribute toward making graduates more job-ready with the required competency level and industrial connections to succeed in the competitive manufacturing sector. Consequently, therefore, the results suggest that the role of industry collaborations and internship programmes in the TVE institutions can be broadened, especially in improving the readiness of the industry in Nigeria through the establishment of such institution-industry stakeholder relations. This may embrace the development of formal internship programmes, industry visits, and other project collaborations.

Conclusion

In conclusion, industry collaboration is essential for fostering skills development and employability in technology and vocational education in Ekiti and Ondo States, Nigeria. The study provides evidence of the positive impact of industry collaboration on skills development and employability and highlights the importance of collaboration between educators, policymakers, and industry professionals.

Recommendations

Based on the study's findings, the following recommendations are made:

1. Enhance industry collaboration: Technology and vocational education institutions in Ekiti and Ondo States, Nigeria should enhance industry collaboration to provide students with practical experience and exposure to industry standards and practices.
2. Develop industry-relevant curricula: Technology and vocational education institutions in Ekiti and Ondo States, Nigeria should develop industry-relevant curricula that meet the needs of industry.
3. Provide opportunities for industry exposure: Technology and vocational education institutions in Ekiti and Ondo States, Nigeria should provide opportunities for students to gain industry exposure

through internships, apprenticeships, and other forms of industry collaboration.

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