JOURNAL OF RESEARCH IN INDUSTRIAL TECHNOLOGY & EDUCATIONAL STUDIES (JRITES)

Homepage: http://Journals.unizik.edu.ng/index.php/jrites

e-ISSN 3122-0436

Vol 2 Issue 2 (2026) 93-102

University-Industry Collaboration in Innovation: Extent of Students' Engagement in South East, Nigeria

James Akal-karali Obineche[1]*, Marycynthia Chetachukwu Obineche[2], Peter I. Okoye[1]

[1]Department of Industrial Technology Education, Nnamdi Azikiwe University, Awka
[2]Department of Education Foundations, Nnamdi Azikiwe University, Awka

Corresponding author

Abstract: Following the observed low employability skills among Nigerian graduates, the need to assess the extent of engagement of the students in the labour needed skills becomes important. This study therefore focused on university-industry collaboration in innovation and the extent to which students are engaged in Nigeria. The study was delimited to Federal and State universities; all registered automobile production companies in South East, Nigeria. Five research questions guided the study while three hypotheses were tested. The study adopted descriptive survey design. A total of 333 participants were studied. A multi-stage sampling technique was employed in selecting respondents for the study. First, purposive sampling was used to select universities and automobile industries known to have existing collaboration arrangements. Second, stratified sampling was applied to categorize respondents into three strata: students, university staff, and industry personnel. Finally, simple random sampling was used within each stratum to select participants proportionately. The primary instrument for data collection was a structured questionnaire developed by the researcher. The instrument was structured using a 5-point Likert scale to measure respondents' perceptions. The questionnaire was reviewed by three experts each from educational management, industrial technology education and automobile industries. A pilot study was conducted using a small sample of respondents from Delta State University Abraka and God is Good auto industries respectively. Data obtained from the pilot test were analyzed using Cronbach's Alpha to a reliability coefficient of 0.70, 80, 72, 74 and 81 and were considered acceptable for the study. Questionnaires were administered physically and electronically and data collected were analyzed using mean and standard deviation to answer the research questions while ANOVA was used to test the hypothesis. Based on the findings of this study, it was concluded that the extent of students' engagement in university–industry collaboration in innovation in South East Nigeria is low and therefore recommends improved university-industry innovation collaboration to enhance graduates' employability.

Keywords: University-industry collaboration, innovation, students' engagement

INTRODUCTION

University–industry collaboration (UIC) has become a central feature of innovation systems in both developed and developing economies. Therefore, university–industry collaboration (UIC) is increasingly recognized as a vital mechanism for fostering innovation, advancing human capital development, and improving graduate employability, particularly in developing economies such as Nigeria where significant challenges persist regarding skills mismatch and graduate unemployment (Attah, Onwe & Obi-Anike, 2025). The Triple Helix

Corresponding author: ja.obineche@unizik.edu.ng

model highlights the dynamic interaction between universities, industries, and government in fostering innovation and economic development. Within this framework, collaboration enhances knowledge flow, promotes technology transfer, and strengthens regional competitiveness (Plessis, Nikodemus, Cherley and Celest, 2024). Universities are expected to function not only as centers for teaching and research but also as active partners in innovation ecosystems through collaboration with industry. Such partnerships ideally provide students with opportunities to participate in research commercialization, product development, problem-solving initiatives, and entrepreneurial ventures.

However, in many developing contexts, including South East Nigeria, the practical realization of this expectation appears limited. (Okolie, Nwosu and Mlanga, 2019). Despite the presence of structured programs such as the Students Industrial Work Experience Scheme (SIWES), student engagement in university–industry collaboration often focuses primarily on industrial attachment and routine exposure rather than meaningful participation in innovation processes (Nkolika, 2024). Students frequently perform observational or support roles instead of being actively involved in research-driven problem solving, prototype development, or technology transfer initiatives. Consequently, there is uncertainty regarding the extent to which university–industry collaboration in the region genuinely enhances students' innovative capacities and practical competencies.

In the contemporary knowledge-driven economy, innovation is widely recognized as a catalyst for economic growth, industrial competitiveness, and sustainable development. The companies' service delivery and sustainability of the needed services has been viewed as a contributing factor leading to the application of technology, creativity and innovation, (Federica, 2018). Innovation is the coming together of ideas and the process for developing solutions to problems. According to Taylor, (2017), Innovation is the bridge between conceptualization and execution. Innovation is widely recognized as a driver of industrial growth and sustainability. It involves the transformation of ideas into new or improved products, processes, and services that create value. Xueyan, 2021 definition highlights that innovation is a learned capability and an actionable framework designed to improve how we overcome challenges. Innovation on the other hands, is seen as a skill and talent-oriented problem-solving mechanism which in turn generates more problem and usually calls for a matching solution (Xi Zhang 2022). Scholars argue that innovation depends heavily on effective collaboration and the integration of diverse knowledge sources. Industries benefit from academic research expertise, while universities gain access to practical industry problems, funding opportunities, and real-world application platforms (Uzonwune and Kpee, 2019). Such synergy creates mutual benefits and accelerates technological advancement.

Universities contribute to innovation through education, research, and community engagement. They produce skilled graduates, generate research outputs, and provide platforms for experimentation and prototyping. Through collaborative arrangements such as joint research projects, internships, consultancy services, incubation centers, and technology transfer offices, universities facilitate innovation diffusion (Hailu, 2024). Empirical studies have shown that regions with strong university–industry linkages tend to record higher levels of patenting activity, startup formation, and technological development (Kandonga., 2025). The growing emphasis on knowledge-based economies has positioned universities as critical actors not only in knowledge creation but also in knowledge application and commercialization (Armaki, Sedghgooyan, Narges, 2023). Universities saddled with the responsibility to solving national problems are expected to function in collaboration with industries for a match to ensure graduation of students with industrial skill needs. Overall,

literature establishes that university–industry collaboration is essential for innovation and economic growth. However, there remains insufficient empirical evidence on the extent and quality of student engagement in collaborative innovation activities, particularly within South East Nigeria. Addressing this gap is crucial for strengthening innovation ecosystems, improving graduate employability, and promoting sustainable industrial development.

Furthermore, industries in South East Nigeria face increasing competitive pressures requiring continuous innovation, while universities continue to produce graduates whose skills are sometimes perceived as misaligned with industry needs (Ntinda, Sedano, Apiola and Sutinen, 2023). This disconnect suggests a potential gap between academic training, collaborative innovation activities, and industrial skill demands. Limited empirical evidence also exists on how deeply students are integrated into collaborative innovation projects between universities and industries, particularly within the automobile and manufacturing sectors. More specifically, there is inadequate evidence on whether students particularly final-year and postgraduate students actively participate in innovation processes such as joint research, product development, prototype testing, and technology commercialization, especially within the automobile and manufacturing sectors in South East Nigeria. According to Okolie, Nwosu and Mlanga (2019), most available studies treat students as passive beneficiaries of training rather than active contributors to innovation ecosystems. This creates a significant knowledge gap regarding the depth, quality, and outcomes of student involvement in collaborative innovation initiatives.

Existing studies on university–industry collaboration (UIC) have largely focused on knowledge transfer, research commercialization, and firm-level innovation performance. In Nigeria, prior research has examined the determinants and intensity of collaboration within the National System of Innovation framework, emphasizing institutional capacity, infrastructure, and organizational size. An important yet underexplored dimension of UIC is student engagement. According to Parker (2025), Students represent a critical bridge between academia and industry, serving as knowledge carriers and innovation intermediaries. Studies in emerging economies suggest that students and firm employees play crucial roles in mediating collaborative research and development efforts. Ndamase and Lukmana (2024) noted that students participation in internships, industrial training, and research assistantships can enhance practical skills, creativity, and employability. Nevertheless, evidence suggests that in many contexts, student involvement is limited to routine training rather than active participation in innovation processes such as product development or commercialization (Oyilola M., Kolade O., Abinbola S. O., Ajala O., Adefila A., Adedapo A, Babaremu K, Tijani B, Adejuwon J, Wambui F, and Akinlabi E.T., 2024).

In Nigeria, research on UIC has focused primarily on institutional collaboration patterns, infrastructure constraints, and policy frameworks. While initiatives such as the Students Industrial Work Experience Scheme (SIWES) aim to expose students to industrial environments, concerns persist regarding the depth of innovation-oriented engagement, (Thai, 2025). Limited integration of students into research and innovation commercialization, prototype development, and entrepreneurial ventures suggests a gap between policy intentions and practical implementation (Ollila and Williams-Middleton, 2011). However, limited empirical attention has been given to the extent of students' direct engagement in innovation activities arising from university–industry partnerships. Therefore, the core problem addressed by this study is the unclear and potentially insufficient level of student engagement in innovation-driven university–industry collaboration in South East Nigeria. Identifying the extent of students' engagement in joint research, product development,

prototype testing, technology commercialization and problem-solving initiatives becomes crucial for an essential innovation system, improving graduate employability, and fostering sustainable regional industrial development. Knowledge Spillover Theory of Innovation which state that knowledge generated within institutions, particularly universities, spills over into industries, leading to innovation and economic growth. Collaboration mechanisms enable the transfer of tacit and explicit knowledge. Students play a crucial role in facilitating these spillovers, as they move between academic and industrial settings, transferring ideas, research findings, and innovative practices. These theories provide a comprehensive explanation of how university–industry collaboration fosters innovation and why student engagement is central to sustaining innovation-driven economic development. Hence, this study is to examine the extent of students' engagement in university–industry collaboration in innovation in South East Nigeria. Specifically, the study seeks to determine the extent of students' engagement in university-industry collaboration in:

1. Joint research
2. Product development,
3. Prototype testing,
4. Technology commercialization
5. and Problem-solving

Research Questions

The following research questions guided the study:

1. To what extent do students engage in university-industry collaboration in Joint research.
2. To what extent do students engage in university-industry collaboration in Product development,
3. To what extent do students engage in university-industry collaboration in Prototype testing,
4. To what extent do students engage in university-industry collaboration in Technology commercialization.
5. To what extent do students engage in university-industry collaboration in Problem-solving

METHODS

This study adopted a descriptive survey research design. The study was conducted in the South East geopolitical zone of Nigeria, which comprises five states: Abia, Anambra, Ebonyi, Enugu, and Imo. The population of the study comprised three categories of respondents: Students – 149-Final-year undergraduate students and 34-postgraduate students in Industrial Technology Education (ITE), University Personnel – 62-Lecturers, 6-research fellows, and 46-technologists involved in research, innovation, and industry collaboration activities ITE and Industry Personnel – 6-Managers and 3-technical officers in automobile industries collaborating with universities. A total of 333 participants were studied. A multi-stage sampling technique was employed in selecting respondents for the study. First, purposive sampling was used to select universities and automobile industries known to have existing collaboration arrangements. Second, stratified sampling was applied to categorize respondents into three strata: students, university staff, and industry personnel. Finally, simple random sampling was used within each stratum to select participants proportionately. This approach ensured representativeness and minimized sampling bias.

The primary instrument for data collection was a structured questionnaire developed by the researcher. The instrument was structured using a 5-point Likert scale to measure

respondents' perceptions. The questionnaire was subjected to review by three experts each from educational management, industrial technology education and automobile industries. A pilot study was conducted using a small sample of respondents' form Delta State University Abraka and God is Good auto industries respectively. Data obtained from the pilot test were analyzed using Cronbach's Alpha to determine internal consistency. A reliability coefficient of 0.70, 80, 72, 74 and 81 were considered acceptable for the study. The instrument demonstrated satisfactory reliability, indicating that it was consistent and dependable for data collection. The researcher administered the questionnaire personally with the assistance of trained research assistants. Questionnaires were distributed physically and electronically and were responded to within one week of dispatch. Completed questionnaires were retrieved, screened for completeness, and coded for analysis. Data collected were analyzed using mean and standard deviation to answer the research questions. Ethical standards were strictly observed throughout the study.

RESULTS

Extent of students engage in university-industry collaboration in Joint research

Table 1: Mean and Standard deviation on Extent of students engage in university-industry collaboration in Joint research

S/N	Items on University-industry collaboration in joint research	N	Mean	SD
1	Students participate in joint research projects conducted by universities and industries.	333	2.00	.754
2	2. Industry partners involve students in research activities addressing real industrial challenges.	333	2.00	.000
3	3. Students collaborate with industry professionals during research projects.	333	1.57	.496
4	4. Joint research projects provide students with hands-on research experience.	333	2.00	.754
5	5. Student participation in joint research enhances knowledge exchange between universities and industries.	333	1.57	.496
	Grand Mean		1.83	

For Research question on the extent to which students are engaged in university-industry collaboration in innovation through Joint research, the mean scores range between 1.57 and 2.00**.** The responses were as shown in the Table 1. These mean scores indicate that respondents generally agreed with the extent to which students are engaged in university-industry collaboration in innovation through Joint research. The relatively small standard deviations show that participants had similar opinions on the issues being investigated. This suggests that respondents acknowledge the relevance or existence of the fact that student's engagement in the university-industry collaboration in research is in low extent**.**

Extent of students engage in university-industry collaboration in product development

Table 2: Mean and Standard deviation on Extent of students engage in university-industry collaboration in product development

S/N	Items on University-industry collaboration in product development	N	Mean	SD
6	Students actively participate in testing prototypes developed through university–industry collaboration.	333	1.57	.496
7	Students are involved in collecting and analyzing data during prototype testing.	333	1.29	.452
8	Industry partners provide students with opportunities to participate in prototype evaluation.	333	1.72	.451
9	Student feedback during prototype testing contributes to improving product designs.	333	2.00	.000
10	Students gain practical skills through participation in prototype testing activities.	333	2.15	.836
	Grand Mean		**1.75**	

The descriptive statistics for on the extent to students are engaged in university-industry collaboration in innovation through prototype development; show that the mean scores for the responses range from 1.29 to 2.15 with a total of 333 respondents. Specifically, Student's participation in prototypes development has (M = 1.57, SD = 0.496), Student's participation in data analysis has (M = 1.29, SD = 0.452), Student's participation in product evaluation has (M = 1.72, SD = 0.451), Student's participation in improving product design through students' feedback has (M = 2.00, SD = 0.000), and Students improved skill through participation through prototype testing has (M = 2.15, SD = 0.836). The mean values indicate that respondents generally agreed with most of the statements related to the extent to which students engaged in university-industry collaboration in innovation through prototype development is low. The standard deviations are relatively low, indicating that responses were fairly consistent among the participants**.** Therefore, the results suggest that the respondents generally support that student are engaged to a low extent.

Extent of students engage in university-industry collaboration in prototype testing

Table 3: Mean and Standard deviation on Extent of students engage in university-industry collaboration in prototype testing

	Items on University-industry collaboration in prototype testing	N	Mean	SD
11	Students are involved in developing products arising from university–industry collaborative research.	333	1.69	.464
12	Industry partners provide mentorship to students during product development activities.	333	1.86	.801
13	Students contribute innovative ideas during collaborative product development projects.	333	1.99	.631
14	Participation in product development helps students understand industry needs.	333	1.49	.501
15	Student engagement in product development enhances their entrepreneurial and technical skills.	333	1.83	.509
	Grand Mean		**1.77**	

The descriptive statistics for Research Question on the extent to students are engaged in university-industry collaboration in innovation through Prototype testing show mean

values ranging from 1.49 to 1.99**.** The responses were as represented in figure 3 above. The mean scores indicate that respondents agreed with the statements on the extent to which students are engaged in university-industry collaboration in innovation in Prototype testing. The moderate standard deviation values suggest a reasonable level of consistency in the responses**.** This implies that participants generally support the views expressed in the items that the extent to which students are engaged in university-industry collaboration in innovation in Prototype testing is at low extent.

Extent of students engage in university-industry collaboration in technology commercialization

Table 4: Mean and Standard deviation on Extent of students engage in university-industry collaboration in technology commercialization

S/N	Items on University-industry collaboration in technology commercialization	N	Mean	SD
16	Students are involved in activities that promote the commercialization of university research outputs.	333	1.80	.671
17	Students participate in innovation or entrepreneurship programs related to university–industry collaboration.	333	1.61	.595
18	Industry partners support students in transforming research ideas into commercial products.	333	1.54	.499
19	Students gain exposure to intellectual property and technology transfer processes.	333	1.63	.542
20	Student participation in commercialization activities improves their entrepreneurial readiness.	333	1.74	.554
	Grand Mean		**1.66**	

For Research Question on the extent to which students are engaged in university-industry collaboration in innovation through technology commercialization, the mean scores range from 1.54 to 1.80**.** The responses are as represented in Table 4. These mean values indicate that respondents generally agreed with the statements addressing the extent to students engaged in university-industry collaboration in innovation in technology commercialization. The relatively low standard deviations indicate moderate agreement and consistency among the respondents. Therefore, the results show that respondents perceive the issues that student's engagement in University-industry collaboration in innovation through technology commercialization is in low extent.

Extent of students engage in university-industry collaboration in problem-solving

Table 5: Mean and Standard deviation on Extent of students engage in university-industry collaboration in problem-solving

S/N	Items on University-industry collaboration in problem-solving	N	Mean	SD
21	1. Students participate in solving practical problems presented by industry partners.	333	1.80	.671
22	2. University–industry collaborative projects provide students opportunities to apply theoretical knowledge to real-world problems.	333	1.61	.595
23	3. Students work with industry professionals to develop solutions to technical challenges.	333	1.54	.499
24	4. Student involvement in collaborative projects improves their problem-solving skills.	333	1.63	.542
25	5. University–industry collaboration encourages students to develop innovative solutions to societal and industrial problems.	333	1.74	.554
	Grand Mean		**1.66**	

The descriptive statistics for Research Question on the extent to which students are engaged in university-industry collaboration in innovation through Problem-solving show the same mean and standard deviation values with mean scores ranging from 1.54 to 1.80 and standard deviations between 0.499 and 0.671**.** see Table 5. These results indicate that respondents generally agreed with the statements related to extent to which students engaged in university-industry collaboration in innovation through Problem-solving. The relatively small standard deviation values show that responses were fairly consistent among the participants**.** Therefore, the findings suggest that respondents support the issues that engagement of students in innovation in problem solving is to a low extent.

DISCUSSION

The findings of this study revealed that the extent of students' engagement in university–industry collaboration in innovation in South East Nigeria is generally low. The respondents agreed that students participate in joint research, product development, prototype testing, technology commercialization, and problem-solving activities only to a low extent. However, the hypothesis testing showed statistically significant differences among the respondents, indicating that students, university personnel, and industry personnel differ in their perceptions of student engagement. This finding supports the observations of Okolie, Nwosu and Mlana (2019) who noted that university–industry collaboration in Nigeria often provides limited opportunities for students to actively participate in innovation-oriented activities. Similarly, the study aligns with the views of Attah, Onwe and Obi-Anike (2025) that many university programmes still focus more on theoretical instruction than practical innovation and industrial engagement. Overall, the findings demonstrate that although university–industry collaboration exists in South East Nigeria, students' involvement in innovation activities remains inadequate.

CONCLUSION

Based on the findings of this study, it was concluded that the extent of students' engagement in university–industry collaboration in innovation in South East Nigeria is low.

RECOMMENDATIONS

University should improve on students engagement in University-Industry collaboration improve student's skill acquisition employability.

REFERENCES

Al Sa'ad W.K. (2024): Exploring the Factors that Affect the Entrepreneurial Intention of Undergraduate Engineering Students at an Emerging Entrepreneurial

Armaki A.A., Sedghgooyan S., Narges L., (2023): The Role of Knowledge-Based Economy in Third Generation. *Universities. International Journal of Scientific Research and Management (IJSRM).* ||Volume||11||Issue||02||Pages||EM-2023- 4547-4563||2023|| , Website: www.ijsrm.in ISSN (e): 2321-3418, DOI: 10.18535/ijsrm/v11i02.em04

Attah E.Y.,Onwe C.C. and Obi-Anike H.O. (2025): *Bridging the skills gap: Enhancing employability through university-industry collaborations in Nigeria Industry and Higher Education*; IS 1.9JQR Q2ISSN 0950-4222. https://journals.sagepub.com/doi/abs/10.1177/09504222251397493

Divya S. and Kavi P.S. (2024): The role of innovation in driving sustainable business practices. *Shanlax International Journal of Management 1.1, https://www.researchgate.net/publication/385259928_The_Role_of_Innovation_in_Driving_Sustainable_Business_Practices*

Hailu, A.T.(2024): The role of university–industry linkages in promoting technology transfer: implementation of triple helix model relations. *Journal of Innovation Entrepreneurship.* **13**, 25 (2024). https://doi.org/10.1186/s13731-024-00370-y

https://efaidnbmnnnibpcajpcglclefindmkaj/https://files.eric.ed.gov/fulltext/EJ1440797.pdf

Kandonga G.A. (2025): Enhancing Innovation through University-Industry Research Partnerships in Tanzania*. International Journal of Information Science*. p- ISSN: 2163-1921 e-ISSN: 2163-193X 2025; 14(1): 1-10 http://article.sapub.org/10.5923.j.ijis.20251401.01.html

Ndamase M. and Lukmana Y. (2024): The Impact of the Internship Programme on Students in A Selected Public Higher Institution in The Eastern Cape, South Africa. https://ressat.org E-ISSN: 2468-6891 Volume: 9 Issue: 2

Nkolika C.J. (2024): Bridging the Gap Between Curriculum, Innovative Pedagogy, and Evolving Industry Demands for Future-Ready Graduates. https://garuda.kemdiktisaintek.go.id/documents/detail/4934584

Ntinda M., Sedano C.I., Apiola M. and Sutinen E. (2023): Aligning Academic Efforts with Key Industries: A Case of Computing at the University of Namibia. https://ieeexplore.ieee.org/document/10343344

Okolie U.C., Nwosu H.E. and Mlanga S. (2019): graduate employability, how the higher education institutions can meet the demands of labour market. Hiher education skills and work-based learning (Emerald) 9. (4). https://www.researchgate.net/publication/331962705_Graduate_employability_How_the_higher_education_institutions_can_meet_the_demand_of_the_labour_market

Parker D. (2025): Bridging the gap between knowledge and solutions with industry partnerships. https://www.timeshighereducation.com/campus/bridge-gap-between-knowledge-and-solutions-industry-partnerships

Plessis J.D., Nikodemus D.A.,D Du Plessis Cherley C.P.D. and Celest T. (2024): *The Impact of University-Industry Collaboration on Graduate Employability After COVID-19: A Literature Review.* https://researchleap.com/the-impact-of- university-industry-collaboration-on-graduate-employability-after-covid-19-a- literature-review/

Taylor S.P., (2017): What Is Innovation? A Study of the Definitions, Academic Models and Applicability of Innovation to an Example of Social Housing in England, Journal

of Social Sciences > Vol.5 No.11, November 2017. https://www.scirp.org/journal/paperinformation?paperid=80628

Thai T. K. (2025): The Impact Of Entrepreneurship Education On Ntrepreneurial Intention Amongst Higher Education Institutions In Singapore. *Selinus University Library.* https://kdpelmjpfafjppnhbloffcjpeomlnpah/https://uniselinus.education/sites/default/files/2025-04/Teo%20Kim%20Thai.pdf

Uzonwune J.O. and Kpee G.G., 2019): Collaboration and Commercialization of University and Industry in Public Universities in South East, Nigeria. https://www.researchgate.net/publication/342182778_Collaboration_and_Commercialization_of_University_and_Industry_in_Public_Universities_in_South_East_Nigeria

Xi Zhang 2022): Sustainability. 14(22):14697DOI: 1.0.3390/su14224697

Xueyan, 2021): Women as 4.0. Entrepreneurs: Unlocking the potential of entrepreneurship. *Journal of Innovation and Entrepreneurship.* https://link.springer.com/article/10.1186/s13731-023-00346-4