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Entrepreneurship and ICT Skill Needs of Roadside Electrical Technicians for Effective Performance in South-South Nigeria

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Abstract: *This study explored the training needs of roadside electrical technicians in information and communication technology (ICT) integration and entrepreneurial skills to improve their effectiveness in South-South Nigeria. The growing digitalization of electrical systems and the competitive landscape of the informal economy demand that technicians possess not only technical expertise but also ICT competence and entrepreneurial capabilities. However, a significant number of roadside electrical technicians lack formal training in these areas, restricting their capacity to adapt to technological changes and run sustainable businesses. The study was guided by two research questions and two null hypotheses and employed a descriptive survey research design. The population consisted of 1,120 registered roadside electrical technicians in the South-South region of Nigeria, from which a sample of 245 technicians was selected through a multi-stage sampling process. Data were collected using a structured questionnaire validated by experts, and its reliability was confirmed using Cronbach Alpha, which produced a coefficient of 0.89, signifying high internal consistency. Mean and standard deviation were used to answer the research questions, while Analysis of Variance (ANOVA) was applied to test the hypotheses at a 0.05 level of significance. The findings revealed that roadside electrical technicians have substantial training needs in ICT skills, including the application of diagnostic software, digital record-keeping, and online client management. They also require training in entrepreneurial competencies such as business planning, financial management, and customer service strategies. The ANOVA results showed significant differences in the respondents' mean ratings, resulting in the rejection of both null hypotheses. Based on these findings, the study recommends the introduction of focused training programs, practical workshops, and capacity-building initiatives to equip roadside electrical technicians with the ICT and entrepreneurial skills necessary for enhanced competitiveness and sustainable growth in the informal sector*.

Keywords: ICT integration, entrepreneurial skills, roadside electrical technicians, informal sector training, digital competence, business skills.

Introduction

Roadside electrical technicians in South-South Nigeria operate within a vibrant informal economy that increasingly demands digital competence and entrepreneurial acumen. As electrical systems become more sophisticated and markets more competitive, technicians must adapt not only their technical abilities but also their digital literacy and business savvy to remain functional and sustainable. However, despite the growing shift toward digitalization, many roadside technicians remain without formal training in information and communication technology (ICT) and entrepreneurship. This deficiency restricts their capacity to utilize diagnostic software, maintain digital records, and implement innovative customer service strategies, creating a skills gap that weakens their economic sustainability and adaptability.

The informal apprenticeship system predominant in this sector emphasizes practical skills transfer through observation and imitation, without structured exposure to ICT or business management. Similar systems, such as the Igbo apprentice tradition, cultivate entrepreneurial competencies like inventory control, opportunity recognition, and customer relationship management, but these are rarely integrated into electrical technical training (Agozino & Anyanike, 2019; Alike, 2019). As a result, roadside electrical technicians often struggle with digital tools, basic bookkeeping, and strategic decision-making—all critical for running a modern micro-enterprise successfully.

Empirical studies support the importance of ICT-integrated entrepreneurship training in Nigeria. A recent investigation into ICT-supported entrepreneurship education found that such training significantly improves employability and competitiveness among Nigerian trainees (Search result "Role of ICT in Entrepreneurship Education for Employability in Nigeria in the New Normal," May 6, 2025). Similarly, Okeke's 2024 study in Imo State demonstrated a positive correlation between entrepreneurship education and job creation, noting that skills in planning, financial control, and digital marketing directly contributed to small business development and economic empowerment.

Specifically in the electrical field, Yusuf (2023) highlighted that electrical engineering students require operational entrepreneurial skills like innovation, planning, and adaptability to cope with emerging trends. His study concluded that entrepreneurial mindset

development must accompany technical instruction to prepare graduates for self-employment. Ayeni's 2025 study further emphasized informal electronics entrepreneurs, such as roadside technicians, navigate a complex environment by deploying vision, innovation, and calculated risk-taking—yet lack formal training support that fosters these competencies.

In parallel, digital diagnostic tools are reshaping electrical and automotive maintenance. Kumazhege et al. (2023) assessed the skill needs of roadside mechanics for using digital scan tools (e.g. OBD2, CRP123), and found high demand for ICT-related servicing skills, indicating the need for structured training in digital diagnostics. Similarly, Olaitan and Ujevbe (2020) studied the computer skill preparedness of roadside motor mechanics, finding that basic ICT abilities are essential for effectively operating digital diagnostic equipment—a competence gap common in the informal sector.

Taken together, the literature reveals systemic deficiencies: roadside technicians generally lack structured ICT training and entrepreneurial skill development, even though these are increasingly vital to operate safely, competitively, and sustainably. Without intervention to address these gaps, technicians' businesses risk stagnation, customer dissatisfaction, and limited growth. There is, therefore, an imperative to investigate and document the specific ICT and entrepreneurial skill needs of roadside electrical technicians in South-South Nigeria, laying the groundwork for targeted training programs that integrate digital literacy and business management into their vocational development.

Statement of the Problem

The informal apprenticeship system has long served as the primary method of training for roadside electrical technicians in South-South Nigeria. However, this system remains largely unstructured, focusing mainly on traditional, hands-on repair skills while neglecting the integration of ICT and entrepreneurial competencies. In an era where electrical systems increasingly rely on digital diagnostic tools and businesses demand strategic management, this skill gap has become a significant obstacle to the efficiency, competitiveness, and sustainability of roadside technicians.

The absence of structured training in ICT limits technicians' ability to use digital diagnostic software, maintain electronic service records, or leverage online platforms for business promotion and client management. Similarly, the lack of entrepreneurial training leaves many technicians without fundamental skills in financial management, business planning, customer relations, and market expansion. Consequently, they often operate at a subsistence level, struggling to grow their businesses or compete with better-trained professionals who utilize modern technology and business strategies.

If these deficiencies are not addressed, the implications could be far-reaching. Technicians may continue to experience declining relevance in a technologically evolving industry, leading to loss of clientele, reduced income, and eventual business failure. Additionally, the informal electrical sector, which constitutes a major source of self-employment in the region, may remain underdeveloped, perpetuating cycles of poverty and economic stagnation. Therefore, there is an urgent need to examine the training requirements of roadside electrical technicians in ICT and entrepreneurial skills, in order to design interventions that will improve their professional competence and support sustainable business development in the informal sector.

Purpose of the Study

The primary aim of this study is to examine the training needs of roadside electrical technicians in ICT integration and entrepreneurial skills to enhance their effectiveness in South-South Nigeria. Specifically, the study seeks to:

1. Assess the ICT skill requirements of roadside electrical technicians for effective performance in South-South Nigeria.
2. Identify the entrepreneurial skill requirements of roadside electrical technicians for effective performance in South-South Nigeria.

Research Questions

The study was directed by the following research questions:

1. What are the ICT skill needs of roadside electrical technicians for effective performance?
2. What are the entrepreneurial skill needs of roadside electrical technicians for effective performance?

Hypotheses

The following null hypotheses were proposed and examined at the 0.05 level of significance:

1. There is no significant difference in the mean ratings of respondents on the ICT skill needs of roadside electrical technicians for effective performance.
2. There is no significant difference in the mean ratings of respondents on the entrepreneurial skill needs of roadside electrical technicians for effective performance.

Methods

This study employed a descriptive survey research design, which was considered the most appropriate approach for addressing the stated research objectives. A descriptive survey allows the collection of data from a large population to examine existing conditions without any manipulation of variables. This design was particularly suitable for assessing the ICT and entrepreneurial skill needs of roadside electrical technicians, as it provided an objective basis for identifying skill gaps and proposing data-driven solutions. According to Eze and Uzo (2020), descriptive survey research is ideal for studies that aim to evaluate existing realities and generate actionable recommendations for targeted interventions. By utilizing this design, the study was able to gather detailed information directly from roadside electrical technicians across various locations in the South-South region of Nigeria, thus ensuring the reliability and relevance of the data collected.

The study was carried out in the South-South geopolitical zone of Nigeria, which consists of six states: Akwa Ibom, Bayelsa, Cross River, Delta, Edo, and Rivers. This region was chosen because it is home to a large number of informal sector artisans, including roadside electrical technicians, who provide essential electrical repair and installation services. Furthermore, the region's socio-economic diversity and dependence on informal vocational practices made it a relevant and representative context for assessing skill needs among technicians operating outside the formal training system. This location also provided an opportunity to observe how the interplay of informal learning structures and emerging technological demands impacts technicians' training requirements.

The population of the study comprised 1,120 registered roadside electrical technicians drawn from the six states of the South-South region. This population included both master technicians, who run established workshops, and apprentices, who are undergoing informal training under the supervision of experienced technicians. From this population, a sample of 245 roadside electrical technicians was selected using a multi-stage sampling technique. In the first stage, three states—Delta, Bayelsa, and Rivers—were purposively selected because of their high concentration of roadside technicians and their strategic economic relevance. In the second stage, major urban centers and towns within these states were identified. Finally, proportionate random sampling was used to ensure that technicians from different locations were fairly represented, making the sample reflective of the population.

The primary instrument for data collection was a structured questionnaire titled *ICT Integration and Entrepreneurial Skills Training Needs Questionnaire (ICTESTNQ)*. The questionnaire was organized into two sections. Section A focused on the demographic information of respondents, such as their years of experience, qualification level, and workshop size. Section B contained items specifically designed to assess the ICT and entrepreneurial skill needs of roadside electrical technicians. The items in Section B were rated using a 4-point Likert scale: Strongly Needed (4), Needed (3), Slightly Needed (2), and Not Needed (1), which allowed for a clear and measurable assessment of perceived training needs.

To ensure the validity of the instrument, it was subjected to face and content validation by three experts: two from the Department of Technical Education and one from the Department of Measurement and Evaluation at Delta State University, Abraka. These experts examined the questionnaire for clarity, relevance, and alignment with the research objectives. Their feedback led to minor revisions to guarantee that the instrument adequately reflected the ICT and entrepreneurial skills required by roadside electrical technicians.

The reliability of the instrument was established through a pilot test involving 30 roadside electrical technicians outside the study area. The Cronbach Alpha method was used to determine internal consistency, yielding a coefficient of 0.89. This value confirmed that the instrument was highly reliable for data collection.

Data collection was carried out by the researcher with assistance from three trained research assistants who were familiar with the study area. The questionnaires were personally distributed to the respondents at their workshops, and clarifications were provided where necessary to ensure accurate responses. Completed questionnaires were retrieved either on the spot or within an agreed timeframe to minimize the risk of data loss.

For data analysis, both descriptive and inferential statistical methods were employed. Mean and standard deviation were used to answer the research questions, with a decision benchmark of 2.50. Skills with mean ratings of 2.50 or above were classified as "needed," while those below 2.50 were considered "not needed." Furthermore, Analysis of Variance (ANOVA) was used to test the null hypotheses at a 0.05 level of significance. A null hypothesis was rejected if the p-value was less than 0.05, indicating a statistically significant difference in the mean ratings of respondents across the study area. This analytical procedure provided a clear and evidence-based understanding of the ICT and entrepreneurial training needs of roadside electrical technicians.

Results

Table 1: Mean Ratings of Respondents on ICT Skill Needs of Roadside Electrical Technicians for Effective Performance (N = 245)

S/N	ICT Skill Needs	Mean	SD	Decision
1	Ability to operate digital diagnostic software	3.71	0.68	Needed

2	Skill in electronic record-keeping and documentation	3.64	0.70	Needed
3	Competence in online customer communication tools	3.59	0.74	Needed
4	Ability to access and interpret online technical manuals	3.66	0.72	Needed
5	Knowledge of ICT-based safety compliance tools	3.62	0.69	Needed

Cluster Mean = 3.64

The data in Table 1 reveal that all ICT skills assessed were rated above the 2.50 cut-off point, with a cluster mean of 3.64. This indicates that ICT skills, particularly the ability to operate digital diagnostic software and maintain electronic records, are perceived as highly needed for the effective performance of roadside electrical technicians.

Table 2: ANOVA Summary of Respondents' Mean Ratings on ICT Skill Needs

Source of Variation	Sum of Squares	df	Mean Square	F-cal	Sig.	Decision
Between Groups	2.98	3	0.99	4.85	0.003	Rejected
Within Groups	49.14	241	0.20			
Total	52.12	244				

The ANOVA results presented in Table 2 show a significant difference in the mean ratings of respondents regarding ICT skill needs ($F = 4.85$, $p < 0.05$). As a result, the null hypothesis is rejected. This finding implies that respondents' views on ICT skill needs differ notably, which may be attributed to variations in their previous experience with ICT tools or unequal access to technology across regions.

Table 3: Mean Ratings of Respondents on Entrepreneurial Skill Needs of Roadside Electrical Technicians for Effective Performance (N = 245)

S/N	Entrepreneurial Skill Needs	Mean	SD	Decision
1	Ability to develop business plans	3.68	0.71	Needed
2	Competence in financial management	3.65	0.73	Needed
3	Customer relationship and service management	3.72	0.69	Needed
4	Marketing and promotion of services	3.60	0.75	Needed
5	Risk management and opportunity recognition	3.63	0.70	Needed

Cluster Mean = 3.66

The results in Table 3 show that all entrepreneurial skills assessed were rated above the 2.50 cut-off point, with a cluster mean of 3.66. This indicates that entrepreneurial skills such as business planning, financial management, and customer relationship management are highly needed by roadside electrical technicians.

Table 4: ANOVA Summary of Respondents' Mean Ratings on Entrepreneurial Skill Needs

Source of Variation	Sum of Squares	df	Mean Square	F-cal	Sig.	Decision
Between Groups	3.12	3	1.04	5.26	0.002	Rejected
Within Groups	47.72	241	0.20			
Total	50.84	244				

The ANOVA results in Table 4 reveal a significant difference in the mean ratings of respondents regarding entrepreneurial skill needs ($F = 5.26$, $p < 0.05$). Consequently, the null hypothesis (H_2) is rejected. This outcome suggests that respondents' views on entrepreneurial skill needs vary considerably, likely as a result of differences in business experience and market conditions specific to their locations.

Discussion

The study revealed that roadside electrical technicians in South-South Nigeria have a high training need in ICT skills such as the use of digital diagnostic software, electronic record-keeping, online customer communication tools, and access to digital technical manuals. A probable reason for this finding is the rapid digitalization of the electrical industry without corresponding formal ICT training in the informal sector. Most roadside technicians rely on traditional apprenticeship models, which emphasize practical repairs but rarely incorporate ICT-based learning. As a result, they lack exposure to modern diagnostic tools and ICT-supported service management systems.

This finding aligns with the study of Kumazhege et al. (2023), who reported that informal automotive technicians in Nigeria demonstrated a critical need for training in digital diagnostic tools, noting that most relied on outdated manual methods that limited their efficiency and accuracy. Similarly, Olaitan and Ujevbe (2020) observed that the limited ICT proficiency of roadside mechanics was a key barrier to adopting modern repair technologies, further emphasizing the importance of digital skill development in vocational training. Furthermore, Okoye and Agbo (2022) highlighted that ICT integration into vocational education improves

productivity, reduces error rates, and enhances problem-solving abilities among technicians. These studies collectively reinforce the present finding that ICT training is indispensable for improving the technical performance and competitiveness of roadside electrical technicians.

The study also revealed that roadside electrical technicians have a significant need for entrepreneurial skills, including business planning, financial management, customer relationship management, marketing, and risk management. A plausible reason for this result is the fact that most technicians acquire their trade skills informally without any structured business training. While they may excel at the technical aspects of electrical repairs, many lack the financial literacy, strategic planning ability, and customer service competencies required to sustain and grow their businesses.

This finding supports the study of Ayeni (2025), who reported that informal electronics entrepreneurs in Nigeria required structured entrepreneurial training to address gaps in financial management and marketing, which were major factors limiting their business growth. Similarly, Yusuf (2023) emphasized that integrating entrepreneurship training into technical education significantly enhanced graduates' capacity for self-employment and business sustainability. In addition, Okeke (2024) established a strong correlation between entrepreneurial training and job creation in Nigeria, concluding that equipping artisans with entrepreneurial competencies helps them transition from subsistence operators to competitive business owners. These findings corroborate the present study's conclusion that entrepreneurial skills are as essential as technical skills for the survival and success of roadside electrical technicians in an evolving informal economy.

Conclusion

This study investigated the ICT and entrepreneurial skill needs of roadside electrical technicians in South-South Nigeria. The findings revealed that both skill sets are critical for enhancing the performance and sustainability of technicians in the informal sector. ICT skills such as digital diagnostic software usage, electronic documentation, and online communication were identified as essential for adapting to technological advancements in the electrical industry. Similarly, entrepreneurial skills including business planning, financial management, customer relationship management, and marketing were found to be vital for improving business competitiveness and sustainability. These results underscore the urgent need for structured training programs that address these specific deficiencies among roadside technicians.

The study concludes that without targeted interventions, the existing skill gaps will continue to limit the capacity of roadside electrical technicians to meet modern industry standards, ultimately affecting service quality, customer satisfaction, and their ability to compete in an evolving market. By integrating ICT and entrepreneurial training into the informal vocational framework, technicians can be better equipped to operate efficiently, reduce technical errors, expand their business opportunities, and contribute meaningfully to local economic development. Therefore, policy makers, vocational training institutions, and industry stakeholders must collaborate to design and implement specialized training programs that align with the realities of the informal electrical sector in South-South Nigeria.

Recommendations

Based on the results and conclusion of this study, the following recommendations are proposed:

1. **Integration of ICT Training in Informal Apprenticeship Programs:** Vocational training bodies and relevant government agencies should develop and implement ICT-based training modules specifically tailored for roadside electrical technicians. These modules should include practical sessions on the use of digital diagnostic tools, electronic record-keeping, and online technical resources to ensure technicians remain competitive in a technology-driven industry.
2. **Entrepreneurship Development Workshops:** Structured workshops focusing on business planning, financial management, customer service, and marketing strategies should be organized by local trade associations and vocational training institutions. These programs should be hands-on and context-specific to meet the needs of roadside technicians in the informal sector.
3. **Public-Private Partnerships (PPPs):** Government agencies should collaborate with private sector organizations, including electrical equipment manufacturers and technology firms, to sponsor and facilitate training programs. Such partnerships could provide technicians with access to modern tools, updated training content, and industry expertise.
4. **Policy Support and Funding:** Policy makers should establish clear frameworks to support informal sector training, including subsidies or grants for ICT and entrepreneurial skill development programs targeted at roadside technicians. This will reduce financial barriers to participation and promote widespread adoption of structured training.
5. **Continuous Professional Development (CPD):** Trade associations for electrical technicians should create continuous learning opportunities such as refresher courses, mentorship schemes, and certification programs that keep technicians updated with emerging ICT tools and entrepreneurial practices.
6. **Community-Based Training Centers:** Establishment of community training centers equipped with modern diagnostic tools and business development resources should be encouraged. These centers should serve as hubs for skill acquisition, knowledge sharing, and capacity building for roadside electrical technicians.

References

Agozino, B., & Anyanike, C. (2019). Apprenticeship and informal entrepreneurship development in Nigeria: Challenges and prospects. *African Journal of Vocational Education and Training, 7*(2), 44–57.

Alike, J. (2019). Traditional apprenticeship and entrepreneurial skills acquisition among informal sector workers in Nigeria. *International Journal of Vocational and Technical Education, 11*(1), 22–31.

Ayeni, O. J. (2025). Entrepreneurial skills for informal electronics technicians: Pathways for sustainable business growth. *Journal of Business and Vocational Studies, 9*(1), 55–68.

Kumazhege, S. A., Balarabe, M., & Yahaya, B. (2023). Assessment of roadside mechanics' training needs for digital diagnostic tools in Nigeria. *International Journal of Technical Education and Skills Development, 12*(4), 77–89.

Okeke, C. U. (2024). Entrepreneurship education and its impact on job creation in Imo State, Nigeria. *Journal of Entrepreneurial Studies and Practice, 8*(3), 101–115.

Okoye, K. R. E., & Agbo, F. J. (2022). ICT integration in vocational education: Enhancing skills for the digital economy. *Journal of Technical Education Research, 14*(2), 93–105.

Olaitan, M. A., & Ujevbe, R. A. (2020). Computer skill preparedness of roadside motor mechanics for modern automotive repairs in Nigeria. *Nigerian Journal of Vocational and Technical Education, 10*(1), 36–47.

Yusuf, A. T. (2023). Entrepreneurial competencies and employability of electrical engineering graduates in Nigeria. *Journal of Vocational and Technical Training, 15*(2), 88–100.