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Entrepreneurial Skills for Operational Adaptation to Emerging Trends in the Electrical Industry

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***Abstract*—The study's primary purpose was to assess the entrepreneurial skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria. The study, which adopted a descriptive survey research design, was conducted in northeast Nigeria and had three research questions and three null hypotheses. The study population was 211, which comprised 178 Lecturers of electrical/electronics from the three Federal Universities and seven polytechnics offering electrical/electronics engineering and 49 electrical/electronics industry supervisors in 33 establishments in North Eastern Nigeria. The study adopted a purposive sampling technique in which the entire population was used as the sample for the analysis. A structured questionnaire developed by the researcher titled Questionnaire for Entrepreneurial Skills Required by Electrical Engineering Students for Operational Adaptation to Emerging Trends (QESTREESOAET) was used as an instrument for data collection. Three experts validated the instrument, and a reliability index of 0.89 was obtained using Cronbach Alpha. The mean statistic was used to answer the research questions, while the t-test was used to test the null hypotheses at a 0.05 significance level. The study's findings revealed that ten managerial, ten accounting and 18 marketing entrepreneurial skills were identified as necessary skills for operational adaptation to emerging trends in the Electrical Industry in Nigeria. Based on the findings, the study recommended that the National University Commission (NUC), National Board for Technical Education (BTE) and the National Commission for Colleges of Education (NCCE) should develop a curriculum that will adequately introduce the concept of management and its importance to the students for adequate assimilation and practice for all students of electrical engineering.**

***Index Terms*—Electrical Engineering, Electrical Industry, Emerging Trends, Entrepreneurial Skills, Operational Adaptation**

I. Introduction

THE National Policy on Education defines the institutions offering tertiary education, including Universities, Colleges of Education and Polytechnics. Electrical engineering programs run at the universities and the Polytechnics are regulated by the Government through the National University Commission (NUC) and the National Board for Technical Education (NBTE), respectively [1].

The Universities produce Electrical engineers at degrees and postgraduate levels, while the Polytechnics produce Electrical Technologists at the Higher National Diploma levels. They also graduate Electrical Technicians at the lower (National Diploma) levels. In the University, electrical engineering is a five-year course distributed through ten semesters. The 10th is carried out of school on Industrial training attachment. The Polytechnics ran a 2-year (4 semester) program with three months of Industrial training between the second and the third semester for the National diploma. The Higher National Diploma (HND) program is also a 2-year (4-semester program), but there is a prerequisite that candidates should have done a compulsory one-year industrial service [2]

Bachelor's degree in an electrical engineering program that is run at Nigerian universities operates academic curricula that are tailored along the stipulations contained in the National University Commission (NUC), Benchmark Minimum Academic Standards(BMAS) and as required by the Council for the Regulation of Engineering in Nigeria, (COREN). According to the BMAS document, the general philosophy is to produce graduates with high academic standards and adequate practical backgrounds for operational adaptation and be of immediate value to the industry and the community in general [3].

As contained in the Nigerian education policy, the general objective of technical education is to prepare learners for independent living and coping with an emerging trend in each discipline. The need to attain this objective is more critical today in the face of economic, environmental, and social challenges [4]; Ref. [5] further suggests that Nigerian students of today can meet future challenges if their schooling and informal learning activities prepare them for the students' roles as citizens, employees, managers, parents, volunteers and entrepreneurs. For these students to reach their full potential as adults, they need to develop a range of skills and knowledge that would facilitate mastery of electrical engineering entrepreneurial skills under the teacher's guidance [6]. To improve the quality of electrical engineering graduates' entrepreneurial skills and pave the way for effective functioning and adaptation to the emerging trends in the electrical industry in Nigeria, Electrical engineering students must acquaint themselves with adequate entrepreneurial skills that will stand the test of time in emerging economics and trends [7].

Entrepreneurial skills are simply business skills that an individual acquires to enable him to function effectively in the

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turbulent, ever-changing business environment as an entrepreneur in the Electrical Industry in Nigeria [8]. Agbonifoh, in Ref [7], also defined entrepreneurial skills as skills relating to identifying business opportunities and receiving a sustainable income from these opportunities. Acquiring entrepreneurial skills means combining personal characteristics and financial resources within one's environment and taking advantage of them for rewarding outcomes.

Ref. [9] posited that acquiring entrepreneurial skills means finding and evaluating business opportunities, gathering the necessary resources, initiating appropriate action to ensure success, and implementing measures to take advantage of the opportunities for a rewarding outcome. According to Ref. [10], the entrepreneur engages in business enterprise, often with some personal financial risk.

Ref. [8] also opined that entrepreneurs can see and evaluate business opportunities, gather the necessary resources, take advantage of them, and initiate appropriate action for success. However, an entrepreneur is a person who operates a new enterprise or venture and assumes some accountability for the inherent risks. The entrepreneur is also anybody who organises, manages a business undertaking, and carries a chance for the sake of profit [11]. For the essence of this paper, an entrepreneur is a person who constantly searches for change, responds to it and exploits it as an opportunity.

In Nigeria, there is a growing concern over the massive turnout of unemployed youths annually from all educational institutions. As students of all professions are now affected by unemployment, entrepreneurship skills are needed by students for self-employment and other gainful employment at the end of their program. Therefore, only a practically entrepreneurship-oriented education and skill and skills training program is needed for operational adaptation in Nigeria [9]. There is, therefore, a need to identify the skills in entrepreneurship education necessary for the student's success in moving into the labour market and sustaining themselves through effective participation in all activities in the industry.

Ref. [10] asserted that at the end of entrepreneurship education courses, the students are expected to have achieved the following qualities to enhance their employment: good human relations and creativity. An entrepreneur is also likely to develop the following characteristics: a desire for responsibility, a preference for moderate immediate feedback, a high energy level, future-oriented, high organisational skills and a belief in achievement. The following personal qualities relevant to employment can be generally attributed to entrepreneurship education: the ability to organise, suggest ideas, improve, and be sensitive to criticism. The job qualities included perseverance, cheerfulness, dependability, patience, physical fitness, confidence, friendship, estheticism, persistence and cooperation [9].

Ref. [12] mentioned that managerial, accounting, and marketing skills are essential for any student of Electrical Engineering to effectively function and meet up with the emerging trends in the Electrical Industry and the labour market in Nigeria. Managerial skills are a vital core skill needed for effective management of an enterprise. Management is the art of getting things done through people. According to Ref. [13], management is the process of harnessing diverse resources (materials, finance, people and time) in a manner as to achieve what the organisation set to perform. It equally involves good planning, organising, directing and controlling of workers and materials to effectively and efficiently meet the set objectives of an enterprise [14].

Osuala in Ref. [12] defined management as organising, planning and controlling the total business activities and leading people so that the use of material, men and equipment efficiently achieves planned objectives.

According to Ref. [15], managerial skills are required by Electrical Engineering students in starting, developing and managing an enterprise. It also includes decision-making, control, and negotiation skills, essential in creating and growing a new business venture [16]. Therefore, management skills are essentially needed by entrepreneurs so that they can effectively achieve their business goals through coordinated efforts of planning, organising, staffing, directing and controlling, as well as marketing products and services [17]

Marketing products and services at a profit is the overall goal of every entrepreneur. The sole aim of marketing is to ensure that the products or services required by the customers or consumers are made available at affordable prices with a good profit margin. The implication, according to Ref. [18], is that the entrepreneurs must be able to determine the customers' needs and devise how best the requirements would be met, judiciously select the market to be served and identify the possible advantages at their disposal to be able to compete favourably with other competitors or have the edge over others.

Ref. [27] posited that acquiring marketing skills offers the entrepreneur a unique strategy for succeeding in business. The entrepreneur can provide the right product to his targeted customers. He can cost and determine his product price and which will be acceptable to the customers, based on their perception of the value and a cost that allows for profit making. Business-related students require these marketing skills to enable them to identify their potential customers and persuade them to buy their products or services.

According to Ref. [19], an entrepreneur's success is measured by how profitable the enterprise or firm is and the growth it has recorded over the years. It is so in cognisance that these entrepreneurs are not money management or financial control experts. In other words, they have limited knowledge of finance and accounting, though they are technically competent by their education/skill training.

The knowledge of fundamental accounting skills by Electrical Engineering students will promote their good financial management, which is aimed at ensuring that there is adequate cash in hand to meet the necessary current and capital expenditures as well as to assist in maximising growth and profits [23]. It requires knowledge of liquidity. Money management demands that Electrical Engineering students plan for all their future needs and plan for the most economical way of acquiring funds from different sources. According to Ref.

[20], the students should also be able to prepare for the most efficient way of using earned money from friends, family members, banks, and other sources.

Observationally, it is evident that many skilled entrepreneurs have gone bankrupt due to poor financial management and inadequate educational preparation. Knowledge of essential accounting functions is generally of utmost importance to craftsmen entrepreneurs. It, as has been mentioned, is acquired through entrepreneurship education.

According to Ref. [18], appreciation of accounting functions and their uses will help Electrical Engineering students to have reasonable financial control of their business; it will help them to improve their public or outside image in terms of borrowing at favourable terms; it will assist the artisan's entrepreneurs in anticipating and providing for seasonal fluctuations in cash inflows or outflows.

A. Statement of the Problem

Entrepreneurial skills have been acknowledged as potent and viable tools for self-empowerment, job creation, and economic survival. Hence, the Nigerian Government made entrepreneurship studies compulsory in all higher institutions to equip graduates with entrepreneurship skills [19]. Electrical Engineering is designed to turn out knowledgeable and skilful graduates who will succeed in teaching, office work or entrepreneurship. It is, therefore, surprising and, at the same time, disappointing that many of them are circulating curriculum vitae in search of scanty employment opportunities because they need to possess entrepreneurial skills for self-employment. No little wonder the Executive Secretary of the National Universities Commission stated that the quality and focus of the training offered by universities are not in tune with the needs of society and has led to high graduates unemployment in Nigeria as the skills they possess are not directly relevant to the needs of the labour market, hence rendering them unemployable [20]. It makes it imperative to assess the extent of the entrepreneurial skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria.

B. Purpose of the study

The study's primary purpose was to assess the entrepreneurial skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria. Specifically, the study sought to determine the following:

- Managerial entrepreneurship skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria;
- Accounting entrepreneurship skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria;
- Marketing entrepreneurship skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria.

C. Research Questions

The following research questions were formulated to guide the study:

- What managerial entrepreneurship skills are required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria?
- What accounting entrepreneurship skills are required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria?
- What marketing entrepreneurship skills are required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria?

D. Hypotheses

- HO1: The mean response of lecturers and Electrical Engineering industry supervisors on the managerial entrepreneurship skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria is the same.
- HO2: There is no significant difference between the mean response of lecturers and Electrical Engineering industry supervisors on the accounting entrepreneurship skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria
- HO3: The mean response of lecturers and Electrical Engineering industry supervisors on the marketing entrepreneurship skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria is the same.

II. METHODS

The study in North East Nigeria adopted a descriptive survey research design. North East, Nigeria is located within latitude 6.260 East and longitude 4.920 North East of the equator. The zone comprises Adamawa, Bauchi, Borno, Gombe, Taraba and Yobe States. The study population was 211, which comprised 178 Lecturers of electrical/electronics from the three (3) Federal Universities and seven (7) polytechnics offering electrical/electronics engineering and 49 electrical/electronics industry supervisors in 33 establishments in North Eastern Nigeria. Due to the manageable size of the population, the whole population was used as a sample for the study, hence the adoption of the purposive sampling technique. The instrument used for data collection was a structured questionnaire developed by the researchers tagged: "Questionnaire for Entrepreneurial Skills Required by Electrical Engineering Students for Operational Adaptation to Emerging Trends (QESTREESOAET)". See Table I. The responses on the questionnaire were structured on a 5-point Rating scale of Highly Required (HR) = 5, Required (R) = 4,

Moderately Required (MR) = 3, Slightly Required (SR) = 2, and Not Required (NR) = 1. The questionnaire was validated by three validates from the Department of Electrical Technology Education, Modibbo Adama University, Yola, Adamawa State, Department of Electrical/Electronics Technology, Abubakar Tafawa Balewa University, Bauchi and Department of Electrical/Electronics, Federal Polytechnic, Damaturu, Yobe State.

TABLE I
ITEMS OF THE QUESTIONNAIRE

S/N	ITEMS
Managerial Skills	
1.	Ability to communicate effectively
2.	Ability to carry out effective planning
3.	Ability to control both human and material resources
4.	Ability to carry out adequate inventory supervisory
5.	Ability to schedule jobs based on priority
6.	Ability to maintain good human relations skills
7.	Ability to coordinate activities within the industry
8.	Ability to effectively direct tasks within the industry
9.	Set the appropriate duration for all activities within the industry
10.	Managing a cordial relationship between management and other members of staff in the industry for the realisation of industry objectives
Accounting Skills	
11.	Ability to differentiate between revenue and expenditure accounts
12.	Knowing posting all expense accounts effectively in the ledger
13.	Ability to identify which account to debit and which to credit in the ledger
14.	Ability to record sums drawn from a bank with cheques in the cash book
15.	Deduct return inwards from the sales for the period
16.	Determine the trading status of the business
17.	Ability to identify profit and loss account
18.	Ability to prepare the trading account
19.	Ability to record money paid into the bank by customers
20.	Have a good understanding that bank charges increase the balance in the cash book and reduce the balance in the bank
Marketing Skills	
21.	Ability to acquire effective sales techniques
22.	Ability to capture the attention of customers
23.	Ability to carry out effective marketing/ information research
24.	Ability to choose appropriate advertising techniques for goods and services
25.	Ability to convey to others a message without commanding
26.	Ability to determine demand and supply situation
27.	Ability to determine the needs of customers
28.	Ability to develop good negotiation skills
29.	Ability to retain the attention of customers
30.	Accept feedback from others
31.	Ability to communicate orally effectively
32.	Ability to communicate with individuals with various depths of knowledge capabilities
33.	Ability to communicate with others using electronic communication
34.	Provide specific details about the company's product or services
35.	Ability to understand the needs of customers
36.	Ability to determine the extent to which products will sell
37.	Ability to identify new trends in the marketing environment
38.	Ability to make goods and services available to customers

After conducting a trial test of the instrument on 12 lecturers in Federal Polytechnic Nasarawa, Nasarawa State and 10 Industrial supervisors from Nasko Biscuit Company, Jos Plateau State, a reliability index of 0.89 was obtained using the Cronbach Alpha method. Data for the study was collected by the researchers with the help of five research assistants. The mean statistic was used to answer the three research questions, while a t-test was used to test the null hypotheses of the study. All items scaled on the questionnaire were decided based on the actual limits of numbers, as shown in Table II.

TABLE II
SCORE INTERPRETATION

Score Range	Interpretation
5.00-4.50	Highly Required (HR)
4.49-3.50	Required (R)
3.49-2.50	Moderately Required (MR)
2.49-1.50	Slightly Required (SR)
1.49-0.00	Not Required (NR)

In deciding on the hypothesis, where the p-value was more significant than the α-value, the null hypothesis was considered "Significant (S)" and, if otherwise ", Not Significant (NS)".

III. RESULTS

A. Abbreviations and Acronyms

Research Question 1: What are the managerial entrepreneurship skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria?

TABLE III
MANAGERIAL ENTREPRENEURSHIP SKILLS REQUIRED

	N_L =178	n_i= 33	N = 211		
S/N	$\bar{x}_t$	$\bar{x}_i$	$\bar{x}_G$	**σ**	**Remark**
1.	4.57	4.52	4.56	0.79	HR
2.	3.66	3.85	3.69	1.33	R
3.	3.98	4.09	4.00	1.33	R
4.	4.40	4.21	4.37	1.00	R
5.	4.39	4.15	4.36	0.95	R
6.	3.40	2.94	3.33	1.65	MR
7.	4.01	3.64	3.95	1.36	R
8.	4.00	3.76	3.96	1.23	R
9.	4.52	4.36	4.50	0.86	HR
10.	4.56	4.79	4.59	0.71	HR
	Group Mean		**4.13**		**Required**

x¯_L= Mean of Lecturers, x¯_i = Mean of Industrial Supervisors, x¯_G= Grand Mean, σ = Standard deviation nL = Number of Lecturers, ni = Number of Industrial Supervisors, N = Total Number of Respondents, HR = Highly Required, R = Required, MR = Moderately Required

Table III shows the response to the managerial entrepreneurship skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria. The respondents indicated that items 1, 9 and 10 managerial entrepreneurship skills are highly required by Electrical Engineering students for operational adaptation to emerging trends in the Electrical Industry, with mean responses ranging between 4.50 and 4.59 and having a standard deviation between 0.71 and 0.86. The respondents also indicated items 2, 3, 4, 5, 6, 7 and 8 with a mean response of 3.69 and 4.37 and a standard deviation of 0.95 and 1.36, respectively. Only item 6, with a mean value of 3.33 and a standard deviation of 1.65, was moderately required. With a group mean of 4.13, the respondents showed that all the items listed in Table III are managerial entrepreneurship skills needed by electrical engineering students for operational adaptation to

emerging trends in the Electrical Industry in Nigeria.

Hypothesis 1 (HO1): The mean response of lecturers and Electrical Engineering industry supervisors on the managerial entrepreneurship skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria is the same.

TABLE IV
T-TEST STATISTICAL ANALYSIS ON MANAGERIAL ENTREPRENEURSHIP SKILLS

S/N	Respondent	N	$\bar{x}$	σ	df	t	p	Rmk
1.	Lecturers	178	4.57	0.81	209	0.35	0.73	NS
	Ind. Superv.	33	4.52	0.67				
2.	Lecturers	178	3.66	1.36	209	0.74	0.46	NS
	Ind. Superv.	33	3.85	1.15				
3.	Lecturers	178	3.98	1.38	209	0.45	0.65	NS
	Ind. Superv.	33	4.09	1.01				
4.	Lecturers	178	4.40	1.00	209	0.98	0.33	NS
	Ind. Superv.	33	4.21	0.99				
5.	Lecturers	178	4.39	0.97	209	1.35	0.18	NS
	Ind. Superv.	33	4.15	0.80				
6.	Lecturers	178	3.40	1.56	209	1.50	0.14	NS
	Ind. Superv.	33	2.94	2.03				
7.	Lecturers	178	4.01	1.38	209	1.46	0.15	NS
	Ind. Superv.	33	3.64	1.22				
8.	Lecturers	178	4.00	1.24	209	1.04	0.30	NS
	Ind. Superv.	33	3.76	1.17				
9.	Lecturers	178	4.52	0.86	209	0.97	0.33	NS
	Ind. Superv.	33	4.36	0.90				
10.	Lecturers	178	4.56	0.74	209	1.72	0.19	NS
	Ind. Superv.	33	4.79	0.48				

P >0.05 N= Number of respondents, S = Significant, NS = Not Significant, σ= Standard Deviation, Rmk = Remark

The result presented in Table IV showed that all the ten managerial entrepreneurship skills tested had p-values that ranged between 0.18 and 0.73, which is greater than the α-value of 0.05, which indicated no significant difference in the mean responses of lecturers and Electrical Engineering industry supervisors. Therefore, the null hypothesis of no significant difference in the mean response of lecturers and Electrical Engineering industry supervisors on managerial entrepreneurship skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria was upheld.

A. Abbreviations and Acronyms

Research Question 2: What accounting entrepreneurship skills are required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria?

Table V shows the response on the accounting entrepreneurship skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria.

TABLE V
ACCOUNTING ENTREPRENEURSHIP SKILLS REQUIRED

	N_L =178	n_i= 33	N = 211		
S/NO	$\bar{x}_t$	$\bar{x}_i$	$\bar{x}_G$	**σ**	**Remark**
11.	4.50	4.21	4.45	0.83	Required
12.	4.43	4.21	4.40	0.87	Required
13.	4.38	4.39	4.38	0.98	Required
14.	4.48	4.24	4.44	0.85	Required
15.	4.32	4.06	4.28	0.93	Required
16.	4.37	4.27	4.35	0.89	Required
17.	4.39	4.67	4.43	1.01	Required
18.	4.44	4.15	4.39	0.86	Required
19.	4.48	4.24	4.44	0.85	Required
20.	4.16	3.94	4.12	1.05	Required
	Group Mean		**4.37**		**Required**

$\bar{x}$_L= Mean of Lecturers, $\bar{x}$_i = Mean of Industrial Supervisors, $\bar{x}$_G= Grand Mean, σ = Standard deviation nL = Number of Lecturers, ni = Number of Industrial Supervisors, N = Total Number of Respondents

The respondents specified that items 11 – 20 are managerial skills needed by Electrical Engineering students for functional adaptation to emerging trends in the Electrical Industry, with their mean responses having a range between 4.12 and 4.45 with an accompanying standard deviation ranging between 0.83 and 1.05, respectively. With a group mean of 4.37, the respondents showed that all the items listed in Table V are accounting entrepreneurship skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria.

Hypothesis 2 (HO2): The mean response of lecturers and Electrical Engineering industry supervisors on the accounting entrepreneurship skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria is the same.

TABLE VI
T-TEST STATISTICAL ANALYSIS ON ACCOUNTING ENTREPRENEURSHIP SKILLS REQUIRED

S/N	Respondent	N	$\bar{x}$	σ	df	t	p	Rmk
11.	Lecturers	178	4.50	0.78	209	1.84	0.07	NS
	Ind. Superv.	33	4.21	1.02				
12.	Lecturers	178	4.43	0.82	209	1.34	0.18	NS
	Ind. Superv.	33	4.21	1.11				
13.	Lecturers	178	4.38	1.01	209	0.09	0.93	NS
	Ind. Superv.	33	4.39	0.83				
14.	Lecturers	178	4.48	0.83	209	1.47	0.14	NS
	Ind. Superv.	33	4.24	0.90				
15.	Lecturers	178	4.32	0.92	209	1.48	0.14	NS
	Ind. Superv.	33	4.06	0.97				
16.	Lecturers	178	4.37	0.92	209	0.55	0.59	NS
	Ind. Superv.	33	4.27	0.72				
17.	Lecturers	178	4.39	1.05	209	1.46	0.15	NS
	Ind. Superv.	33	4.67	0.74				
18.	Lecturers	178	4.44	0.86	209	1.76	0.08	NS
	Ind. Superv.	33	4.15	0.83				
19.	Lecturers	178	4.48	0.83	209	1.50	0.14	NS
	Ind. Superv.	33	4.24	0.90				
20.	Lecturers	178	4.16	1.03	209	1.10	0.27	NS
	Ind. Superv.	33	3.94	1.14				

P >0.05 N= Number of respondents, S = Significant, NS = Not Significant, σ= Standard Deviation, Rmk = Remark

The result presented in Table VI showed that all the ten accounting entrepreneurship skills listed in items 11-20 and tested had their p-values which ranged between 0.07 and 0.93, which is greater than the α-value of 0.05 which indicated no significant difference in the mean responses of lecturers and Electrical Engineering industry supervisors. Therefore, the null hypothesis of no significant difference in the mean response of lecturers and Electrical Engineering industry supervisors on

accounting entrepreneurship skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria was upheld.

A. Abbreviations and Acronyms

Research Question 3: What marketing entrepreneurial skills are required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria?

TABLE VII
MARKETING ENTREPRENEURSHIP SKILLS REQUIRED

	N_L =178	n_i= 33	N = 211		
S/N	$\bar{x}_t$	$\bar{x}_i$	$\bar{x}_G$	**σ**	**Remark**
21.	4.04	3.73	4.00	1.22	Required
22.	4.05	4.24	4.08	1.06	Required
23.	4.23	3.73	4.15	1.12	Required
24.	4.12	3.94	4.09	1.21	Required
25.	4.11	3.70	4.05	1.10	Required
26.	4.10	3.88	4.06	1.17	Required
27.	4.02	3.91	4.00	1.22	Required
28.	4.48	4.24	4.44	0.85	Required
29.	4.32	3.94	4.26	0.96	Required
30.	4.14	4.15	4.14	1.12	Required
31.	4.24	4.12	4.22	1.00	Required
32.	4.31	4.55	4.35	0.78	Required
33.	4.31	4.21	4.30	0.86	Required
34.	4.25	4.48	4.29	1.06	Required
35.	3.56	3.39	3.54	1.51	Required
36.	3.80	3.58	3.77	1.35	Required
37.	4.28	3.94	4.23	1.02	Required
38.	3.98	3.58	3.92	1.42	Required
	Group Mean		**4.11**		**Required**

x¯_L= Mean of Lecturers, x¯_i = Mean of Industrial Supervisors, x¯_G= Grand Mean, σ = Standard deviation nL = Number of Lecturers, ni = Number of Industrial Supervisors, N = Total Number of Respondents, HR = Highly Required, R = Required, MR = Moderately Required

Table VII shows the response to the marketing entrepreneurship skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria. The respondents indicated that items 21 – 38 are accounting skills required by Electrical Engineering students for functional adaptation to emerging trends in the Electrical Industry, with mean responses that ranged between 3.90 and 4.34 and a harmonising standard deviation which ranged between 0.58 and 1.06, respectively. With a group mean of 4.16, the respondents showed that all the items listed in Table VII are accounting entrepreneurship skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria.

Hypothesis 3 (HO3): The mean response of lecturers and Electrical Engineering industry supervisors on the marketing entrepreneurship skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria is the same.

TABLE VIII
T-TEST STATISTICAL ANALYSIS ON MARKETING ENTREPRENEURSHIP SKILLS

S/N	Respondent	N	$\bar{x}$	σ	df	t	p	Rmk
21.	Lecturers	178	4.04	1.20	209	1.38	0.17	NS
	Ind. Superv.	33	3.73	1.33				
22.	Lecturers	178	4.05	1.03	209	0.95	0.34	NS
	Ind. Superv.	33	4.24	1.23				
23.	Lecturers	178	4.23	1.11	209	2.40	0.12	NS
	Ind. Superv.	33	3.73	1.07				
24.	Lecturers	178	4.12	1.20	209	0.78	0.44	NS
	Ind. Superv.	33	3.94	1.25				
25.	Lecturers	178	4.11	1.08	209	2.00	0.05	NS
	Ind. Superv.	33	3.70	1.19				
26.	Lecturers	178	4.10	1.18	209	0.98	0.33	NS
	Ind. Superv.	33	3.88	1.11				
27.	Lecturers	178	4.02	1.23	209	0.46	0.64	NS
	Ind. Superv.	33	3.91	1.21				
28.	Lecturers	178	4.48	0.83	209	1.47	0.14	NS
	Ind. Superv.	33	4.24	0.90				
29.	Lecturers	178	4.32	0.92	209	2.10	0.11	NS
	Ind. Superv.	33	3.94	1.14				
30.	Lecturers	178	4.14	1.18	209	0.05	0.96	NS
	Ind. Superv.	33	4.15	0.76				
31.	Lecturers	178	4.24	1.00	209	0.63	0.53	NS
	Ind. Superv.	33	4.12	0.99				
32.	Lecturers	178	4.31	0.78	209	1.61	0.11	NS
	Ind. Superv.	33	4.55	0.75				
33.	Lecturers	178	4.31	0.90	209	0.63	0.53	NS
	Ind. Superv.	33	4.21	0.55				
34.	Lecturers	178	4.25	1.09	209	-1.15	0.25	NS
	Ind. Superv.	33	4.48	0.87				
35.	Lecturers	178	3.56	1.54	209	0.59	0.56	NS
	Ind. Superv.	33	3.39	1.34				
36.	Lecturers	178	3.80	1.37	209	0.89	0.37	NS
	Ind. Superv.	33	3.58	1.23				
37.	Lecturers	178	4.28	1.04	209	1.78	0.08	NS
	Ind. Superv.	33	3.94	0.83				
38.	Lecturers	178	3.98	1.39	209	1.52	0.13	NS
	Ind. Superv.	33	3.58	1.54				

P >0.05 N= Number of respondents, S = Significant, NS = Not Significant, σ= Standard Deviation, Rmk = Remark

The result presented in Table 5 showed that all the 18 marketing entrepreneurship skills listed in items 21-38 and tested had their p-values ranging between 0.05 and 0.96, which is greater than the α-value of 0.05, which indicated no significant difference in the mean responses of lecturers and Electrical Engineering industry supervisors. Therefore, the null hypothesis of no significant difference in the mean response of lecturers and Electrical Engineering industry supervisors on marketing entrepreneurship skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria was upheld.

IV. FINDINGS AND DISCUSSION

Based on the results presented, the following findings emerged:

- Ten managerial entrepreneurship skills were identified as necessary skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria
- Ten accounting entrepreneurship skills were identified as necessary skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria

- 18 marketing entrepreneurship skills were identified as essential skills needed by electrical engineering students for functional adaptation to emerging trends in the Electrical Industry in Nigeria

The mean response of lecturers and Electrical Engineering industry supervisors on the managerial entrepreneurship skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria is the same.

The mean response of lecturers and Electrical Engineering industry supervisors on the accounting entrepreneurship skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria is the same.

The mean response of lecturers and Electrical Engineering industry supervisors on the marketing entrepreneurship skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria is the same.

The findings of the study concerning research question one revealed that the managerial entrepreneurship skills required by Electrical Engineering Students for operational adaptation to emerging trends in the Electrical Industry in Nigeria include the ability to communicate effectively, carry out effective planning, control both human and material resources, carry out adequate inventory supervisory, schedule job based on priority, maintain good human relation skills, coordinate activities within the industry Ability to coordinate activities within the industry, effectively direct task within the sector, Set the appropriate duration for all activities within the industry, manage a cordial relationship between management and other members of staff in the industry for the realisation of industry objectives. The supporting null hypothesis revealed no significant difference between the mean response of lecturers and Electrical Engineering industry supervisors on the managerial entrepreneurship skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria. The finding is in agreement with Ref. [7] and Ref. [15], who, in their separate submission, suggested that for an enterprise to be successful and able to within the rigorous vicinity of the industry in which it is operating, the entrepreneur must possess specific managerial skills such as clear, direct communication, active listening, delegation, coaching and mentoring, knowing how to praise effectively, conflict resolution and should be flexible. Ref. 21] and Ref. [22] suggested that managers must have the ability to manage relationships, planning, prioritisation, critical thinking and good industry knowledge.

The finding of the study concerning research question two revealed that the accounting entrepreneurship skills required by electrical engineering students include the ability to differentiate between revenue and expenditure accounts, knowing how to post all expenses accounts effectively in the ledger, identifying which account to debit and which to credit in the ledger, record sums drawn from the bank with cheques in the cash book, deduct return inwards from the sales for the period, determine the trading status of the business, identify profit and loss account, prepare the trading account, record money paid into the bank by customers, and have a good understanding that bank charges increase the balance in the cash book and reduce the balance in the bank. The supporting null hypothesis revealed no significant difference between the mean response of lecturers and Electrical Engineering industry supervisors on the accounting entrepreneurship skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria. The finding is in agreement with Ref. [23], [24], [8] and [20], which, in the summary of their separate report, submitted that no business can survive if the financial records are not well prepared, entered and kept. The authors suggested that for entrepreneurs to adapt to emerging trends operationally, the entrepreneur must understand and evaluate cash flow scenarios, analyse financial data, forecast future earnings and expenses, understand and apply contract provisions, oversee vendor or government contracts, implement contract compliance policy, secure financial management systems and apply advanced mathematics.

The finding of the study with regard to research question three revealed that the marketing entrepreneurship skills required by electrical engineering students include: ability to acquire effective sales techniques, ability to capture the attention of customers, ability to carry out effective marketing/ information research, ability to choose appropriate advertising technique for goods and services, ability to convey to others a message without commanding, ability to determine demand and supply situation, ability to determine the needs of customers, ability to develop good negotiation skills, ability to retain the attention of customers, accept feedback from others, ability to communicate orally effectives, ability to communicate with individuals with various depths of knowledge capabilities, ability to share with others using electronic communication, provide specific details about company's product or services, ability to understand the needs of customers, ability to determine the extent to which products will sell, ability to identify new trends in the marketing environment, and ability to make goods and services available to customers. The supporting null hypothesis revealed no significant difference between the mean response of lecturers and Electrical Engineering industry supervisors on the marketing entrepreneurship skills required by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria. The findings agree with Ref. [25] and [26], who listed the following skills as essential for marketing any product and services rendered within an industry. These marketing skills include communication, creativity and problem-solving, attention to detail, interpersonal skills, leadership, adaptability, writing, data analysis and analytics. In the same vein, Ref. [11] asserted that marketing is about communicating to an audience at its core, so it's no surprise that communication is the top skill those in the field need to have.

V. Conclusion and Recommendation

This study has identified the entrepreneurship skills required

by electrical engineering students for operational adaptation to emerging trends in the Electrical Industry in Nigeria, which will help keep education and training in tune with knowledge and skills needed in the present world of work and operationally adapt to ever-changing trends in the business world. These skills will go a long way to produce competent and relevant graduates in today's technologically advanced work environment.

Because of the findings of the study, the following recommendations are made:

National University Commission (NUC), National Board for Technical Education (BTE) and National Commission for Colleges of Education (NCCE) should develop a curriculum that will adequately introduce the concept of management and its importance to the students for adequate assimilation and practice for all students of electrical engineering.

Electrical engineering students should be taught elements of financial accounting in the tertiary institution and business laws to be acquainted with the rudiments of financial recording and implementation.

Departments and faculties of engineering should encourage their students to produce items and market them for self-practice and development of marketing skills to prepare them for the global market.

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