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Achieving the Sustainable Development Goals Using Entrepreneurship, Innovations and Investments: The Engineer as Key Driver

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Abstract

The sustainable Development Goals (SDG's) can be used to harness frontline technologies in order to address gaps in emerging economies. A Survey has been carried out to critically investigate five key variables that will convert technology transfer into value using a multi-institutional web survey amongst engineers in six geo-political zones of Nigeria. A target population of 100 respondents of registered engineers with the Council for Regulation of Engineering in Nigeria (COREN) was used. The variables were: establishing well-tailored entrepreneurship skill acquisition programs in our universities, using Engineers as key drivers of innovations, industry-academia-government collaboration, inclusive sustainable finance and Small scale Medium Enterprises (SME) Coalition. The results were validated through a set of data from chi-square analysis: (1) 97.40% of the respondents agreed that establishing well-tailored entrepreneurship skill acquisition programs in our universities and investing on youth economic prosperity will help to achieve the sustainable development goals with only 2.6% declining, (2) 90.93% of the respondents agreed to using Engineers as creative entrepreneurs as key drivers of innovations in achieving the sustainable development goals with only 9.07% declining, (3) 89.63% agreed to inclusive sustainable finance with only 10.37% declining, (4) 88.42% agreed to industry-academia-government collaboration with only 11.58% declining while (5) 88.33% were of the opinion that establishing and funding SME coalitions, to encourage investors to massively invest will boost economy, and help in achieving the sustainable development goals with only 11.67% declining. In conclusion, establishing well-tailored entrepreneurship skill acquisition programs in our universities and investing on youth economic prosperity will help to achieve the sustainable development goals.

1. Introduction

The triple bottom lines which are the three pillars of sustainable development: The environment, society and the economy are harnessed to conserve human capital, natural capital and technological capital. Achieving the seventeen Sustainable Development Goals (SDG's) using entrepreneurship, innovations and investment will transform the world with Engineers as key drivers and creative innovators. This has been a problem over the years and the united nations rolled out 2030 agenda

for transformation of the world using the SDG's [1]. Using frontline technologies to impact on innovations will allow for critical thinking. Some of these technologies such as Big Data Analysis, Internet of things (I o T), Artificial Intelligence (AI) machine learning, Biotechnology,

Nanotechnology, renewable energy and Drone technology geared towards achieving SDG's [1]. Big data analysis is one of the frontline technologies that have brought about break-through in scientific thinking, in the area of health in both animals and human beings, improving global decision making and showing the world real time information streams [2]. Internet of things is the management and close monitoring of machines that control actions of connected objects and allows the natural world, people and animals to be closely monitored effectively. Internet of things can be applied to: The Agricultural sector, Health sector, Energy sector, water management sector and Development sector to solve environmental issues but the Royal academy report stated that Engineering a better can only be achieved using the sustainable development goals but entrepreneurship was not included [3].

The Sustainable Development Goals that these sectors will address are: Goals 3: Good health and well- being, Goal 2: Zero Hunger, Goal 7: Affordable and clean energy, Goal 6: Clean water and sanitation, Goal 8: Decent work and economic growth, Goal 11: Sustainable cities and communities, Goal 9: Industry, innovations and infrastructure, Goal 12: Responsible consumption and production: Goals 17: Partnership for the goals [4].

The Nigerian government using the Nigerian Society of Engineers (NSE) Abuja headquarter of the National body and other stake holders, should develop strategies to harness latest frontline technologies that will be used to achieve these SDG's, by investing in it, using Engineers as key drivers for a sustainable Nigerian Economy. This will be a reality by prioritizing SDG targets, accessing baselines, looking into gaps, and creating links that will help to achieve SDG's [5]. Artificial Intelligence (machine learning) is a frontline technology that deals with image recognition, problem solving abilities, logical reasoning that exceed human capacity. It deals with Robotics technology that is used to transforms the manufacturing sector which helps to achieve Goal 9 (industry, innovations and infrastructure). The three dimensional printing (3D printing) allows for cheaper production of complex products, components and prototyping of iterative rapid manufactured products [6]. In the health Sector, the 3D printing offers help in the production of: Artificial limbs, Artificial human body parts e.g. ears and artificial teeth.

In the area of Biotechnology, treatments of ailments are made possible using big data and Artificial Intelligence [7]. Other SDG's are: Goal 1: No Poverty, Goal 4: Quality Education, Goal 5: Gender Equality, Goal 10: Reduced Inequality, Goal 13: Climate action, Goal 14: Life below water, Goal 15; Life on land and Goal 16: Peace and Justice strong institutions. Nanotechnology uses the infinitesimal scale of materials to do manufacturing. Nanotechnology is applied in water technology for purification and sanitation which can solve sustainable development Goal 6: Clean water and sanitation. Delivery of drugs in the health sector using the delivery technologies for medications in hospitals employs the use of nanotechnology and this will help to achieve Goal 3: Good health and well –being [8].

Vaccines have been developed for the dreaded COVID-19 disease that has greatly changed the social progress of humanity as well as her economic progress. Engineers around the world are driving these developments in order to achieve the sustainable development Goals [9]. Engineers as key driver's, have built systems that have been able to achieve the sustainable development goals some systems built by creative entrepreneurs are outlined in Table 1.

Table 1: Table of Systems built by Engineers that have been able to achieve the sustainable development goals.

S/N	Systems built by Engineers and frontline technologies used.	Sustainable development goals (SDG's) touched.
1.	Powering irrigation system to produce food to feed a teaming populace.	Goal 2 :Zero hunger
2.	Frontier technologies that will enable hospitals to operate equipment and keep vaccines at optimal temperatures.	Goal 3: Good health and well- being.
3.	Technologies that enables our children to study and achieve basic education: e-learning, Coding, Data analysis and using e-books.	Goal 4 : Quality Education
4.	Technologies that has helped to empower our women and female children through communication technology (ICT), Use of smart boards, Use of internet, Use of smart phones and tablets.	Goal 5: Gender equality Goal 10: Reduced inequality
5.	Technologies that have helped to advocate for the rights of human beings where applicable	Goal 10: Reduced inequality
6.	Technologies that have helped to double up food production most especially in countries like Ghana (Africa) e.g. Blue skies industries Ghana and Nigeria, Dangote Sugar factory.	Goal 2: Zero hunger.

A portable health clinic (PHC) innovated, invested and published in Bangladesh by Ashir Ahmad, has changed the narrative in the health sector. This innovation uses a compact tele-health care system that seeks to reach remote communities with quality health care. A private communication outfit partnered with Government in Bangladesh to achieve the sustainable development Goal 3: Good health and well- being. Health workers now have portable clinics in the form of a brief case that contains diagnostic equipment. Soft wares for record keeping of patients are kept in archives to be used when needed. A single algorithm categorized in colors of green, yellow, orange and red is used. Green for Healthy, Yellow for Caution and Orange for emergency. Mobile network coverage helps to connect a doctor nearby to treat the patient via e-media. With this innovation from Engineers in Bangladesh, accessible health care delivery is made possible for rural dwellers. Engineers as entrepreneurs have paved the way to creativity and technology innovations that will help to achieve SDG's [10].

During the COVID-19 era, many Engineers innovated different designs of respirators to be used in hospitals to rescue patients with deficient breathing and technovation has helped to transform the world [10]. Entrepreneurship programs in two universities sampled: Igbinedion University Okada, Okada Town, Edo State, Nigeria and University of Benin Centre for Entrepreneurial Development (CED), have been broadened to accommodate practical real-life inputs from industries. Infusion of certified, experienced corporate executives and entrepreneur tutors has been done. The entrepreneurial centers have been boosted with cross fertilization of ideas. The two sampled universities carry out periodic hosting of exhibitions to display research findings commercialized into products. Solving contradictory problems will help to boost creativity [11]. Creativity of Engineer's always yield great ideas when human intelligence is applied to innovations to yield solutions [11]. Lumsdaine et al [12] cross carpeted ideas of different engineers and analyzed the creativity in the different outcomes and outputs in industries. Cropley [13] used a four dimensional(4D) model to propose creativity, Novelty, elegance and generalization but did not look at the issues of sustainable development goals as it relates to entrepreneurship and innovations.
GAPS:

Achieving the Sustainable Development Goals (SDG's) using entrepreneurship, innovations and investment to transform the world with Engineers as key drivers and creative innovators has not been critically examined hence this survey is apt.

Using frontline technologies to impact on innovations will allow for critical thinking. Some of these In achieving entrepreneurship resilience and economic resilience in the post COVID-19 era, in Africa with Nigeria in focus, the six geopolitical zones stay in the focus for five variables to be critically looked into for resolutions. They are:

1. Well -tailored Youth Entrepreneurship skill acquisition program
2. Engineers as key drivers of innovations and Creative entrepreneur
3. Inclusive sustainable finance
4. Industry- Academia – Government Collaboration
5. Small and Medium scale Enterprises (SME) coalition for Africa (Nigeria, in focus).

2. Methodology

2.1 Model Formulation

An in-depth interview was conducted and a survey using questionnaires, were distributed in Igbinedion University Okada, Okada Town, Edo State, Nigeria and University of Benin, Benin city, Edo State, Nigeria, to find out the best ways to achieve the sustainable development goals using entrepreneurial resilience with youth entrepreneurship skill acquisition program, Engineers as key drivers of innovations and Creative entrepreneurs looking into Orange economy, Trade and Heritage, Women, Technology, Digitization and Innovations. Other grail areas researched were: Inclusive sustainable finance for entrepreneurs to strive, Industry- Academia – Government Collaboration and Small Medium scale Enterprises (SME) coalition for Africa (with Nigeria, in focus). From 100 questionnaires distributed to a private university and public university, 77 respondents returned useable questionnaires as 23 respondents declined.

Table 2: Responses from Questionnaires on the five variables to be critically examined
From the 77 respondents.

S/N.	Achieving the SDG's using entrepreneurship, innovations and investments: The Engineer as a key driver.	Respondents	Percentage
1.	Well -tailored Youth Entrepreneurship skill acquisition program	75	97.40%
2.	Engineers as key drivers of innovations and Creative entrepreneurs.	70	90.93%
3.	Inclusive sustainable finance	69	89.63%
4.	Industry- Academia – Government Collaboration.	68	88.42%
5.	Small and Medium scale Enterprises (SME) coalition for Africa.	69	89.33%

From the Table 2, respondents were of the view that a well -tailored Youth Entrepreneurship skill acquisition program when harnessed will help to achieve the SDG's with 97.40%% as the highest response with only 2.70% decline. Inclusive sustainable finance had 89.63% respondents with only 10.37% decline showing that sustainable finance plays a vital role in achieving the SDG's as the

next to youth entrepreneurship. Others were 89.33% for Small and Medium scale Enterprises (SME) coalition for Africa as a very important variable to boost entrepreneurship practices with only 10.69% decline, Engineers as key drivers of innovations and Creative entrepreneurs had 90.93% with 9.07% decline and lastly, 88.42% for Industry- Academia – Government Collaboration with 11.58% decline. In order to achieve objectives of this study, the following research Questions were raised:

1. Will Government collaboration with the academia and the industry focusing on youth entrepreneurship help to achieve the sustainable development goals (SDG's)?
2. Can inclusive sustainable finance help to achieve the SDG's?
3. Will establishing SME coalition for Africa (with Nigeria, in focus), help to encourage investors to invest, create a stable, resilient environment for investments and boost the economy?
4. Will Engineers as key drivers of innovations, and as creative entrepreneurs, be able to achieve an orange economy, good trade and heritage, digitization and improve lives?
5. Using Innovations, well-tailored entrepreneurship skill acquisition programs and strategically investing into the SDG's for youth economic prosperity, will the SDG's be achieved?

Based on the research questions, the following research hypothesis has been tested.

1. H_o: There is no positive relationship between industry – academia – government collaboration and focusing on youth entrepreneurship to achieve the SDG's.
   H_1: There is a relationship between the industry-academia-government collaboration and focusing on youth entrepreneurship to help to achieve the SDG's.
2. H_o: There is no positive relationship between inclusive sustainable finance for entrepreneurship resilience, economic development and achieving the SDG's.
   H_1: There is a relationship between inclusive sustainable finance for entrepreneurship resilience and economic development and achieving the SDG's.
3. H_o: There is no positive relationship between establishing SME coalition for Africa (Nigeria as a focus) to encourage investors to invest, create a stable and resilient environment for investments boost the economy and the achievements of SDG's.
   H_1: There is a relationship between establishing SME coalition, for Africa (Nigeria as a focus) to encourage investors to invest, create as table and resilient environment for investment to boost the economy and the achievements of the SDG's.
4. H_o: There is no positive relationship between Engineers as key drivers of innovations, as creative entrepreneurs, as digitization experts and achieving the SDG's.
   H_1: There is a relationship between Engineers as key drivers of innovations, as creative entrepreneurs for digitization, good trade and heritage to improving live and achieving the SDG's.
5. H_o: There is no positive relationship between using innovations, well-tailored entrepreneurship skill acquisition programs, strategically investing on youth economic prosperity and achieving the SDG's.
   H_1: There is a relationship between using innovations, well- tailored entrepreneurship programs and strategically investing into the SDG's for youth economic prosperity in order to achieve the SDG's.

Decision Rule:
The standard rule of chi-square X^2 states:
Accept Ho: if X^2 calculated value < X^2 tabulated value
Reject Ho: if X^2 calculated value > X^2 tabulated value
$\therefore X^2$ calculated > X^2 tab, reject the Ho and accept H_1.

The Sources of Data
For this research, the sources of data were primary and secondary sources. An original investigation was carried out to collect data using questionnaires (primary sources). The existing published data collected were the secondary sources of data used.

Data Analysis
Parametric testing was used to test the results obtained in valid the results. The chi-square test was used at a suitable level of significance.

$$\text{Chi-square, } X^2 = \frac{\sum(Fo-Fe)^2}{Fe} \qquad (1)$$

Fo = observed frequency
Fe = expected frequency

3. Result and Discussion

3.1 Results of Data Analysis

Only seventy-seven (77) questionnaires were filled, returned and found useable while 23 were not useable. 77% of the questionnaires were filled and 23% were not filled.

*Bio data of respondents***:**

Table 3: Gender classification

S/N.	Sex	Respondents	Percentage
1.	Male	30	39
2.	Female	47	61
	Total	**77**	**100%**

Source: Field survey January 2022

Table 3 showed that 61% of the respondents were females while 39% of the respondents were males.

Table 4: Age classification

S/N.	Age	Respondents	Percentage
1.	Below 25 years	4	5.19%
2.	25- 40 years	42	54.5%
3.	41 – 50 years	31	40.31%
4.	50 and above	0	0
	Total	**77**	**100%**

Source: Field survey January 2022

From Table 4, the age distribution showed that ages 25-40 years had the highest response of 54.5%, followed by ages 41 – 50 years with 40.31% and the lowest was recorded for ages below 25 years with 5.19%. This distribution showed that the youths (united Nations Population Data) which lies between the ages of 25-40 years were responsive to the survey as the study addressed their concerns.

Table 5: Educational Status of Respondents

S/N.	Qualification	Frequency	Percentage
1.	OND	3	3.89
2.	HND	6	7.79%
3	B. Eng.	57	74.05
4.	Master's degree	8	10.38%

5.	Ph.D.	3	3.89%
	Total	**77**	**100%**

Source: Field survey January 2022

From Table 5, the educational status of respondents that was highest in response to the questionnaires distributed were the Bachelors in Engineering, (B.Eng.) category with 74.05%, followed by Master's degree (M.Eng.) respondents with 10.38%, followed by the Higher National diploma (HND) respondents with 7.79% and the ordinary National Diploma (OND), and Doctor of Philosophy (Ph.D.) respondents having same response of 3.89%. This showed that the graduates (B.Eng.) were the categories yearning for the achievement of the SDG's using entrepreneurship, innovations and investments.

Testing the Hypothesis

The null hypothesis was denoted by Ho and the alternate hypothesis denoted by H_1. Based on the sample of seventy-seven (77) respondents, the hypothesis at 5% level of significance with a specific degree of freedom (df) the null hypothesis (Ho) is to be rejected. Where the calculated chi-square (X^2 -calculated) is greater that the tabulated chi-square (X^2 -tabulated). This implies that the alternative hypothesis (H_1) will be accepted.

Contrarily, where the value of the X^2 tab is less, the null hypothesis (Ho) will be accepted and the alternative hypothesis (H_1) is rejected.

Test-Statistics:

Chi-square $X^2 = \frac{\sum(\text{Fo}-\text{Fe})^2}{\text{Fe}}$

(calculated).

Hypothesis 1:

H_o: There is no positive relationship between industry – academia-government collaboration and focusing on youth entrepreneurship to achieve the SDG's.

H_1: There is a positive relationship between industry – academia-government collaboration and focusing on the youth entrepreneurship to help achieve the SDG's.

Research Question 1

Table 6: Responses from the Questionnaires (using the 5 point Likert scale)

S/N.	Responses from the respondents	5 point Likert scale)	Frequency	Percentage (%)
1.	Strongly agree	SA	39	50.66
2.	Agree	A	29	37.67
3	Undecided	UD	4	5.19
4.	Disagree	D	2	2.59
5.	Strongly disagree	SD	3	3.89
		Total	**77**	**100%**

Expected frequency Fe = $\frac{\Sigma Fo}{No.of\ cells}$

$= \frac{77}{5} = 15.4$

Table 7: The chi-square analysis for research Question 1

Cells	**Fo**	**Fe**	**Fo – Fe**	**(Fo - Fe)^2**	$\frac{\sum(Fo - Fe)^2}{Fe}$
1	39	15.4	23.6	556.96	36.116
2	29	15.4	13.6	184.96	12.01
3.	4	15.4	-11.4	129.96	8.438
4.	2	15.4	-13.4	179.56	11.659
`5.	3	15.4	-12.4	153.76	9.984
Total	77	77		$\sum(Fo - Fe)^2$ = 1,205.2	78.259

X^2 calculated $= \frac{\sum(Fo-Fe)^2}{Fe}$

$= \frac{1,205.2}{15.4} = 78.2597$

X^2 Tabulated Degree of freedom = (Row-1) (column -1)

= (5-1) (2-1)

$\therefore$ df = 4

X^2 tabulated at 5% (0.05) (from chi square table showing critical values of distribution) level of significance under 4 is given as 9.488 [14].

$\therefore$ X^2 tabulated = 9.488

Interpretation

This means that there is a positive relationship between industry – academia – government collaboration and focusing on youth entrepreneurship in order to achieve the sustainable development goals (SDG's).

Hypothesis 2

H_o: There is no positive relationship between inclusive sustainable finance for entrepreneurial resilience, economic development and achieving the SDG's.

H_1: There is a positive relationship between inclusive sustainable finance for entrepreneurial resilience, economic development and achieving all the sustainable development goals

Research Question 2

Table 8: Responses from the Questionnaires (using the 5 point Likert scale)

S/N.	**Responses**	**Frequency**	**Percentage (%)**
1.	Strongly Agree (SA)	50	64.95
2.	Agree (A)	19	24.68
3	Undecided (UD)	6	7.79
4.	Disagree (D)	1	1.29
5.	Strongly disagree (SD)	1	1/29
	Total	**77**	**100%**

Source: Field survey January 2022

Expected frequency Fe = $\frac{\Sigma Fo}{No.of\ cells}$

$= \frac{77}{5} = 15.4$

Table 9: Chi-square analysis for research Question 2

Cells	**Fo**	**Fe**	**Fo – Fe**	**(Fo-Fe)^2**	$\frac{\sum(Fo-Fe)^2}{Fe}$
1	50	15.4	34.6	1,197.16	77.737
2	19	15.4	3.6	12.96	0.8416
3.	6	15.4	-9.4	88.36	5.737
4.	1	15.4	-4.4	207.36	13.464
`5.	1	15.4	-14.4	207.36	13.464
Total	77	77		1,713.2	11.2436

$$X^2 = \frac{\sum(Fo-Fe)^2}{Fe} = \frac{1,713.2}{15.4} = 11.2436$$

X^2 Tabulated
Degree of freedom = (Row-1)
= (5-1)
∴ df = 4
X^2 tabulated at 5% (0.05) level of significance under 4 is given as 9.488, ∴ X^2 tabulated = 9.488
From decision rule, the result is interpreted.

Interpretation of Result
This means that there is a positive relationship between inclusive sustainable finance and achieving the sustainable development goals (SDG's).

Hypothesis 3
H_o: There is no positive relationship between establishing SME coalition for Africa (Nigeria as focus) to encourage investors and achieving the SDG's.
H_1: There is a positive relationship between establishing SME coalition for Africa (Nigeria as a focus) to encourage investors and the achieving of the sustainable development goals (SDG's)

Research Question 3

Table 10: Responses from the Questionnaires (using the 5 point Likert scale)

S/N.	**Responses**	**5 point Likert scale)**	**Frequency**	**Percentage**
1.	Strongly Agree	SA	48	62.36
2.	Agree	A	20	25.97
3	Undecided	UD	1	1.29
4.	Disagree	D	6	7.79
5.	Strongly disagree	SD	2	2.59
	Total		**77**	**100%**

Calculating the expected frequency

$$\text{Expected frequency Fe} = \frac{\Sigma Fo}{No.of\ cells} = \frac{77}{5} = 15.4$$

Table 11: Chi-square analysis for research Question 3

Cells	**Fo**	**Fe**	**Fo-Fe**	**(Fo-Fe)²**	$\frac{\sum(\text{Fo}-\text{Fe})^2}{\text{Fe}}$
1	48	15.4	32.6	1,062.76	69.01
2	20	15.4	4.6	21.16	1.374
3.	1	15.4	-14.4	207.36	13.465
4.	6	15.4	-9.4	88.36	5.738
`5.	2	15.4	-13.4	179.56	11.659
Total	77	77		1,559.2	101.246

X^2 cal. = $\frac{\sum(\text{Fo}-\text{Fe})^2}{\text{Fe}}$

$= \frac{1,559.2}{15.4} = 101.246$

X^2 Tabulated

Degree of freedom = (Row-1) (Column – 1)

= (5-1) (2-1) = (4)(1) = 4, ∴ df = 4

X^2 tabulated at 5% (0.05) level of significance under 4 is given as 9.488, ∴X^2 tabulated = 9.488

Interpretation of Result

This means that there is a positive relationship between the SME coalition for Africa program (Nigeria in focus) to encourage investors to invest in Nigeria, create a stable and resilient environment for investments to boost the economy and achieving the sustainable development goals (SDG's).

Hypothesis 4

H_o: There is no positive relationship between Engineers as key drivers of innovations, as creative entrepreneurs, as digitization experts and achieving the SDG's.

H_1: There is a positive relationship between Engineers as key drivers of innovations, as creative entrepreneurs, as digitization experts and the achievement of the sustainable development goals (SDG's)

Research Question 4

Table 12: Responses from the Questionnaires (using the 5 point Likert scale)

S/N.	**Responses**	**5 point Likert scale)**	**Frequency**	**Percentage**
1.	Strongly Agree	SA	59	76.64
2.	Agree	A	11	14.29
3	Undecided	UD	4	5.19
4.	Disagree	D	1	1.29
5.	Strongly disagree	SD	2	2.59
	Total		**77**	**100%**

Calculating the expected frequency

Expected frequency Fe = $\frac{\Sigma Fo}{No.of\ cells}$

$= \frac{77}{5} = 15.4$

Table 13: Chi-square analysis for research Question 4

Cells	**Fo**	**Fe**	**Fo – Fe**	**(Fo - Fe)²**	$\frac{\sum(\text{Fo} - \text{Fe})^2}{\text{Fe}}$
1	59	15.4	43.6	1,900.96	123.43
2.	11	15.4	-4.4	19.36	1.257
3.	4	15.4	-11.4	129.96	8.43
4.	1	15.4	-14.4	207.36	13.46
`5.	2	15.4	-13.4	179.56	11.65
Total	77	77		2,437.20	158.227

$$X^2 = \frac{2437.2}{15.4} = 158.227$$

Calculate for X^2 tabulated

Degree of freedom = (Row-1) (Column – 1)

= (5-1) (2-1)

= 4

X^2 tabulated at 5% (0.05) level of significance under 4 is given as

X^2 tabulated = 9.488

Interpretation

This implies that there is a positive relationship between Engineers as key drivers of innovations, as creative entrepreneurs and achieving the sustainable development goals (SDG's).

Hypothesis 5

H_o: There is no positive relationship between using innovations, well-tailored entrepreneurship skill acquisition programs, strategically investing on youth economic prosperity and achieving the SDG's.

H_1: There is a positive relationship between using innovations, well-tailored entrepreneurship skill acquisition program, strategically investing on youth economic prosperity and the achievement of the sustainable development goals (SDG's).

Research Question 5

Table 14: Responses from the Questionnaires (using the 5 point Likert scale)

S/N.	**Responses**	**5 point Likert scale**	**Frequency**	**Percentage**
1.	Strongly Agree	SA	61	79.22
2.	Agree	A	14	18.18
3	Undecided	UD	1	1.30
4.	Disagree	D	11	1.30
5.	Strongly disagree	SD	0	0
	Total		**77**	**100%**

Calculating the expected frequency

Expected frequency Fe = $\frac{\Sigma Fo}{No.of\ cells}$

$= \frac{77}{5} = 15.4$

Table 15: Chi-square analysis for research Question 5

Cells	**Fo**	**Fe**	**Fo-Fe**	**(Fo-Fe)²**	$\frac{\sum(\text{Fo} - \text{Fe})^2}{\text{Fe}}$
1.	61	15.4	45.6	2,079.36	135.02
2.	14	15.4	-1.4	1.96	0.1272
3.	1	15.4	-14.4	207.36	13.465

4.	1	15.4	-14.4	207.36	13.465
`5.	0	15.4	-15.4	237.16	15.40
Total	77	77		2,733.2	177.4772

$\frac{\sum(Fo-Fe)^2}{Fe} = \frac{2,733.2}{15.4} = 177.48$

X^2 Tabulated

Degree of freedom = (Row-1) (Column – 1)

= (5-1) (2-1)

$\therefore df = 4$

X^2 tabulated at 5% (0.05) level of significance under 4 is given as 9.488, $\therefore$ X^2 tabulated = 9.488

Interpretation

Calculate is > X^2 tabulated

Decision rule: Reject Ho and accept the H_1

Hence: This implies that innovations will help to achieve sustainable development goals (SDG's), A well-tailored entrepreneurship skill acquisition program that strategically empowers youth and propels youth economic prosperity will help to achieve the sustainable development goals (SDG's).

3.2 Discussion:

Achieving the sustainable development goals will help to develop the society, develop conducive ecosystems, build the economic infrastructure, improve education, spring up think tanks, create viable entrepreneurial prowess, build an orange economy, boost trade and investments, achieve digitization, build coalition of SME's, project a green economy and encourage an inclusive sustainable financial economy that will solve global problems for an accelerated technology.

Effective collaboration between industries, academia and government will help to solve problems using an effective and efficient entrepreneurial structure that will empower youth with the knowledge to actively participate in development process. Entrepreneurship will get rid of poverty, oppression, a low productive nation and there will be proliferation of SME's with good financial support that will assist in socio-economic development of any nation.

There is urgent need for investors to invest into SDG programs for a transformation into the new normal rather than wait for government. Government using the council for regulation of Engineering in Nigeria (COREN) a government agency, should encourage Engineers to drive the entrepreneurial activities of innovations as creative entrepreneurs that will change the narratives and help to achieve the SDG's.

4. Conclusion

With the highest response, 97.40% of respondents agreed that a well -tailored Youth Entrepreneurship skill acquisition program when harnessed will help to achieve the SDG's. Inclusive sustainable finance recorded 89.63% respondents showing that sustainable finance is instrumental to the achievement of the SDG's. Small and Medium scale Enterprises (SME) coalition recorded 89.33% as a very important variable to boost entrepreneurship practices. Engineers as key drivers of innovations and Creative entrepreneurs recorded 90.93% and Industry- Academia – Government Collaboration recorded 88.42% responses. The objectives of this study was achieved, and the following were established: Government collaboration with the academia and the industry

focusing on youth entrepreneurship will help to achieve the sustainable development goals (SDG's), inclusive sustainable finance will help to achieve the SDG's, Establishing SME coalition, will help to encourage investors to invest, create a stable, resilient environment for investments and boost the economy.

Engineers as key drivers of innovations, and creative entrepreneurs, will be able to achieve an orange economy, good trade and heritage, digitization and improve lives. Using Innovations, well-tailored entrepreneurship skill acquisition programs and strategically investing into the SDG's for youth economic prosperity, will help to achieve the SDG's. In conclusion, establishing well-tailored entrepreneurship skill acquisition programs in our universities and investing on youth economic prosperity will help to achieve the sustainable development goals.

Nomenclature

Fo	Observed frequency
Fe	Expected frequency
CED	Center for Entrepreneurial Development
PHC	Portable Health Clinic
X	Chi-square
COREN	Council for Regulation of Engineering in Nigeria
SDG	Sustainable Development Goals
SME	Small Medium scale Enterprises
Df	Degree of Freedom
I-A-G-C	Industry Academia Government Collaboration

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Appendix

A SURVEY ON THE ACHIEVEMEMT OF SUSTAINABLE DEVELOPMENT GOALS USING ENTREPRENEURESHIP, INNOVATIONS AND INVESTMENTS: THE ENGINEER AS KEY DRIVERS.

QUESTIONNAIRE
FOR RESEARCHERS/ SCIENTISTS WITH ENTREPRENEURESHIP, INNOVATION AND INVESTMENT PROWESS

Introduction
As a researcher, I am currently evaluating The Sustainable Development Goals Using Entrepreneurship, Innovations and Investments with Engineers as Key Drivers to achieve the goals. The study seeks to identify well -tailored Youth Entrepreneurship skill acquisition program, Inclusive sustainable finance, Small and Medium scale Enterprises (SME), Engineers as key drivers of innovations and Creative entrepreneurs and Industry- Academia – Government Collaboration as indicators that will help to achieve the sustainable development goals. This is with the view to providing a stable, resilient environment for investments to boost the economy. You assured that all information given will be strictly kept confidential. I solicit your cooperation.
Contact:
Engr.Dr.Queeneth Kingsley-Omoyibo
queeneth.omoyibo@iuokada.edu.ng

Section A:
Background information
1. Name of Institution…….
2. Academic qualification (e.g. M. Eng, Ph.D.)……..

Section B:
1. Tick the category of research. Applied research( ), Practical ( )
2. Which is your area of specialty, Entrepreneurship ( ), Innovations ( ), Investments ( ).
3. Do you have a skill acquisition program in your institution?
   Sustainable development goals SDG'S
4. Are you familiar with the 17 SDG's?
5. Which of the SDG's do you want to achieve?
6. The triple helix model
   Which do you think supports the ACHIEVEMENT OF THE SDG'S?
7. INDUSTRIES ( )
8. ACADEMIA ( )
9. GOVERNMENT ( )
10. **Table 1: Responses from Questionnaires on the five variables to be critically examined From the 77 respondents.**

Questions	The SDG's using entrepreneurship, innovations and investments with Engineers as key drivers can be achieved with the following indicators, which do you agree with or decline?	**5 point Likert scale**	Responses
1.	Will a well-tailored youth entrepreneurship skill acquisition program help to achieve the SDG's?	Strongly Agree SA Agree A Undecided UD Disagree D Strongly disagree SD	
2.	Will Engineers as key drivers of innovations and as Creative entrepreneurs be able to help achieve the SDG's?	Strongly Agree SA Agree A Undecided UD Disagree D Strongly disagree SD	

3.	Can Inclusive sustainable finance be used to achieve the SDG's?	Strongly Agree SA Agree A Undecided UD Disagree D Strongly disagree SD	
4.	Will Industry- Academia – Government Collaboration help to achieve the SDG's?.	Strongly Agree SA Agree A Undecided UD Disagree D Strongly disagree SD	
5.	Will the establishment of Small and Medium scale Enterprises (SME) help to boost entrepreneurship and encourage innovations?.	Strongly Agree SA Agree A Undecided UD Disagree D Strongly disagree SD	