







































**Table 3 ANOVA<sup>b</sup>**

**ANOVA<sup>a</sup>**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	421.616	8	52.702	99.951	.000 <sup>b</sup>
	Residual	42.182	80	.527		
	Total	463.798	88			

a. Dependent Variable: VAR00009

b. Predictors: (Constant), VAR00008, VAR00005, VAR00006, VAR00001, VAR00007, VAR00002, VAR00004, VAR00003

**Table 4 Coefficients<sup>a</sup> for y**

**Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B		
	B	Std. Error	Beta			Lower Bound	Upper Bound	
1	(Constant)	1.934	1.775			-1.598	5.466	
	Economic and Financial Challenges	.206	.049	.180	4.195	.000	.108	.303
	Social, Cultural and environment challenges	.280	.068	.262	4.143	.000	.146	.415
	Inadequate Resource Assesment	.253	.101	.196	2.516	.014	.053	.454
	Standards and Quality Control Challenge	.258	.084	.224	3.083	.003	.092	.425
	Legislative/Instituonal and Political	.212	.061	.187	3.495	.001		
	Technical Challenges	.352	.059	.333	5.972	.000	.091	.332
	National Policies and Awareness Challenge	.153	.070	.137	2.194	.031	.235	.469
	Market Distortions	.099	.078	.052	1.267	.209	.014	.291
							-.057	.255

a. Dependent Variable: VAR00009

From table 2, the model summary indicates that there is a very strong relationship between y and X<sub>1</sub>, X<sub>2</sub>, X<sub>3</sub>, X<sub>4</sub>, X<sub>5</sub>, X<sub>6</sub>, X<sub>7</sub>, X<sub>8</sub> with the coefficient correlation R = 0.953 (95.3%) and coefficient of determination R<sup>2</sup> 0.909 (90.9%).

From table 4, all the barriers except Market distortions are significant. It has significance value of 0.209 which is above 0.05 level of significance.

### Ranking of Results

**Table 5 The Variables are Ranked Based on their Significance Value and Mean Value**

Variables	Sig Value	Mean Value	Ranked
X1Economic and Financial Challenges	0.000	4.195	2 <sup>nd</sup>
X2 Social, Cultural and environment challenges	0.000	4.143	3 <sup>rd</sup>
X3Inadequate Resource Assesment	0.014	2.516	6 <sup>th</sup>
X4Standards and Quality Control Challenge	0.003	3.083	5 <sup>th</sup>
X5Legislative/Instituonal and Political	0.001	3.495	4 <sup>th</sup>
X6Technical Challenges	0.000	5.972	1 <sup>st</sup>
X7National Policies and Awareness Challenge	0.031	2.194	7 <sup>th</sup>
X8 Market Distortions	0.209	1.267	8 <sup>th</sup>

### Research Question Three

**What are the strategies to mitigate and control the challenges of photovoltaic system for sustainable energy in Nigeria.**

**Table 6 Responses on strategies to mitigate and control the challenges of photovoltaic system for sustainable energy in Nigeria**

<b>STRATEGIES</b>	<b>FREQUENCY</b>	<b>PERCENTAGE (%)</b>
Private Sector Encouragement	27	30.3
Allocation of Resources to Photovoltaic technology	21	23.6
Capacity Building	10	1.2
Government Development of Policies on Renewable energy efficiency	19	21.3
Preparation of Standards and Codes of Practice	6	6.7
Research and Development	10	11.2
Awareness on photovoltaic technology resources exploitation and utilization	18	20.2
Resource survey and assessment	9	10.1
<b>TOTAL</b>	<b>89</b>	<b>100</b>

### Test of Hypothesis

#### Hypothesis One

HO1: There is no significant effect of the collective barriers on achieving sustainable energy in Nigeria .

From table 2, the power of test,  $p$  — value (sig)  $F$  sig change value=  $0.000 < \alpha = 0.05$ . Therefore, the test is said to be significant. The study concludes that significant effect of the collective barriers on achieving sustainable energy in Nigeria.

## **Hypothesis Two**

HO2: There is no significant effect of each barriers on achieving sustainable energy in Nigeria.

From table 4, the significance value of each of the factors are significant except for variable 8 (market distortions) which has a value of 0.203.

It is pertinent to conclude that there is significant effect of barriers on achieving sustainable energy in Nigeria.

## **DISCUSSION OF RESULTS**

1. The discussion of the test shows that there is a significant effect of the collective barriers on achieving sustainable energy in Nigeria.
2. Also it clearly reveals that there is significant effect of each of the individual barriers on achieving sustainable energy in Nigeria.
3. The study further revealed that among the identified prospects of sustainable energy in Nigeria through Photovoltaic technology, promotion off-grid power generation is the most likely area of success and the most needed area of importance for sustainable renewable energy in Nigeria through photovoltaic technology.
4. The key barriers to Photovoltaic technology adoption, utilization, implementation in Nigeria according to their order of significance are Technical Challenges, Economic and Financial Challenges, Social, Cultural and environment challenges, Legislative/Institutional and Political, Standards and Quality Control Challenge, Inadequate Resource Assesment, National Policies and Awareness Challenge; however, Market Distortions is seen from the outcome of the results not to be a key barrier in Nigeria.

## **5.0 CONCLUSION AND RECOMMENDATIONS**

### **Conclusion**

In this study, the researcher has shown Nigeria's photovoltaic technology prospects and challenges in achieving sustainable energy. Pragmatic strategies to be followed to help mitigate the challenges steps were highlighted. No doubt, several plans have been developed by several governments in Nigeria but the problem has always been with the implementation. However the study concludes that:

1. Promotion of off-grid power generation, Rural Electrification, Alternatives to fuel-wood, Off-Grid IT centres, Refrigeration for vaccines and medical stores and Solar water pumping are the major prospects of sustainable energy in Nigeria through Photovoltaic technology.
2. Economic and Financial Challenges, Social, Cultural and environment challenges, Inadequate Resource Assessment, Standards and Quality Control Challenge, Legislative/Institutional and Political, Technical Challenges, National Policies and Awareness Challenge are the key barriers to achieving sustainable energy in Nigeria through Photovoltaic technology. However, Market Distortions is not a key barrier in Nigerian context.
3. Technical challenges and Economic and Financial Challenges are the most striking barriers from the findings of the study. As such these concurs with the findings of Abdullahi, Suresh, Renukappa and Oloke (2017) on Key Barriers to the Implementation of Solar Energy in Nigeria: A Critical Analysis; where they posited that Nigeria should look into development of its own solar energy potential by investing in trainings for professionals and increasing funding solar technology in the country.
4. Private Sector Encouragement, Allocation of Resources to Photovoltaic technology, Capacity Building, Government Development of Policies on Renewable, Preparation of Standards and Codes of Practice, Research and Development, Awareness on photovoltaic technology resources exploitation and utilization, Resource survey and assessment are strategies to mitigate and control the challenges of photovoltaic system for sustainable energy in Nigeria

## **Recommendations**

From the findings of the study, the following recommendations were made

1. Nigerian Government should invest in the development of Nigerian made PV panels which will contribute to the Nations GDP and GNI. This will be the natural consequence since these panels will be exported and foreign exchange will flow into Nigeria's economy.

2. There is need for human capacity building of professionals in the photovoltaic technology. Human capacity building will stimulate an avalanche of technological know how which will be required to both develop newer technologies and maintain the existing ones.
3. Government and Private Sectors in Nigeria should establish PV technology clusters and hubs in Nigeria which will stimulate Industrial growth through establishment of new firms (SMEs) that produce and market Solar PV panels and other accessories.
4. Relevant Government Agencies should develop and implement a working renewable energy policy which will help Nigeria plan to begin in the right direction.
5. The government should create the right investment climate for investors in renewable energy In Nigeria.

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