



**TVET INNOVATION TO SUSTAINABLE ENERGY AND YOUTH UNEMPLOYMENT REDUCTION IN
NIGERIA
A STUDY OF SOME SELECTED RENEWABLE ENERGY COMPANIES IN LAGOS STATE, NIGERIA**

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Abstract

The study examined the effect of TVET innovation to sustainable energy on youth unemployment reduction in Nigeria. The study specifically investigated the effect of TVET innovation to solar energy and biomass energy on youth unemployment reduction focusing on some selected renewable energy companies in Lagos State, Nigeria. The study adopted purposive sampling technique. A survey research design was employed for the investigation. A sample size of 150 was identified and reached by selecting 30 Solar Companies from 5 Local Government Divisions in Lagos State. These divisions include: Ikeja, Ikorodu, Lagos, Badagry and Epe. The study employed an online questionnaire with 15 items using 4 point likert-scale to elicit necessary data from the respondents. Component factor analysis and Cronbach Alpha statistics were used to examine the psychometric qualities (validity and reliability) of the instrument. Using SPSS version 26, multiple linear regression was conducted to assess the descriptive and inferential statistics of the study's data. The study found a strong positive significant relationship between TVET innovation to sustainable energy and youth unemployment reduction; the t-statistic demonstrates this {f (2/147), t = 490.473, P<0.05}. The model summary reveals that r²=.91.8 which implies that 91.8% of the total variation in youth unemployment reduction is jointly accounted for by SE and BE. Based on the findings, the study concluded that there is a strong positive significant association between sustainable energy and youth unemployment reduction.

Keywords: TVET, Innovation, Sustainable Energy, Solar Energy, Biomass Energy, Youth, Employment.

Introduction

Technical and vocational education and training (TVET) is regarded as essential to fulfilling Nigeria's national development goals since it is thought to be the key to sustainable development. However, the nation continues to have problems with youth unemployment, inadequate skills compared to demands in the workplace, and youth vulnerability to sponsors of violent extremism due to poverty brought on by unemployment. The ongoing issue of unemployment has been related to inadequate knowledge and skill acquisition for students who later became jobless due to a lack of sufficient employable capabilities. Energy is an essential gauge of every nation's economic development. Energy resources support economic growth by enhancing internal production, generating income, and providing jobs for the workforce's youth. According to the American Petroleum Institute (API), the oil sector alone provides over 9.0 million jobs both directly and indirectly, making up more than 5.0 percent of all employment in the country (Central Bank of Nigeria, 2015), in light of the contributions that energy sources make to economic development. The effect of sustainable energy on employment generation has been established. For instance, compared to energy from conventional sources, energy produced from biomass facilities, landfill gas, or solar photovoltaic cells provides a greater number of jobs per unit of energy produced. Sustainable energy sources are ones that can be used forever and never run out. Sustainable energy, which doesn't deteriorate or exhaust itself and doesn't need to be regenerated or refilled, provides all of the energy we require. The easiest to reach energy source, solar energy can be used even when it's cloudy. Solar energy is one type of renewable energy. The rate at which the Earth receives solar energy is around 10,000 times greater than the rate at which people use it. For a number of purposes, solar systems can generate power, heat, cooling, fuels, and natural lighting. Solar technology can turn solar power into electricity using photovoltaic panels or solar radiation-concentrating mirrors. On the other hand, organic material



that can be renewed that comes from plants and animals makes up biomass energy. Biomass, which is produced when plants engage in photosynthesis, is where the chemical energy from the sun is kept. In addition to being converted into liquid and gaseous fuels, biomass can also be burned directly for heating purposes. For instance, efficiency in energy use and renewable energy can result in a sizable number of jobs and offer numerous advantages, including those connected to reducing the effects of climate change (International Energy Agency and International Monetary Fund, 2020). A sequence of shocks with compounding effects have reached a critical turning point in the energy transition. Companies should expect increased brand reputation if they invest in technology and incorporate sustainable energy into their fundamental corporate values (Business Insider, 2019).

The most effective method for providing youths with information, skills, and self-confidence is education (Nwodoh, 2021). TVET is essential for improving communities' and youngsters' wellbeing. It increases productivity, empowers youth to take on new ventures, and fosters entrepreneurship. The TVET system is acknowledged on a global scale as in the realm of education that develops trained relating to people for the workforce and the fight against poverty (Okwelle, 2019). Tidd, Bessant, Pavitt, and Wiley in Nur, Sazali, Abdullah, Abu, Naresh, and Syed (2016) described innovation as a process of changing an opportunity into novel ideas and being extensively applied in practice. According to Kamis, Alwi, and Yunus (2017), TVET enhances education in sustainable development in life, life skills (skills to handle life), and entrepreneurial education. TVET according to Wapnuk (2013), cited by Chinwe (2021) comprises the learning of skills and abilities that can help people function well in industrial and commercial vocations. TVET is a versatile instrument or armor device that may be used to fortify youths against unemployment, engaging in criminal activity and social unrest as affirmed by some related research works (Fai, 2017; Jiboku, Jiboku, & Babasanya, 2021).

Many experts have proposed potential factors that could be raising carbon emissions. The factors that can be used to lower or regulate carbon emissions have, however, barely been studied. Additionally, little research has been done on how these factors affect employment. By analyzing the impact of TVET innovation to solar energy and biomass energy on decreasing youth unemployment, this study aims to close this gap.

This hypothesis was formulated for the study:

- H01:** There is no significant effect of TVET innovation to solar energy on youth unemployment reduction in Nigeria.
- H02:** There is no significant effect of TVET innovation to biomass energy on youth unemployment reduction in Nigeria.

Several theories support the study. However, this study is built on knowledge-based theory.

Knowledge-Based theory

Knowledge is seen as the most strategically important resource of the enterprise according to the knowledge-based theory put forth by Nonaka and Takeuchi in 1995. According to the knowledge-based theory of the company, intellectual capital, also known as knowledge-based resources, is crucial in dynamic business contexts. These assets help to give benefits to customers, stimulate innovation and creativity, increase efficiency, and cut costs. According to its proponents, the varied basis of knowledge and competencies among organizations are the key factors that contribute to great company performance and long-term competitive advantage because knowledge-based resources are frequently challenging to replicate and socially complicated.

Numerous authors have examined the problem from various angles and added various dynamics into the research. For example, Usman, Alola, and Sarkodie (2020) evaluated the significance of sustainable energy technology as a crucial factor of environmental deterioration in the US caused by fossil fuel use. Using a generalized least-squares method, Bamati and Raofi (2020) shown that aspects of technology encourage the production of renewable energy in 25



different nations. Using renewable energy generation as the foundation, in their 2020 study, Przychodzen and Przychodzen focused on the major political and economic problems that were influencing the transition of 27 post-socialist transition countries to a less carbon-intensive economy. It was discovered that rising CO₂ emissions, per capita, and economic expansion were stimulants of the production of renewable energy. For their part, Pan, Ai, Li, Pan, and Yan (2019) investigated the connections between environmental legislation, energy efficiency, and innovation in China between 2006 and 2015. The results show that market-based environmental policy encourages technical innovation, which in turn promotes energy efficiency. Innovation was found to have a substantial impact on increasing energy efficiency in both the short and long terms. While Mu, Cai, Evans, Wang, and Roland-Holst (2018), Saudi (2019) looked into the roles of non-renewable, renewable energy consumption, and technical advancement within the Environmental-Kuznets-Curve (EKC) framework for Malaysia in order to analyze how China's expansion of renewable energy would affect jobs. The authors measured the shift in job experience in the labor market as a result of the adoption of green technology using the CGE, or "computable general equilibrium model." According to their study's empirical results, job growth in China is largely due to advancement of solar energy PV and wind energy. They also discovered that subsidies for renewable energy projects had a significant employment impact that is unintended or induced. These subsidies, which derive from environmental levies on the use or extraction of fossil fuels, hurt the non-renewable energy industry and contribute to employment losses there.

Energy use and technological innovation have a positive and reciprocal relationship, according to Jin, Duan, and Tang's (2018) analysis of the topic using data from China and the traditional panel data approach. According to their findings, technical advancements may help emerging nations achieve sustainability by increasing standardizing their energy usage and improving their energy infrastructure. The high impact of the renewable energy sector on overall employment in environmental regulation was discovered by Hafstead and Williams (2018). They looked into whether severe laws encouraged businesses to innovate in greener ways. As a result, there is a growing need for highly skilled professionals. However, throughout the course of their research, they discovered that the growth of the green energy industry is also responsible for an increase in non-relevant jobs. Correcting the OECD countries' air pollution levels, Alvarez-Herranz, Balsalobre-Lorente, Shahbaz, and Cantos (2017) investigated the connection between innovation and the usage of renewable energy.

Methodology

The study examined the effect of TVET innovation to sustainable energy on youth unemployment reduction in Nigeria. The study specifically examined the effect of solar energy and biomass energy on youth unemployment reduction focusing on some selected renewable energy companies in Lagos State, Nigeria. Purposive sampling technique was utilized for the study. A survey research design was employed for the investigation. A sample size of 150 was identified and reached by selecting 30 renewable energy Companies from 5 Local Government Divisions in Lagos State. These divisions include: Ikeja, Ikorodu, Lagos, Badagry and Epe. The study employed an online questionnaire with 15 items using 4 point likert-scale to elicit necessary data from the respondents. Component factor analysis and Cronbach Alpha statistics were used to examine the psychometric qualities (validity and reliability) of the instrument. Using SPSS version 26, multiple linear regression was conducted to determine the descriptive and inferential statistics of the study's data.

The analysis model for the study is defined thus:

$$UR = f (STE)$$

$$UR = f (SE, BE)$$

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \dots + e_t \quad \dots \dots \dots (1)$$

$$SD = \beta_0 + \beta_1SE + \beta_2BE + \dots + e_t \quad \dots \dots \dots (2)$$

Where,



YUR = Youth Unemployment Reduction

STE = Sustainable Energy

SE = Solar Energy

BE = Biomass Energy

e_t = Error Term

β_0 = Constant

β_1, β_2 = Co-efficient of the Variables

Results

Table I: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
.858	.858	15

Source: Researcher's Computation 2023 using SPSS version 26

Table I reveals the reliability statistics of the instruments utilized for the study which are judged to be $\alpha = .858$. This indicates that the instruments are reliable for the study.

Table II: Descriptive Statistics

	Mean	Std. Deviation	N
YUR	12.6600	2.79460	150
SE	12.6667	2.90952	150
BE	12.5400	2.87696	150

Source: Researcher's Computation 2023 using SPSS version 26

Table II reveals a brief summary of the study's sample. Youth Unemployment Reduction (YUR) has a mean value of 12.6600 and a standard deviation of 2.79460 while Solar Energy (SE) and Biomass Energy have mean values of 12.6667 and 12.5400 and standard deviations of 2.90952 and 2.87696 respectively.

Table III: Correlation Matrix

Pearson Correlation		YUR	SE	BE
	YUR	1.000		
	SE	.883	1.000	
	BE	.899	.888	1.000

Source: Researcher's Computation 2023 using SPSS version 26

Table III reveals the degree of correlations between the variables. Youth Unemployment Reduction (YUR) relates with Solar Energy (SE) at .883 ($r = .883$) and with Biomass Energy (BE) at .899 ($r = .899$). This suggests that Youth Unemployment Reduction (YUR) have a very strong positive relationship with both Solar Energy (SE) and Biomass Energy (BE)

Table IV: Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.918 ^a	.843	.841	1.11488	1.922

Source: Researcher's Computation 2023 using SPSS version 26

Table IV reveals the R-Square estimate of 91.8% ($R^2 = .918$). This indicates that the independent variables: Solar Energy (SE) and Biomass Energy (BE) are jointly accounted for over 91.8% of the aggregate variation in the dependent variable, Youth Unemployment Reduction (YUR).

Table V: ANOVA^a

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	980.946	2	490.473	394.604	.000 ^b
Residual	182.714	147	1.243		
Total	1163.660	149	491.716	394.604	.000 ^b

Source: Researcher's Computation 2023 using SPSS version 26

Table V demonstrates the considerable link that exists between the independent and dependent variables. The null hypothesis which states that there is no significant link between the independent variable, Youth Unemployment Reduction (YUR) and the dependent variable, Sustainable Energy (STE), is rejected at a 5% significant level based on the probability value of the F-Statistics, which indicates a P-Value of less than 5% ($2/147 = 490.473$, $P < 0.05$).

Discussion

The study mainly focused on the effect of TVET innovation to sustainable energy on youth unemployment reduction in Nigeria. From the findings of the study, TVET innovation to solar and biomass energy has positive significant effect on youth unemployment reduction in Nigeria. Findings of data analysis were presented through tables. Tables produced include: Reliability Statistics, Descriptive Statistics, Correlation Matrix, Model Summary and Analysis of Variance (ANOVA). The reliability statistics of the instruments utilized for the study were judged to be $\alpha = .858$, which indicates that the instruments are reliable for the study. Correlation matrix reveals that Youth Unemployment Reduction (YUR) relates with Solar Energy (SE) at .883 ($r = .883$) and with Biomass Energy (BE) at .899 ($r = .899$). This suggests that Youth Unemployment Reduction (YUR) have a very strong positive relationship with both Solar Energy (SE) and Biomass Energy (BE). Model summary reveals the R-Square estimate of 91.8% ($R^2 = .918$) which implies that the independent variables: Solar Energy (SE) and Biomass Energy (BE) are jointly accounted for over 91.8% of the aggregate variation in the dependent variable, Youth Unemployment Reduction (YUR). ANOVA demonstrates the considerable link that exists between the independent and dependent variables. The null hypothesis which states that there is no significant link between the independent variable, Youth Unemployment Reduction (YUR) and the dependent variable, Sustainable Energy (STE), is rejected at a 5% significant level based on the probability value of the F-Statistics, which indicates a P-Value of less than 5% ($2/147 = 490.473$, $P < 0.05$). The study found a positive significant relationship between TVET innovation to sustainable energy and youth unemployment reduction in Nigeria.

Conclusion

The study examined the effect of TVET innovation to sustainable energy on youth unemployment reduction in Nigeria. It is hypothesized that there is no significant effect of TVET innovation to sustainable energy, in this case solar and biomass energy on youth unemployment reduction in Nigeria. A theoretical framework is a structure which



holds or strengthens a hypothesis that should be investigated and illuminates why the research should be carried out (Gabriel, 2013). The proposed investigations enhance the building of academic literature and proposes future empirical study. There has been little empirical studies focusing on TVET innovation to sustainable energy on youth unemployment reduction in renewable energy companies in Lagos, Nigeria. To fill this gap the paper suggested this theoretical frame work for that purpose. The study was built on Knowledge-Based View (KBV) proposed by Nonaka and Takeuchi (1995) which argues that the firm's most important strategic resource is knowledge. The firm's knowledge-based theory holds that knowledge-based assets, usually referred to as intellectual capital, are essential in hectic business environments. The study concluded that exposure of youth to sustainable energy through TVET can reduce youth unemployment.

Recommendations

Based on the findings of the study, the study therefore recommended that:

- Youth in Lagos State should further be exposed to TVET innovation to solar energy in order to reduce the unemployment rate among the youth.
- Youth in Lagos State should further be exposed to TVET innovation to biomass energy so as to have the knowledge of other popular sustainable energy source which can enhance reduction of unemployment among the youth.

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