



UPSKILLING WOMEN WITH ICT FOR SUSTAINABLE DEVELOPMENT IN THE NATION'S ECONOMY: THE TVET WAY

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Abstract

The idea of sustainable development is centred on the concept of achieving the objectives of human development while maintaining normal systems' capacity to deliver the natural resources and ecosystem services that are essential to the functioning of the economy and society. This study focused on upskilling women with ICT through TVET for sustainable development in the nation's economy. Survey method was adopted. The population of the study comprised academic and non-academic staff of three polytechnics across the senatorial districts in Ogun state. The study sampled 360 respondents through stratified and quota sampling methods. Questionnaire was deployed to gather data. Findings revealed that women's encouragement in TVET/STEM (beta = .897; p-value < .05 = .000) has the greatest significant benefit to improving sustainable development in the nation's economy. Women motivation (beta = .083; p-value < .05 = .000). Findings also established that women sponsorship, motivation, encouragement and increase in ICT knowledge which implies upskilling through TVET/STEM will go a long way in sustaining socio-economy development of the nation economy as well as bridging the gender gap in ICT leadership and position. The study recommended that stakeholders should endeavour to sponsor women in taking ICT courses in all of the TVET programmes across the state. While doing this, they should also motivate and encourage them whenever they seem to be demoralizing.

Keywords: Upskilling Women, ICT, Sustainable Development, Nigeria's Economy, TVET

Introduction

Development is a process that produces expansion, technological advancement, positive change, or the addition of physical, economic, environmental, social, and demographic components. The period of sustainable development has opened up a new development vision, judging by the paradigm shifts between the 1920s and 1990s. Modern thought regards development as now a process of social system growth, improvement, and advancement across all facets of human activity (Ogwezzy-Ndisika, Ajibade & Onwunali, 2021).

The development paradigm expanded as it changed, resulting in more thorough, integrated, and systematic approaches that take into account topics like the role of the state, the private sector, and civil society, equity and poverty reduction, technology advancement, and the political, institutional, as well as legal framework (Moemeka, 2012). Therefore, for development to be human and sustainable across all fronts, it must be centred on people in a way that takes into account both economic and social development, environmental stewardship, technological and political stability (democracy, human rights, the rule of law, and gender equality). Melkote and Steeves, (2015) contend that the idea of sustainable development is centred on the concept of achieving the objectives of human development while maintaining normal systems' capacity to deliver the natural resources and ecosystem services that are essential to the functioning of the economy and society. As a result, likely, the development will not succeed if it does not prioritise environmental, human, economic, cultural and technological sustainability.

Thus, global connection through the Information and Communications Technology (ICT) have the potential to accelerate the advancement of humanity, especially women in economic, cultural, and environmental, close the digital divide, and create smart communities (Crawford, 2015). Of course, all the 17 Sustainable Development Goals (SDGs) are supported by Information and Communications Technology (ICT), which enables them to move closer to achieving their objectives, so, if women are trained and re-trained on ICT as expected; achieving SDGs objectives is inevitable.

However, due to some stakeholders' attitude of assuring zero tolerance for the issue, the gender issue is still delicate and continues to be discussed at every forum of both local and international populations (Iro-Idoro, et al., 2022). The opportunities, attitudes, and expectations that women must contend with are the sources of many of the problems keeping them from being active participants in the digital revolution. Of course, this challenge is significant and there is a need to support women in their struggle against all types of prejudice that continue to hold them and the nation



behind by harnessing their potential and taking them through ICT (Organisation for Economic Co-operation and Development [OECD], 2019).

Around 250 million fewer women than men are online globally than men are (International Telecommunication Union [ITU], 2017). The patterns seen are concerning as they suggest a rising disparity in Internet use across developed and developing economies, even if the worldwide digital gender divide in Internet usage stayed largely stable (passing from approximately 11% in 2013 to approximately 12% in 2017) (OECD, 2018b). Regarding Internet banking, the digital gender gap is also apparent: women utilise these services 10% and 3% less frequently in Chile and Mexico, respectively. In contrast, women in the US are 2% more likely than men to use Internet banking (OECD, 2019). Furthermore, women only comprise roughly 22% of the workforce in the Nigerian tech sector (ThisDay, 2023). This is due to various factors, such as a lack of accessible opportunities, cultural biases, and the general preference of men for technical professions. It has long been believed that women are more inclined to study the arts and humanities while men are more willing to study science and technology. As a result of this terrible narrative, international organisations have launched campaigns and activities to raise awareness of the value of women in the digital and innovation industries.

Despite the high proportion of women in the population, the figures available as reported by (ThisDay, 2023) shows that only a small number work in the digital and technological industries. Clay (2023) established that only 25% of workers in the tech sector in Nigeria are women. The fact that Nigeria's digital ecosystem has increased from \$4.9 billion in 2021 to \$10 billion in 2022, is quite striking, with only 6% of fintech companies having women as their Chief Executive Officers and 11% in a leadership role which reflect a lack of representation and support (Clay, 2023, Techfunnel, 2023). In solving this issue, it is necessary to start tackling all the social, cultural and environmental barriers that are put in the way of Nigerian women promptly. In this regard, schools (TVET) play a crucial role because they provide an education setting that bridges the gender digital divide by eradicating the gender norms that impede girls from acquiring the knowledge, aspirations, and self-assurance necessary to succeed in the digital world (OECD, 2019). The above presupposes that bridging the gender gap in the analogue world, and even more so in the digital one, requires providing access to (quality) education to all people, particularly girls and women who live in underprivileged circumstances or places.

Access to quality education and scholarship is fundamental to women, especially, in the area of TVET as well as Science, Technology, Engineering and Mathematics (STEM). This will contribute to a decrease in inequality both within and between nations by enhancing access to information and expertise which will further promote social and economic advancement, including for socially disadvantaged groups like people with disability (Crawford, 2017). According to World Bank research, giving girls scholarships can boost their participation in STEM education by up to 40% as well as providing mentorship and training opportunities for women as well as teaching and re-teaching their digital skills are important (ThisDay, 2023).

In order to leverage SDGs, sustainable ICT technical advancements are crucial (Bennett, 2017). The implementation of appropriate policies and guidelines that have a significant impact on users and are important mediating factors for sustainable technology has also been identified by researchers as key determinants of sustainable ICT (Olise, 2010). These factors interrelate absolutely to affect its sustainability. Against this background, this study advocates upskilling Nigerian women with ICT for sustainable development in the nation's economy with a focus on TVET. Likewise, to investigate the extent to which women's sponsorship in ICT can bring about sustainable development in vocational education. In other words, the study believes women's sponsorship, women's motivation and women's encouragement in STEM will go a long way in assuaging the plight of women with low representation and support towards ICT for sustainable development.

However, the significant call for women's skill acquisition and education in the area of ICT through TVET for sustainable development in vocational education has continued to receive upward review from various scholars. For scholars like Adelakun, Oviawe, and Garba (2015), in a study conducted to increase female participation in TVET in Nigeria using a survey research design, the paper established that female registration in Technical, Vocational Education and Training (TVET) is typically low. Auta, (2022) also advocates for the role of TVET in Nigeria's Global Partnership to achieve the Sustainable Development Goals (SDGs). The paper dwells on the three dimensions of SDGs- economic, social and environmental. With respect to the economy, a case was made for adequate investment in the areas of agriculture and manufacturing. With regard to the environment, the paper advocates for a global partnership on sustainable green TVET.



Due to the fact that a significant number of Nigerians do not appreciate, adopt, or utilise ICT to its full potential, the goal of data governance is unrealistic. This is so because sustainable ICT is necessary for SDGs to be achieved (Koltay, 2016). Sustainability is a key factor in determining the worth, adoption, and ICT usage. According to Aguboshim and Miles (2019), users are encouraged to adopt ICT based on their perceptions of the technology's reliability and usability. Obayelu and Ogunlade (2006) believed that the development and access to social networks through low-cost ICTs, and telecentres will enhance timely access to accurate and reliable information by the poor. The paper further states that through the provision of new and improved opportunities for participation in the process of self-determination, economic, social, educational, and cultural advancement, as well as employment outside the purview of traditional institutions and any forms of governance, ICTs will not only empower gender but also sustain poverty alleviation programmes that in the past have failed in Nigeria.

Gerdoçi, and Dibra, (2020), assert that girls in vocational education (VE) in Albania have higher retention, completion, and achievement. However, while enrollment in VE is very low, especially among girls, research can support adopting tailored and effective measures to increase girls' enrollment. Although women make decisions in a constrained and difficult situation, family obligations may hinder their participation in TVET (Chea & Huijsmans, 2017). In developing countries, cultural capital influence is more robust due to lower women's status (Drèze & Sen, 1995, Krugmann & Randolf, 1994), while peer pressure also plays a pivotal role in students' decisions in choosing a VE education (St. Gean, 2010). For girls, the results are mixed, with some research suggesting a positive relationship and others negative. The findings are contradictory for girls, while some studies (Alnaçık, Gökşen, & Yüksek, 2018) revealed a beneficial link.

Aguboshim, Ezeasomba, and Ezeife, (2019), assert that, recently, developments in big data have increased the need for Sustainable Data Governance (SDG). SDG is significant in realizing sustainable economic development in Nigeria. The Unified Theory of Acceptance and Use of Technology (UTAUT) was adopted as the conceptual framework for the study. According to the UTAUT model, users' acceptance behaviour is determined by the advantages of utilising technology and the factors that influence users' decisions to use it. The findings of this study showed that the main effect of sustainable ICT that can leverage SDG in Nigeria is strict adherence to policies, laws, and guidelines on the use of ICT along with good formulation and communication of same.

Research Hypotheses

Ho1: There is no significant relationship between women's motivation in ICT and sustainable development in vocational education.

Ho2: There is no significant relationship between women's encouragement in ICT and sustainable development in vocational education

Ho3: There is no significant relationship between women's increase in knowledge of ICT and sustainable development in vocational education.

Methodology

The survey research design was adopted for this study owing to the nature of the respondents. The population comprised the Academic and Non-Teaching staff of Polytechnics within the three senatorial districts, in Ogun State. Stratified and Quota sampling techniques were adopted. Ogun state was delineated into districts (Ogun Central, Ogun West and Ogun East), while one (1) polytechnic was selected each per senatorial district to make three (3) Polytechnics. A structured questionnaire was used to gather data for the study.

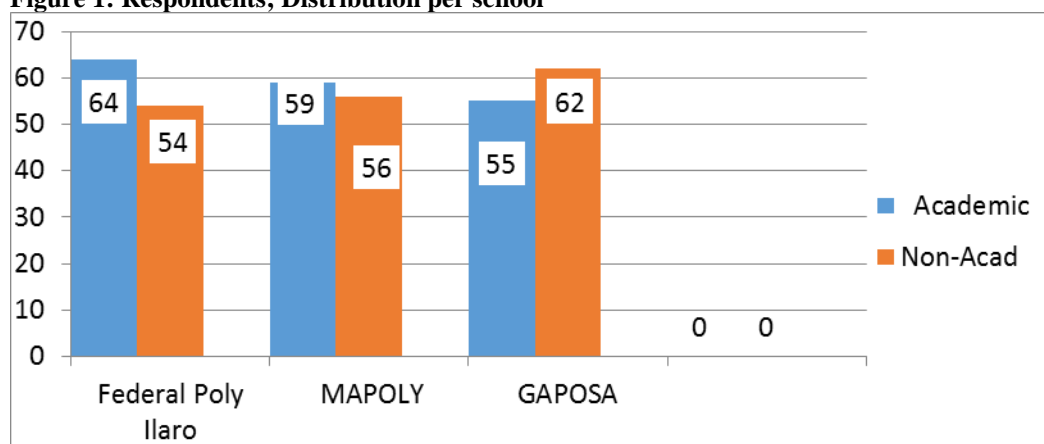
The questionnaires were administered through Google Surveys. The questionnaire link was sent via established Social Media platforms of each of the unions of the group (ASUP, SANNIP AND NASU) through members in each of the selected schools. Inferential statistics (mean, standard deviation, and Pearson Product Moment Correlation) were used to analyse data collected through SPSS, 2021 version.

Data Analysis, Presentation, and Discussion



This study examined upskilling Nigerian women with ICT for sustainable development with a focus on TVET. The number of respondents per school was shown on the below chart.

Figure 1: Respondents; Distribution per school



Source: Researchers' 2023 Computation from SPSS output

The above figure indicates numbers of the respondents per each polytechnic across the senatorial districts in Ogun State.

Table 1: Pearson Correlations of relationships between the variables

		WS	WIK	WM	WE
Pearson Correlation	WS	1.	.433	.505	.933
	WIK	.433	.1	.888	.412
	WM	.505	.888	.1	.480
	WE	.933	.412	.480	1
Sig. (2-tailed)	WS	.	.000	.000	.000
	WIK	.000	.	.000	.000
	WM	.000	.000	.	.000
	WE	.000	.000	.000	.

Source: Researchers' 2023 Computation from SPSS output

NB: WS =Women Sponsorship; **WIK:** Women Increase in ICT knowledge, **WM =** Women Motivation; Women Employment.

Table 2: Summary of the Model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.935 ^a	.894	.873	.324
a. Predictors: (Constant), Women's encouragement, Women's Increase in employment, Women's Motivation				

Source: Researchers' 2023 Computation from SPSS output

a. Predictors: (Constant), Women's Encouragement in TVET, Women's Increase in ICT knowledge, Women's Motivation.



Table 3: ANOVA^a

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	252.016	3	84.005	799.810	.000 ^b
Residual	36.341	346	.105		
Total	288.357	349			

Source: Researchers' 2023 Computation from SPSS output

a. Dependent Variable: Sustainable Development in the nation's economy

Predictors: (Constant), Women's Encouragement in TVET, Women's Increase in ICT knowledge, Women's Motivation, Women's Sponsorship.

Table 4: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.330	.057		-5.814	.000
	Women Increase in ICT knowledge	-.015	.057	.078	.721	.000
	Women Motivation	.122	.063	.083	.931	.000
	Women encouragement	1.024	.025	.897	797	.000
	Women Sponsorship	.315	0.35	.433	.675	.000

Source: Researchers' 2023 Computation from SPSS output

Dependent Variable: Sustainable Development in vocational education

Discussion of Findings

Based on the above analysis, the results in Table 1 revealed a strong positive relationship between women's sponsorship, Women's encouragement, Women's Increase in ICT knowledge, and Women's Motivation in TVET ($r=1, 0.433, 0.505, \text{ and } 0.933$, respectively); these relationships are significant because their p-values are less than the 5% significance level. The implication of this result is that there is a need to upskill women more on ICT for continuous growth. More so, there is an obvious significant relationship between the variables, which is independent (women sponsorship, women encouragement, women Increase in ICT knowledge and women motivation in upskilling in ICT) (for Sustainable development in vocational education) as shown in Table 2 of the study. Of course, the overall influence of these independents variable as indicated in the table of this study could have accounted for 84% of differences in the dependent variable which implied the adequacy of both variables.

The regression coefficients in Table 3 showed that in the absence of all the independent variables considered for the study (women's sponsorship, encouragement, and women's motivation to take ICT courses), the regression constant is negative, indicating the absence of TVET. The information from unstandardized coefficients in Table 4 showed that any increase in the predictors of the study such as women sponsorship, women's encouragement and motivation to take ICT courses, through TVET significantly influence sustainable development by 931; 797; and .675 respectively. However, an increase in women's Increase in ICT knowledge is a significant factor to produce a positive impact on sustainable development in the nation's economy. The result implies that women's increase in ICT knowledge,



sponsorship, encouragement in TVET/ STEM, and motivation are the most significant factors that could determine sustainable development in the nation's economy. In terms of variables contribution based on standardized coefficients beta in Table 4, women encouragement in TVET/STEM (beta =.897; p-value < .05 = .000) has the greatest significant benefit to improve sustainable development in the nation's economy. This factor is followed by women's motivation (beta = .083; p-value < .05 = .000) and women's sponsorship (beta = .433; p-value < .05 = .000), and increase in women employment (beta =.721; p-value < .05 = .000). Findings from this study are in line with some of the factors Amede (2019); Koltay, (2016), Aguboshim & Miles, (2019) discovered. Likewise, Gerdoçi and Dibra (2020), Iro-Idoro et al. (2022) found that scholarship schemes for girls would be a beneficial tool in increasing their participation.

Conclusion and Recommendations

This study concludes on the notion that women's sponsorship, motivation, encouragement and increase in ICT knowledge which implies upskilling through TVET and STEM will go a long way in sustaining the socio-economy development of the nation as well as bridging the gender gap in ICT leadership and position. Therefore, this study recommended that stakeholders should endeavour to sponsor women in taking ICT courses in all of the TVET programmes across the state. While doing this, they should also motivate and encourage them whenever they seem to be demoralizing.

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