

## IMPACT OF ADVANCING GLOBAL TECHNOLOGY ON TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING FOR SUSTAINABLE ECONOMIC DEVELOPMENT

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### Abstract

*The rapid advancement of global technology has significantly transformed education systems worldwide, particularly Technical and Vocational Education and Training (TVET). This paper examined the impact of advancing global technologies on TVET for sustainable economic development in Nigeria. It explored how innovations such as Information and Communication Technology (ICT), Learning Management Systems (LMS), virtual simulations, and digital learning platforms influence teaching, learning, and skill acquisition. The study reviewed some relevant literatures and cited how advancing global technology contributes to sustainable development goals 2030. It highlighted both opportunities and challenges associated with technology integration, including improved access to knowledge, enhanced practical training, and issues such as infrastructural deficits and inadequate teacher competencies. The paper concluded with suggestions for policy reforms, capacity building, and investment in digital infrastructure to maximize the benefits of technological advancement in TVET.*

**Keywords:** *Education, Global Technology, Sustainable Economic Development, TVET.*

### Introduction

Education propels the growth and development of any nation. The development of any nation economically, politically and socially can be traced largely to the standard of education of that nation. Aigboduwa, et al. (2025) stated that education is the mid-point on which all economic activities of a nation rotate. The development or advancement skills that are needed by a nation can be driven through Technical and Vocational Education and Training (TVET).

TVET is the education and training programs designed to prepare individuals for specific trades, crafts, and careers at various levels. It focuses on practical skills acquisition, entrepreneurship and employability by contributing significantly to national development. TVET plays a vital role in equipping individuals with practical skills necessary for employment and economic development. TVET has long been recognized as a critical driver of national development, particularly in industrializing economies (Inuwa. 2025). If actually applied, TVET will enhance workforce productivity, reducing unemployment and promoting industrial and

economic growth. In Nigeria, including Edo State, TVET is increasingly influenced by global technological advancements such as digitalization, automation, and artificial intelligence. Global technology has reshaped the way knowledge is delivered, acquired, and applied. The integration of ICT into TVET has introduced innovative teaching methodologies, making learning more flexible, interactive, and industry-relevant. However, the effectiveness of these technologies depends on the readiness of institutions, instructors, and learners.

Advancing global technology includes innovations such as, Information and Communication Technology (ICT), Artificial Intelligence (AI), Virtual Reality (VR) and Augmented Reality (AR), Learning Management Systems (LMS), Online and distance learning platforms. These technologies are central to the modern knowledge-based economy and have transformed traditional education systems into digital and flexible learning environments. Tools like Zoom, YouTube and smart learning applications enhance understanding and engagement in TVET. The integration of ICT into TVET equips students with digital competencies required in modern workplaces and this flexibility improves participation and inclusion in TVET programs. Advancing global technology is recognized as a pivotal technology with transformative potential across various sectors, including technical and vocational education and training (Adel, 2024; Sandhu et al., 2024). To this end, many TVET teachers lack adequate training in modern technologies thereby affecting the quality of instruction. The acquisition and maintenance of technological tools are expensive, limiting their availability in many institutions. Some TVET curricula do not reflect current technological trends, making graduates less competitive in the labor market. Also, unequal access to technology creates disparities among students, especially in rural areas.

The integration of global technology with TVET will create opportunities such as promotion of lifelong learning, increased global competitiveness, enhanced collaboration with industries, innovation and creativity in skill acquisition and expansion of remote and hybrid learning models.

### **Literature Review**

Research highlights an increasing demand for skilled workers across digital and technical sectors. Reports from global organizations like the World Economic Forum suggest significant disruptions in job markets due to automation and AI, with millions of traditional roles being replaced while new opportunities arise. This shift underscores the need for adaptable and future-ready vocational education systems through advancing global technologies. Akinola and Bello (2020) asserted that vocational education students who use advancing global technology for learning show greater engagement and improved skill acquisition.

Eze and Nwachukwu (2021) said that platforms like YouTube make room for instructional videos that are compatible with classroom training, while WhatsApp groups facilitate peer discussion and knowledge sharing. Finally, platforms like LinkedIn and Facebook groups connect vocational studies with professional employers, thereby increasing their market demand (Ajayi & Okafor, 2022). This advancing global technology allows TVET students to stay up-to-date with industry demand, gain skills and job opportunities, and engage in professional endeavors thereby increasing and sustaining economic growth.

### **Contributions of Advancing Global Technology to Sustainable Development Goals 2030**

When one talk about sustainable development, global technology becoming more advanced is really important for reaching the Sustainable Development Goals (SDGs) by 2030. It mostly helps by bringing new ideas into many different areas. Studies show that new technologies

around the world are very promising for helping us hit several SDGs, especially the ones about making economies grow. For example, when it comes to SDG 8, these tech improvements boost how much work we can get done. They do this by automating everyday tasks, which frees people up to do jobs that require more thinking. They also help point out skill gaps, so we know what kind of training is needed.

Looking at SDG 9, which covers industry, innovation, and infrastructure, these tech changes make building projects better, push for new research, and help create smart cities that can grow in a sustainable way. Beyond these specific points, global tech tools are key for encouraging people to keep learning and improving their skills. This is vital for adapting to how quickly jobs are changing. These advancements also help vocational training. They make good training easier to get, use resources more efficiently, and ensure what is taught matches what industries need. This means better learning results and helps people who have not had as many opportunities, supporting a more inclusive and sustainable future. What's more, using advanced global technologies helps tackle big problems related to other SDGs too.

For instance, SDG 10 sees less inequality because more people can get resources and chances, and because we can reduce unfairness that sometimes creeps into computer programs used for making decisions. For sustainable cities (SDG 11), these technologies make things more energy-efficient, improve public transport, and strengthen systems for responding to disasters. When it comes to climate action (SDG 13), global tech innovations make it easier to watch the environment, create climate models, and put plans into action to cut down on carbon emissions.

One also see clearer healthcare improvements for SDG 3. New technologies allow for better ways to diagnose problems, personalized treatments, and ongoing patient monitoring, which really helps communities that do not have good access to care or live far away. On top of that, progress in global technology improves how we manage water (SDG 6) by making our water supply systems better and by helping us predict risks to water quality. In energy (SDG 7), these technologies help bring in more renewable energy, make power grids better, and cut down on wasted energy. This makes clean energy more affordable and easier to get. All in all, these many different tech improvements really show how much artificial intelligence and similar innovations can change things, helping sustainable development happen all over the world.

### **Benefits of Advancing Global Technology in TVET**

There are a lot of advantages of integrating global technology into TVET curriculum. These include among others:

1. *Development of Life Skills:* global technology can assist TVET students develop and vital life skills, which may include: Problem-solving skills through firsthand learning, strengthen dialog skills with industry, Effective time management in certain environment and corporation through team-work assignment.
2. *Technical Proficiency:* TVET through global technology ensures learners gain technical skills in industry base, such as: Technological competency expertise, Proficiency in industry-standard tools and software, management of hardware, awareness of cyber-security, among others.
3. *Improve Learning:* Global technology afford students the opportunity and flexibility of getting the educational content as simple as possible.
4. *Improves Students Contact:* leisure meeting outside school hours through global technology platforms like Zoom meeting, WhatsApp group and others can be used for contacting students which keeps learners engaged and increases motivation.

5. *Short-Time Feedback*: Instant feedbacks are received from both teachers and learners when engaged with advancing global technology in most cases.
6. *Increase Employment Opportunities*: It increases outreach and visibility of employable personnel by placing CV's on platforms like LinkedIn and other internet spaces.

### **Challenges of Advancing Global Technology Integration in TVET**

Integrating advancing global technology into TVET may present significant challenges such as:

1. Limited technological infrastructure in educational institutions
2. High costs of advancing global technology implementation; the gadgets needed for implementation are too expensive.
3. Shortage of skilled personnel to manage advancing global technology systems effectively. Eze and Nwachukwu (2021) asserted that some teachers and learners lack the skills needed to use social media effectively for learning.
4. Insufficient training for educators on the effective use of advancing global technology tools can hinder their adoption and potential impact in classrooms
5. Non-Recognition; training gained through social media platform in most cases are not recognised formally by institutions of learning and possibly employers.
6. Connectivity Issues: Irregularity and inconsistency in internet connectivity poses a constraint, expensive data and rural area network unreached are all barriers.

### **Discussion**

A comprehensive review of the literature reveals that the incorporation of emerging global technologies within TVET holds significant promise for promoting and sustaining economic development in Nigeria. This is achieved by enhancing the engagement, accessibility, and industry relevance of learning processes. Effective implementation, however, necessitates addressing critical challenges such as bridging the literacy gap, improving internet infrastructure, reducing subscription costs, and ensuring the quality and relevance of educational content. The role of advancing global technology to sustainable development goals 2030 is all encompassing and cannot be over-emphasized. To this end, educators and policymakers must prioritize the development of structured training and retraining programs that integrate contemporary global technologies into TVET professional curricula. Additionally, conducting training workshops for TVET instructors can augment their proficiency in utilizing advanced technologies. Furthermore, fostering collaborations with contemporary content developers and industry specialists can effectively bridge the divide between theoretical knowledge and practical application.

### **Conclusion**

The integration of advancing global technology will significantly influenced TVET for sustainable economic development by improving teaching methods, enhancing skill acquisition, and increasing employability. Despite the challenges, the opportunities outweigh the limitations if proper policies and investments are implemented. For TVET to remain relevant in the digital age, stakeholders must embrace technological innovations and ensure their effective integration into the education system of a growing economy like Nigeria.

### **Suggestions**

To maximize the impact of global technology on TVET for sustainable economic development, the following are suggested:

1. Government should invest in ICT infrastructure in TVET institutions.

2. Continuous training programs should be organized for teachers on digital competencies.
3. TVET curriculum should be updated to reflect emerging technologies.
4. Public-private partnerships should be encouraged to support technology integration.
5. Subsidies should be provided for technological tools and equipment.
6. Rural areas should be prioritized in digital inclusion policies.

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