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STRENGTHENING WORK-BASED LEARNING THROUGH PUBLIC–PRIVATE PARTNERSHIPS FOR CAPACITY BUILDING AND SUSTAINABLE SKILL DEVELOPMENT IN TVET

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ABSTRACT

The pursuit of the Sustainable Development Goals (SDGs) especially SDG 4, which focuses on quality education has brought renewed global focus to Technical and Vocational Education and Training (TVET) as a vital tool for sustainable development. This paper explores the impact of TVET in advancing sustainability by building capacity, fostering public-private partnerships (PPPs), promoting work-based learning (WBL), and matching skills to the evolving demands of the labor market. A review of recent research shows that TVET drives economic growth, encourages social inclusion, supports technological progress, and nurtures lifelong learning. TVET does this by preparing learners with hands-on, market-ready, and entrepreneurial skills. The paper stresses the importance of capacity building not just for individuals, but also for institutions and training systems so they can adapt to rapid technological and industrial changes. These collaborations ensure that TVET remains closely linked to real workforce needs. Additionally, the study highlights WBL as a key bridge between classroom theory and workplace practice, making graduates more employable and sparking innovation. A skill-mapping framework is introduced to illustrate how TVET competencies connect to current jobs and anticipate future roles particularly in the green and digital economies. The framework highlights the need to weave environmental sustainability, digital skills, renewable energy technologies, and principles of the circular economy into TVET programs. In conclusion, the paper argues that achieving sustainable development depends heavily on equipping people with relevant skills. Strengthening TVET through capacity building, strong industry partnerships, and training that looks to the future is essential for inclusive economic growth, a resilient workforce, and fulfilling the broader aims of the SDGs.

Keywords: Sustainable Development Goals, TVET, Capacity Building, Public-Private Partnership, Work-Based Learning and Future Skills

INTRODUCTION

The Sustainable Development Goals (SDGs) were introduced in 2015, inspired by the United Nations' landmark publication, "Transforming Our World" (UN, 2015). These goals were created as an ambitious effort to end poverty and protect the planet. Unlike the earlier Millennium Development Goals (MDGs), which didn't specifically address vocational education and training (VET), the SDGs place VET at the center of Goal 4. This goal is all about making sure everyone has access to inclusive, high-quality education and the opportunity to keep learning throughout their lives (UN, 2015). Similarly, Edokpolor and Owenvbiugie (2017) point out that sustainable development is not just a one-time achievement but an ongoing, forward-thinking process that connects many aspects of life. Also, Saue (2024) notes that sustainable development covers a wide range of issues, focusing especially on

improving people's livelihoods. In Nigeria, for example, sustainable development means making sure that people's basic needs like food, security, healthcare, clothing, and shelter are met for both current and future generations, while also ensuring that dignity and freedom are protected. Nwosu and Micah (2017) add that sustainable development is about finding ways to meet today's needs without harming the environment or limiting future possibilities.

Goal 4 of the SDGs puts a spotlight on lifelong learning through high-quality technical and vocational education, making sure people can pick up the practical skills they need (Mathur et al., 2022). This marks a renewed global push to reinvent technical and vocational education and training (TVET) so that it's more effective for development (McGrath and Powell, 2026). Back in 2012, the Third International Congress on TVET highlighted the importance of focusing on people not just the economy when it comes to vocational education. The Congress emphasized that society should serve TVET just as much as TVET serves society, and it called for a stronger emphasis on developing practical life skills and building human capacity (UNESCO, 2012, cited in McGrath and Powell, 2026).

Capacity building, in this context, means helping people develop the abilities they need based on their specific situations. It could involve retraining teachers to build new skills or generally increasing someone's ability to perform well. The goal is to build on what people already know so they can be even more effective and have the resources needed to reach their goals. According to Okwelle and Ebikeseye (2022), capacity building is about shaping and improving the skills, instincts, and processes needed to adapt and thrive in a world that's constantly changing with new technology. AuSAID (2004), cited in Chukwuedo and Igbinedion (2014), defines it as gaining the competencies that allow individuals, organizations, or even countries to keep improving over time. Olaitan et al. (2011, cited in Okwelle and Ebikeseye, 2022) describe it as increasing people's knowledge, skills, and attitudes so they can become proficient in their chosen fields.

Within TVET, capacity building also means working together internationally to improve vocational education systems. Nwobu (2009, cited in Chukwuedo and Igbinedion, 2014) sums it up as helping people gain the knowledge and attitudes needed to do their jobs well. It's about boosting institutional competence, making vocational training more relevant to the job market, and supporting socio-economic development through education and skills training. Education and training are essential for equipping people with the tools they need for different careers, which in turn supports sustainable development. In today's world, where lifelong and competency-based learning are increasingly important, TVET plays a crucial role in helping learners become adaptable, skilled, and well-rounded.

Technical and Vocational Education and Training (TVET) is defined in many ways, reflecting the diversity of programs worldwide. At its core, TVET is about giving students hands-on skills that make them valuable in the workforce. Saue and Anumnu (2025) argue that TVET helps drive socio-economic and technological progress by building skills. Its purpose is to prepare a skilled and entrepreneurial workforce capable of creating wealth and reducing unemployment and poverty (Maigida and Raymond, 2014, cited in Ogbebor and Oviawe, 2025). In today's era of digital transformation, industries are increasingly knowledge-based, and there's a growing need for advanced technical skills and expertise (Hassan, 2021). TVET is a key pathway for preparing young people to succeed in a fast-changing, global job market.

Technical education is designed to help both trainers and trainees by providing the essential knowledge, skills, and attitudes needed for success in their chosen careers, promoting self-reliance and national development (Nwogu and Nwanorou, 2011, cited in Oviawe et al., 2017). TVET also

teaches people how to spot opportunities, develop strategies, and start businesses—contributing to economic growth. It is seen as a powerful tool for accelerating technical progress, upgrading skills, and supporting both economic and sustainable development (Akhuemonkhan and Raimi, 2013, cited in Ogbebor and Oviawe, 2025). Around the world, TVET is recognized as a key driver of sustainable development by equipping people with practical skills that make them employable, innovative, and entrepreneurial. Reaching high-quality outcomes in TVET is closely linked to developing a highly skilled workforce.

Skills development sits at the heart of several SDGs, especially SDG 4. For example, target 3 calls for better access to TVET and higher education, while target 4 focuses on equipping people with the knowledge and skills needed for decent work and employment. Achieving these goals depends on strengthening partnerships between the public and private sectors in TVET, expanding work-based learning opportunities, and ensuring that training matches both current and future workforce needs.
Strengthening Public-Private Partnership (PPP) of TVET Stakeholders

Public-private partnerships (PPPs) are essential collaborations that bring together government bodies, nonprofit organizations, and private companies (Hodge and Greve, 2019). By combining their unique expertise, resources, and capabilities, these groups work towards shared goals and tackle important challenges in society. In the context of Technical and Vocational Education and Training (TVET), PPPs play a crucial role in making sure that what students learn matches what employers actually need. This not only boosts students' chances of finding jobs but also helps use resources more efficiently. PPPs act as a vital link, connecting training programs that are often driven by what schools can offer (supply) with the actual skills needed in the workforce (demand). These partnerships can also speed up the adoption of new technologies in vocational education. For example, introducing online tools, e-learning platforms, and smart workshops can make learning more effective and accessible. Features like online qualifications, virtual simulations, and distance learning opportunities help expand vocational training to areas where traditional classrooms might not reach (Osabuohien et al., 2020).

Building strong partnerships with industry is especially important for keeping TVET programs up-to-date, given how quickly the world of work is changing. Training curricula should be adaptable, so students are prepared for evolving job requirements. PPPs significantly improve students' employability by providing opportunities for internships, apprenticeships, and direct recruitment through industry networks (Okolie et al., 2019). A true partnership is about negotiation and mutual understanding, where all parties agree on a shared goal and take on specific rights and responsibilities (Irovan, 2024). For example: TVET institutions should actively demonstrate the real benefits of their programs, showing industry partners the value of investing in vocational education by highlighting positive outcomes for students and employers. In return, industry partners should support the institution with funding, resources, and ethical backing. This trust and recognition help the institution grow and continue providing high-quality education in areas such as:

When designing training programs, it's essential to ensure they reflect the latest trends and realities of today's workplaces. Irovan and Tutunaru (2025) point out that this can best be achieved by fostering strong connections between government who often leads training efforts and private sector organizations. Along the same lines, the OECD (2020) and ILO (2018) highlight that having industry involved in shaping the curriculum is key for keeping training relevant to current job market demands.

It's also important to develop apprenticeship, internship, and dual-training programs that are led

by industry. These opportunities give students valuable hands-on experience, helping them bridge the gap between what they learn in class and what they'll actually do on the job.

Building the skills of TVET instructors through training experiences based in real industries is crucial for keeping education in sync with what employers need. The International Labour Organization (2018) and UNESCO (2016) note that these partnerships help teachers connect classroom lessons with the practical skills used in the workplace.

Encouraging private companies to contribute equipment, tools, and teaching materials can be made easier by promoting cost-sharing arrangements. This approach helps spread out the expense of infrastructure and makes better resources available for everyone.

Work-Based Learning (WBL)

Work-based learning (WBL) has a lot in common with entrepreneurial practice, especially in how both encourage innovation and use structured methods. In the workplace, WBL spans everything from informal, experience-based learning to more formal, job-specific training programs particularly within vocational education (UNEVOC, 2019). Because of this, WBL is often seen as a solution to many educational and economic challenges. It has a strong track record of driving economic growth and supporting technological advancement (Ahmad et al., 2020). When it comes to building skills, WBL is a well-organized system that connects students with real companies. By placing learners in actual work environments, WBL helps them gain both specialized knowledge and transferable skills. This hands-on approach allows students to take charge of their learning and develop abilities that are highly valued in the workplace (Subekti, 2019). These experiences are especially important for nurturing an entrepreneurial mindset. WBL is a collaborative effort between schools and businesses, designed to give learners and employees valuable, practical experience. By learning directly in the workplace, students gain practical skills, open up more career opportunities, and become more employable in a competitive job market. Applying what they've learned in real-world situations also prepares them for successful careers and entrepreneurial ventures.

Ahmad et al. (2020) also point out that school-based vocational education programs often include WBL elements like internships, work placements, traineeships, or practical project work. These can be required or optional parts of the curriculum, or even stand-alone modules that contribute to a qualification. Research by Kis (2020) at the OECD shows that in school-based vocational programs, the work-based part usually makes up less than half of the total content, while in apprenticeship programs, it's at least 50 percent or more. This standard matches the guidelines set by the European Centre for the Development of Vocational Training (Cedefop, 2014, cited by ILO, 2022), which differentiates school-based programs with up to half of learning done on the job from apprenticeships, where workplace training is a main component. Overall, including work-based learning periods in school-based vocational education brings many benefits not just for students, but also for vocational schools, participating businesses, and society as a whole (ILO, 2022). See Table 1 below for significance of incorporating WBL:

Table 1: Significance of Incorporating Work-Based Learning (WBL) to stakeholders

S/N	Stakeholders	Significance
1.	Learner	a. Gaining competences required at workplaces/in companies
		b. Acquisition of transferable skills Increased motivation
		c. Relationship with employer (better chance to get a job)
2.	Company	d. Simplified staff recruitment

		e. Lower turnover of labour force
		f. Innovative impulses and knowledge from VET school and learners
3.	VET	g. Better matching of VET delivery with industry needs
		h. Better reputation of VET school
		i. Motivated students
		j. Increased demand from learners
4.	Society / National Economy	k. Increased reputation of the VET system
		l. Better qualified workforce
		m. Coordination of labour market and education system less unemployment

Source: ILO (2022)

Work-based learning (WBL) is no longer just about watching or reading about work from the sidelines (Helyer, 2015, as cited in Subekti, 2019). Today, it's about purposefully giving students real, hands-on experience in actual workplaces. In these placements, students actively participate in the tasks they're learning about, which makes the learning process much more engaging and practical.

Connecting TVET Skills to Today's and Tomorrow's Jobs

Technical and Vocational Education and Training (TVET) is becoming increasingly important in our fast-changing economy. With industries evolving quickly and demanding higher skill levels, there's a real need for practical knowledge and hands-on abilities (Freud, 2021). TVET helps drive economic growth and productivity by preparing a skilled workforce that can keep up with new technologies and industry standards. It bridges the gap between what's taught in theory and what's needed in practice, making it a key player in economic progress through skills-based learning. TVET also boosts employability and workforce readiness by giving learners the exact skills and knowledge that today's industries require especially as automation and AI become more common (Fakhar et al., 2024). It opens doors for lifelong learning and ongoing career development, helping people adapt to the ever-changing job market and advances in technology. In the knowledge-driven world of the twenty-first century, developing talent is crucial for national success and resilience (Gonzalez-Perez and Ramirez-Montoya, 2022).

This kind of talent development happens through TVET programs that emphasize practical, real-world knowledge. TVET gives students the up-to-date skills they need to move forward in their careers (Owais et al., 2020). In many developed countries, like Germany, TVET is highly respected and combines workplace training with classroom learning. Oversight and regulation often come from labor market stakeholders such as employers and trade unions (Hall and Soskice, 2001, as cited in Zixuan et al., 2025). Consequently, TVET acts as a bridge between learning skills and securing long-term employment. It responds to both current labor market needs and the demands of the emerging green and digital economy. In short, sustainable development is built on practical skills and TVET is the engine that delivers those skills. This can be seen on three different levels:

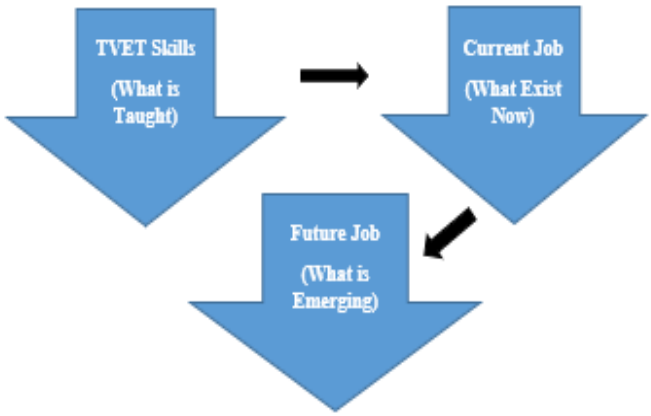

Fig 1. TVET skills for Sustainable Development
Source: Authors (2026)

The mapping system described above suggests weaving green skills into the TVET curriculum for every field, incorporating digital and AI literacy throughout all programs, and placing a strong focus on renewable energy and the circular economy. It also encourages preparing students for future careers in sustainability, rather than just existing jobs, and ensuring that training is aligned with the Sustainable Development Goals (SDGs), climate policies, and Industry 4.0 standards. In the same vein, the mapping system aligns traditional competencies with modern standards for instance, upgrading manual welding skills to include the use of automated or digital welding equipment. Future skills focus on emerging trends such as digital literacy, automation, green technologies, and problem-solving abilities. Skill mapping anticipates these needs by integrating innovation, adaptability, and lifelong learning into TVET curricula. See table 2.

Table 2: TVET skills Plus Current jobs and Future jobs.

TVET Skills	Current Jobs	Future Jobs
A1 = Environmental Technology and Green Skills	B1 = Green Technician	C1 = Circular Economy Designer
A2 = Digital and Data Skills	B2 = Data Analyst for Sustainability	C2 = Smart Grid Specialist
A3 = Engineering & Technical Trades	B3 = Mechanical and Electrical Technician	C3 = Climate Adaptation Planner
A4 = Energy and Renewable Systems	B4 = Solar Panel Installer	C4 = Vertical Farming Engineer
A5 = Sustainable Agriculture and Food Systems	B5 = Organic Farm Supervisor	C5 = AI Sustainability Strategist
A6 = Circular Economy and Waste Management	B6 = Recycling and Waste Management Operator	C6 = Energy Storage Technician

Table 3: TVET Skill, Current Jobs and Future Jobs Mapping

Mapping System	
A1 --> B1	A1 --> C1
A2 --> B2	A2 --> C5
A3 --> B3	A3 --> C6
A4 --> B4	A4 --> C2
A5 --> B5	A5 --> C4
A6 --> B6	A6 --> C3

Source: Authors (2026)

The mapping system above highlights how each skill taught in TVET is connected to both today's jobs and the careers of tomorrow. This means that TVET doesn't just prepare students for the current job market it also equips them for roles that are still emerging. There's a clear and logical pathway from learning specific TVET skills to landing present-day jobs, and then progressing into future careers focused on sustainability. The abilities gained in TVET are useful for immediate employment, but they're also the building blocks for more advanced roles that will shape the green and digital economies of the future. Based on Table 2, here's what we can see:

1) Environmental technology and green skills (A1) help people become green technicians today (B1). Looking ahead, these same skills lay the groundwork for future careers as circular economy designers (C1), where the focus is on creating systems with zero waste and sustainable resource use.
2) Digital and data skills (A2) lead straight to jobs like data analyst for sustainability (B2). As

technology evolves, these digital skills are the foundation for becoming an AI sustainability strategist (C5), where artificial intelligence tackles environmental and energy challenges.

3) Engineering and technical trade skills (A3) open doors to jobs as mechanical and electrical technicians (B3). In the future, these core skills grow into roles like energy storage technician (C6), specializing in the latest battery and renewable energy storage technologies.
4) Energy and renewable systems skills (A4) prepare graduates for work as solar panel installers (B4) right now. As the world shifts to smarter energy systems, those same skills can lead to being a smart grid specialist (C2), managing advanced electricity networks.
5) Sustainable agriculture and food systems skills (A5) mean you can work as an organic farm supervisor (B5) today. With progress in agricultural technology, these skills will evolve into jobs like vertical farming engineer (C4), using new techniques to ensure urban food security.
6) Circular economy and waste management skills (A6) currently create opportunities as recycling and waste management operators (B6). In the future, this expertise can lead to roles such as a climate adaptation planner (C3), blending waste management with urban resilience planning.

Conclusion

Sustainable development relies on having the right skills, and TVET is the main driver for developing them. Building capacity, encouraging collaboration with industry, and promoting hands-on learning are all essential if TVET is to become a true catalyst for positive change in Nigeria. The study concludes that reaching the goals of the Sustainable Development Goals especially SDG 4 depends on transforming and strengthening TVET. Unlike earlier development agendas, the SDGs put TVET front and center as a way to promote inclusive, equitable, and lifelong learning that gives people practical skills for sustainable living. This paper shows that capacity building in TVET isn't just about learning new skills; it's about making TVET institutions more effective, ensuring their programs are relevant to the job market, and helping people adapt to technological and societal changes. Integrating public-private partnerships (PPPs), work-based learning (WBL), and deliberately matching TVET skills to both current and future job needs creates a strong, forward-looking approach.

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