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A Systematic Literature Review of Technical and Vocational Education and Training (TVET) Systems: An insight from China and Sub-Saharan Africa

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Abstract

Technical and Vocational Education and Training (TVET) is important in developing a skilled workforce, promoting sustainable career pathways, and supporting economic growth worldwide. This study provides a systematic comparative analysis of TVET systems in China and Sub-Saharan African countries. The scoping review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement and with the search limited to studies published between 2012 and 2024. The results reveal divergent developmental processes shaped by distinct socio-economic contexts. While China's TVET demonstrates strong governmental support, strategic industry partnerships, and ongoing curriculum modernization, fostering workforce readiness and contributing to national economic priorities, such as rural revitalization, these advantages are not seen in Sub-Saharan African countries. The region faces challenges related to funding, outdated curricula misaligned with labor market needs, infrastructural deficits, and shortages of qualified instructors, which collectively undermine training quality and employability outcomes. Innovatively, this review integrates multi-dimensionality, pedagogical innovation, infrastructural capacity, and social inclusion, providing a

comprehensive framework that further heightens the transformative potential of contextualizing China's competency-based and industry-integrated TVET approaches within the unique socio-economic realities of Sub-Saharan Africa. . These findings offer a way to compare and guide changes in policies that can improve TVET systems, address current job market needs, support sustainable development, and lower youth unemployment in areas with limited resources.

Keywords: TVET, Sustainable Career Development, Curriculum Relevance, Industry Collaboration, Labor Market Alignment, Sub-Saharan Africa, China

Introduction

Technical and Vocational Education and Training (TVET) is a nucleus for developing skilled labor forces for economic development and social inclusion worldwide. It focuses on providing individuals with practical competencies and industry-relevant skills, thus playing a pivotal role in enhancing employability, fostering entrepreneurship, and supporting lifelong learning (Magadza & Mampane, 2024; Mustaffa et al., 2024). These systems are especially vital in contexts where formal education alone cannot meet the dynamic needs of labor markets, serving as a critical bridge to workforce readiness.

TVET is receiving increased strategic attention due to rapid technological advancement and shifting economic structures. International organizations such as UNESCO emphasize TVET's importance in achieving Sustainable Development Goals, particularly those related to decent work and economic growth (Haßler et al., 2021). China exemplifies the potential of coordinated TVET frameworks backed by robust government policies, strong industry collaboration, and substantial infrastructure and human capital investment (Fan et al., 2024). The Chinese system prioritizes integration with industrial sectors, regular curriculum modernization, and comprehensive vocational teacher training, thereby creating a responsive and competitive workforce in a global economy (Chen et al., 2024; Maruyama, 2020; Chen, & Naughton, 2016). Notably, China's approach directly addresses challenges commonly faced by other regions, including curriculum relevance, skills alignment, and training quality.

In Sub-Saharan Africa (SSA), the role of TVET is urgent and complex amid youth unemployment and pervasive skills shortages. Despite considerable regional investment, TVET systems struggle with structural deficiencies, outdated curricula disconnected from labor market demands, insufficient infrastructure and equipment, a shortage of adequately trained instructors with pedagogical and industry expertise, and weak partnerships between training institutions and industry stakeholders. A recent survey conducted in Ghana revealed that of 85 TVET institutions, only 29.4% of programs align with industry requirements, while nearly 10% reported no meaningful linkages with labor market needs (Ayentimi et al., 2018; Amedorme & Fiagbe, 2013), with many of the institutions facing challenges related to poor digital infrastructure and obsolete training equipment, which hinder practical skills acquisition and employability outcomes.

Comparable systemic challenges are evident in Nigeria, Kenya, South Africa, and Tanzania. Cmrp (2022) asserts that TVET in Nigeria is facing issues with curricula that inadequately prepare trainees for emerging sectors such as renewable energy, compounded by infrastructural limitations, thereby widening the regional skills gap which is similar to Kenya where the TVET institutions issues relating to insufficient and inconsistent industry collaboration, leading to curriculum misalignment that correlates strongly with sustained youth unemployment (Muchira et al., 2023). Tanzania experiences critical shortages in qualified instructors and inadequate practical training facilities, undermining TVET effectiveness (Ndibalema, 2025; Nkunya & Mwila, 2024). These persistent challenges, corroborated by empirical evidence from multiple contexts, underscore the urgent need for a coordinated reform agenda prioritizing curriculum modernization, infrastructural investment that addresses both technological advancement and equipment maintenance, comprehensive capacity building for instructors, and the establishment of institutionalized industry partnerships to enhance the relevance and efficacy of TVET programs across SSA.

The gap in comparative research between the TVET systems remains underexplored, notwithstanding the important role of vocational education in economic development. While China's TVET success is primarily attributed to robust state policies, extensive industry collaboration, and continual curriculum adaptation, the same can not be said for sub-Saharan African countries. However, existing literature mainly addresses these regions separately, with little comparative analysis to explore how China's successful models can be adapted to the unique socio-economic contexts of SSA. This gap highlights the need for a systematic comparative study that could synthesize the literature, provide contextually relevant policy recommendations, and inform practical, evidence-based reforms to align SSA's TVET systems with contemporary labor market demands, foster sustainable economic development, and reduce youth unemployment across the region. The study is guided by the two research questions;

1. *What are the key structural and operational differences between China's and Sub-Saharan Africa's TVET systems?*
2. *How can Sub-Saharan Africa adapt China's TVET best practices to local contexts to enhance employment outcomes?*

Literature Review

Introduction to TVET

Technical and Vocational Education and Training (TVET) encompasses diverse educational pathways to equip learners with practical skills and competencies aligned with specific labor market needs. Globally, TVET plays a pivotal role in bridging the gap between formal education and employment, fostering employability, supporting entrepreneurship, and promoting inclusive economic growth (UNESCO, 2021; World Bank 2021; OECD, 2019). As economies evolve rapidly due to technological advancements, TVET's relevance in addressing skills shortages and adapting to new industrial demands becomes increasingly critical (Oketch 2015; Osumbah & Wekesa, 2023).

Theoretical Frameworks and Models in TVET

TVET systems operate within multiple theoretical and governance frameworks. Competency-based education (CBE) emphasizes mastery of defined skills and learner-centered approaches, while experiential learning theories stress on the importance of hands-on practical experiences in skill acquisition (Spencer & Spencer, 1993; Kolb, 1984). Governance models vary widely, ranging from state-led centralized systems to market-driven and hybrid arrangements involving multiple stakeholders (Li, Li, & Jiang, 2024; McGrath, 2022; Cedefop, 2020). Effective TVET systems consistently demonstrate strong collaboration between governments, industries, and educational institutions, ensuring curricula relevance, quality assurance, and alignment with labor market needs (Betcherman & Khan, 2018).

Emerging Trends and Innovations in TVET

Recent advancements in TVET emphasize adopting digital technologies and e-learning platforms, expanding access and flexibility, particularly in resource-limited contexts (Chen & Chan, 2024; UNESCO-UNEVOC, 2021). The COVID-19 pandemic accelerated this digital shift, revealing new opportunities and challenges for TVET delivery (ILO, 2021). Lifelong learning frameworks have gained prominence, highlighting continuous skills development as essential in rapidly changing economies (Schleicher, 2020). Additionally, increased international cooperation and public-private partnerships foster innovation in TVET governance and curriculum design, offering promising pathways for both developed and developing countries to enhance system responsiveness and quality (Melesse, Haley, & Wärvik, 2023).

Contextual Analysis of TVET Systems in China and Sub-Saharan Africa

China's TVET system has evolved into a well-coordinated framework integral to the country's industrial and economic transformation, with the system features alignment of vocational curricula with national industrial priorities, continuous curriculum reform, substantial investment in teacher training, and modern infrastructure (Zuo, Zhang, & Huang, 2025; Zhao & Xue, 2022). China's dual-track model, combining classroom instruction with apprenticeships and enterprise-based training, exemplifies effective integration of education and industry, fostering workforce readiness and innovation (Honghao, & Xi, 2025). Despite its strengths, challenges such as regional disparities and the need to keep pace with rapid technological change persist (Wang et al.; 2023). The case is a bit different for most countries in Sub-Saharan Africa (SSA), which face persistent systemic challenges in TVET development relating to outdated curricula poorly aligned with labor market demands, inadequate infrastructure, and limited access to modern training tools (Bennell, 2023; Allais, 2020). A critical shortage of qualified instructors, often lacking pedagogical skills and practical industry experience, hampering training quality (Ladan, 2023; Ayentimi, Burgess, & Dayaram, 2018), with weak partnerships between TVET institutions and industry restricting practical training opportunities and labor market integration for graduates ((Agbo & Nnajofo, 2023; Naziz, 2019). The contrast between China's integrated, policy-driven TVET framework and SSA's resource-constrained, fragmented systems underscores the need for tailored reforms focused on infrastructure, instructor capacity, and industry collaboration to improve TVET outcomes in SSA.

Methodology

Search Strategy

A systematic bibliometric analysis was conducted across three leading academic databases: Scopus, Google Scholar, and Web of Science (WoS). The search utilized Boolean operators with targeted keywords such as "TVET in China & Career," "TVET in Africa & Career," and "TVET in China or Africa & Career." This approach ensured comprehensive coverage of relevant literature. The search was limited to publications between 2012 and 2024 to capture recent developments and trends in TVET-related career policy challenges. The initial search retrieved 631 records: 331 from Scopus, 151 from WoS, and 149 from Google Scholar.

Screening Process

Following PRISMA guidelines for systematic reviews, the initial dataset was cleaned by removing 170 duplicate entries, and 65 records were excluded for unrelated reasons. This resulted in 396 unique records subjected to detailed screening.

Criteria	Inclusion	Exclusion
Publication date	Publications from 2012 to 2024	Publications outside the 2012–2024 range
Language	Full-text articles published in accessible languages (English)	Articles not in English
Publication type	Peer-reviewed journal articles, conference papers, and reports	Non-peer-reviewed sources, blogs, newspaper articles, and inaccessible or non-retrieved reports
Research focus	Studies related to TVET (Technical and Vocational Education and Training) in China and sub-Saharan Africa, focusing on TVET,	Studies unrelated to TVET or policy contexts
Accessibility	Full-text available for retrieval and review	Inaccessible full texts
Relevance	Articles providing insights on sustainable career choices and policy challenges in TVET	Articles outside the scope of sustainable career or policy issues in TVET

Table 1: Inclusion and exclusion criteria for the included articles

Eligibility Assessment

Eligibility was assessed based on accessibility, language, and relevance criteria. Of the 396 screened, 245 reports could not be retrieved, reducing the pool to 151. Further exclusions involved 54 studies due to inaccessible full texts, 41 due to language barriers (non-English or non-accessible translations), and 25 due to irrelevance to the study’s scope, focusing specifically on TVET’s role in career development and policy contexts in China and Africa.

Final Inclusion

A total of 31 sources met the stringent inclusion criteria, comprising 26 peer-reviewed research studies and five reports. These sources underwent complete comparative analysis, providing key insights into how TVET supports sustainable career choices and highlighting significant policy challenges in China and sub-Saharan Africa. This approach aligns with best practices in bibliometric research, ensuring a focused synthesis of current evidence

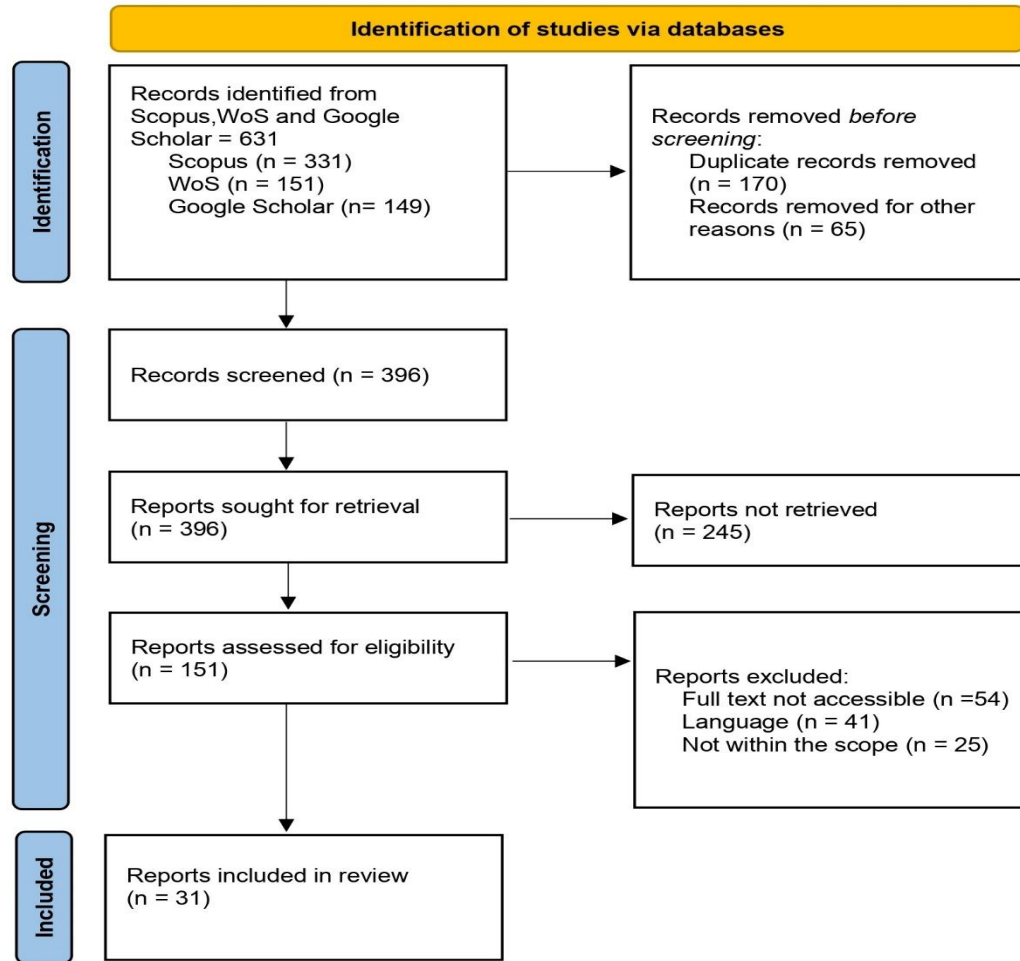


Figure 1: PRISMA flowchart of articles included in scoping review

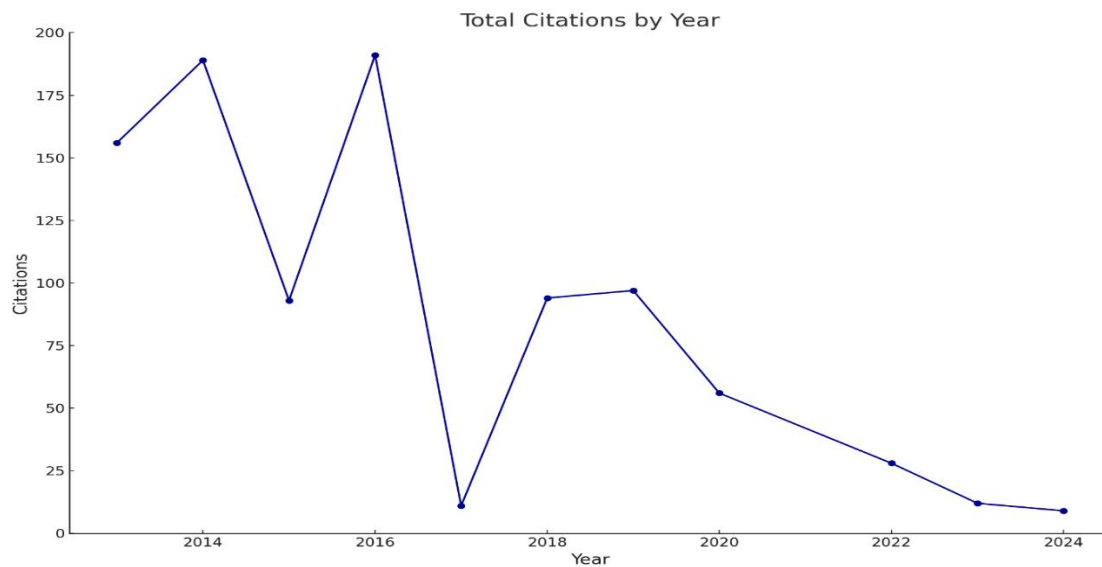


Figure 2: Citation trends of included studies in review

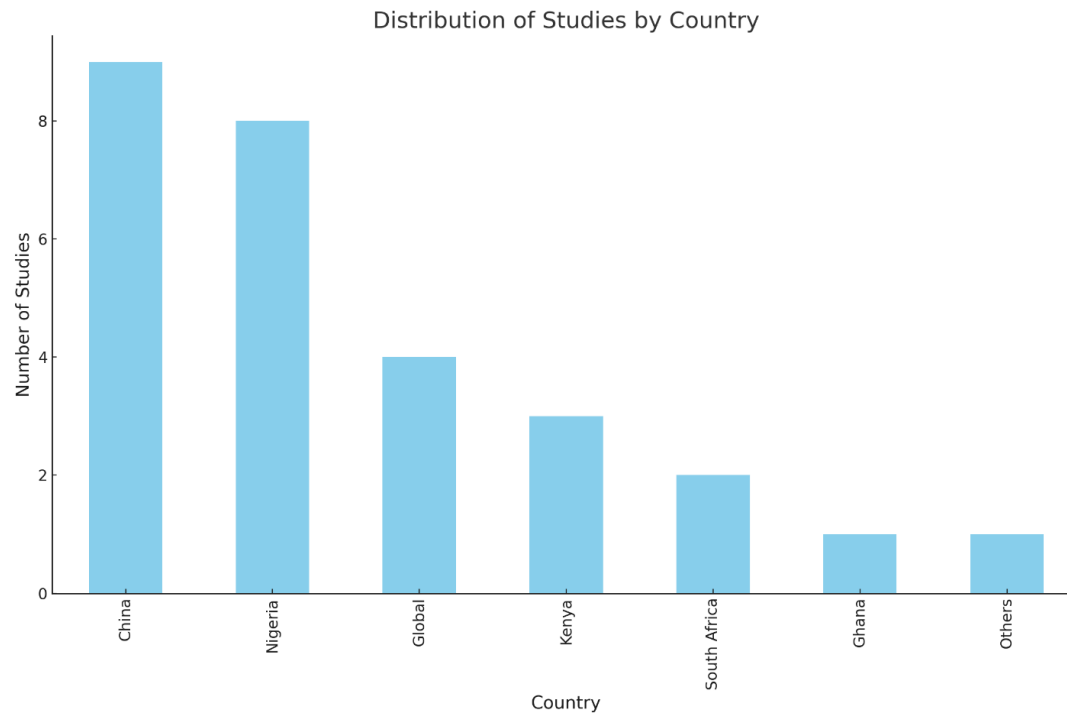


Figure 3: Distribution of studies by country

Table 2: Overview of studies used for scooping review

S.no	Author(s)	Year	Title	Country	Method	Findings	Challenges	Other emerging themes
1	Okoye, R., & Arimonu, M. O.	2016	TVET in Nigeria: Issues, challenges, and a way forward	Nigeria	Case study analysis	Highlighted key issues with TVET in Nigeria, including underfunding and outdated curriculum	Lack of government support, outdated curriculum	Recommendations for improving Nigeria's TVET system
2	Boahin, P., & Hofman, W. A.	2014	Perceived effects of competency-based training on professional skills	Ghana	Quantitative survey	Competency-based training enhances acquisition of professional skills	Difficulty in implementing competency-based training in resource-limited settings	Link between competency-based education and skills development
3	Yi, H., Zhang, L., Yao, Y., Wang, A., Ma, Y., Shi, Y., Chu, J., Loyalka, P., & Rozelle, S.	2015	Exploring dropout rates and causes in upper-secondary TVET schools in China	China	Mixed-method	Identified high dropout rates in Chinese TVET schools due to socio-economic factors	Financial constraints faced by students	Addressing dropout through financial aid
4	Macleane, R., & Pavlova, M.	2012	Vocationalization of secondary and higher education: Pathways to the world of work	Global	Comparative review	Vocationalization enhances job-readiness of students	Misalignment between education and job market demands	Global comparative perspectives on vocational education
5	Okoye, K	2013	Private-public partnership and TVET in a developing economy	Nigeria	Case study	Highlighted the benefits of public-private partnerships in Nigeria's TVET sector	Limited private sector involvement	Enhancing partnerships for skill development
6	McGrath, S., Mulder, M., Papier, J., & Stuart, R.	2019	Handbook of Vocational Education and Training: Developments in	Global	Handbook	Documented the evolution of TVET globally	Slow adoption of new technologies in TVET	Global perspectives on TVET development

			the changing world of work					
7	Seyi, D	2014	An overview of vocational and technical education in Nigeria	Nigeria	Case study	Outlined the challenges of Nigeria's TVET system	Limited funding, poor facilities	Need for reform in Nigerian TVET
8	Ebuenyi, I. D., Rottenburg, E. S., Bunders-Aelen, J. F., & Regeer, B. J.	2020	Challenges of inclusion: Barriers to inclusion of persons with mental disabilities in TVET	Kenya	Qualitative interviews	Barriers exist in integrating persons with mental disabilities into TVET programs	Stigma and lack of proper facilities for the disabled	Pathways for inclusive education
9	Ni Tang & Weiping Shi	2016	Youth Employment and Technical and Vocational Education and Training (TVET) in China	China	Mixed-method	High youth unemployment (9.3%) due to education-job mismatch and skilled labor shortages. TVET reforms help but face challenges like demographic decline and migrant worker issues.	Shrinking workforce, education-job mismatch, unstable migrant work, and rising NEETs	Economic Transition, Policy Tensions, Global Context
10	Musyimi, C. M., Malechwanz, J., & Luo, H	2018	The belt and road initiative and TVET in Kenya	Kenya	Case study	Explored the influence of the Belt and Road Initiative on Kenya's TVET system	Dependency on Chinese support	International cooperation in TVET
11	Yang, J.	2022	Chinese contemporary art teachers' professional development within multicultural framework	China	Mixed-method	Multicultural education has positive impacts on TVET instructors' professional development	Cultural barriers to inclusive education	Importance of professional development in TVET

12	Gyimah, N	2020	Assessment of TVET on the development of the World's Economy	Global	Comparative study	TVET contributes positively to the global economy	Inequality in access to vocational education across regions	Cross-regional perspectives on TVET
13	Adams, W. C	2019	Factors that influence employability of TVET graduates: Comparative study	South Africa	Comparative case study	TVET programs in South Africa improve graduate employability	Poor industry linkages and insufficient practical training	Factors impacting employability in TVET
14	Fan, D	2017	Competence-based education in China's higher TVET: Case of Shenzhen Polytechnic	China	Case study	Competence-based education aligns well with industry needs in China's higher TVET institutions	Difficulty in assessing competencies across different sectors	Aligning education with market needs
15	Yuzheng Lu and Tian Wang	2023	Quality Evaluation Model of Vocational Education in China: A Qualitative Study Based on Grounded Theory	China	Qualitative study using grounded theory	Industry-education integration, school-enterprise partnerships ensures relevance to labor market demands. Professional settings and talent training objectives are the foundation of quality evaluation.	Few empirical studies on quality evaluation models globally.	Policy & Regulations, international partnerships expansion
16	Preckler Galguera, Miriam	2018	TVET at UNESCO	Global	Literature review	UNESCO's role in promoting global TVET	Slow implementation of policy changes	Global TVET policies
17	Wignall, R., Piquard, B., & Joel, E.	2023	Up-skilling women: How TVET can drive gender transformation	Sub-Saharan Africa	Qualitative study	TVET promotes gender equity through skill development	Gender bias in accessing TVET programs	Gender transformation in TVET

			in Sub-Saharan Africa					
18	Dobbo, T. L	2018	Higher vocational education reform: Matching skills to markets in China	China	Case study	Reforms in higher vocational education enhance employability	Mismatch between education outcomes and labor market demands	Role of reforms in vocational education
19	Li, Y., & Seeberg, V.	2022	Technical vocational education for migrant girls in Western China: Transformational benefits	China	Mixed-method	TVET contributes to the social and economic empowerment of migrant girls	Cultural and societal barriers to education for girls	Transformational benefits of TVET
20	Olabiya, O. S., Okeowo, S. O., Adedayo, G. O., & Ipinlaye, A.	2022	Public-private-partnership for effective delivery of TVET during Covid-19 in Nigeria	Nigeria	Case study	Public-private partnerships helped mitigate the impact of Covid-19 on TVET	Limited resources, disruptions due to pandemic	Public-private collaboration in TVET, adaptive education systems during crises
21	Udoudo, N., & Essien, E.	2018	Critical appraisal of TVET policies in Nigeria and their implementation challenges	Nigeria	Policy analysis	TVET policies in Nigeria face implementation challenges due to lack of coordination and poor funding	Inconsistent policy implementation, underfunding	Policy reform, implementation challenges in Nigerian TVET system
22	Wu, X., Ye, Y., Wu, X., & Ye, Y.	2018	Teachers of TVET	China	Qualitative Study	Investigates the challenges faced by TVET teachers in China, including lack of professional development and industry linkages.	Limited access to professional training and inadequate industry collaboration.	Professional development for TVET educators and industry partnerships.
23	Zhou, Q., Diao, J., Wang, Y.,	2023	Strategies for Developing TVET Teachers'	China	Survey-Based Study	Proposes a framework for improving TVET teacher competencies,	Difficulty in applying modern pedagogical	Enhancing professional competencies for TVET educators.

	Chen, M., Yang, C., Li, M., Wang, J., Yi, K., Han, X., & Cui, G.		Professional Competencies			focusing on practical skills, pedagogical methods, and continuous learning.	practices and maintaining industry relevance.	
24	Osidiye, A.	2019	Positioning TVET for Sustainable Development in Africa Taking Cue from the Chinese Model	China	Case study, policy review	TVET systems in Africa can benefit from adopting China's model of industry-education partnerships for sustainable development	Lack of infrastructure, limited funding	Sustainable development, TVET-industry partnerships
25	Osidiye, A.	2019	Funding effectiveness of TVET for decent employment and inclusive growth in Nigeria with perspectives from China	Nigeria, China	Comparative study, policy analysis	Effective funding models from China can enhance TVET's role in promoting employment and inclusive growth in Nigeria	Underfunding of public TVET programs	Inclusive growth, employment through TVET
26	Amri, E	2014	Emerging Careers in Life Science: Compelling Issues and Strategies for Successful TVET Implementation	Global	Thematic Analysis	Identifies new career paths emerging in life sciences and how TVET can adapt to equip students with relevant skills for these industries.	Adapting TVET curriculum to emerging science fields.	Life sciences as an emerging focus area for TVET curriculum development.
27	Diao, J., Han, X., Zhou, Q., & Wang, Y.	2023	Professional Competencies in TVET: Framework, Indicators and Assessment Instrument	China	Framework Development	Develops an assessment framework for professional competencies in TVET, including both practical and	Establishing standardized assessment across different regions and institutions.	Standardization and assessment of competencies in TVET programs.

						theoretical skills evaluation.		
29	Mbatha, K	2024	Meaningful Learning Experience Using Digital Technologies in TVET: Towards Innovative Digital Pedagogy	South Africa	Case Study	Explores how digital technologies can enhance learning in TVET, focusing on South African institutions.	Limited access to digital infrastructure and teacher training in digital pedagogy.	Digital transformation and the role of technology in improving TVET learning experiences.
30	Opara, O	2023	An exploration of TVET students' choices, experiences, and aspirations: A case study of three technical colleges in Lagos, Nigeria	Nigeria	Case Study	Analyzes students' motivations and aspirations in TVET programs, indicating a gap between their career expectations and available training opportunities.	Misalignment between student aspirations and the skills taught in TVET programs.	Student experiences and career aspirations in technical and vocational education.
31	Wang, M., Zheng, Y., Ma, S., & Lu, J.	2024	Does higher vocational education matter for rural revitalization? Evidence from China	China	Empirical Study	Higher vocational education contributes positively to rural revitalization by providing essential skills for local development.	Regional disparities in the effectiveness of higher vocational education.	The role of higher vocational education in rural revitalization and local economic development

Table 2: Overview of studies used for scoping review

Source(s): Author



Figure 4. Predominant keywords from the articles

Findings

This systematic review presents multiple, interrelated themes that characterize the evolving nature of Technical and Vocational Education and Training (TVET) in the China and countries with the sub-saharan Africa region reflecting both advancements and enduring systemic constraints.

Skill Development and Employability Outcomes

A dominant theme emerging from the literature is the demonstrable positive effect of competency-based training and vocationalization on skill acquisition and graduate employability. Empirical evidence from Ghana (Boahin & Hofman, 2014) illustrates that competency-based approaches significantly bolster trainees' professional competencies, equipping them to meet labor market demands despite prevailing resource limitations. Complementary research from South Africa (Adams, 2019) highlights the critical role of practical training and robust industry linkages in maximizing employment outcomes. However, gaps remain in these areas, dampening the full realization of TVET's potential. Additionally, findings from China demonstrate that higher vocational education aligned with industry requirements not only equips learners with relevant skills but also contributes to broader socio-economic objectives, such as rural revitalization and economic diversification, and TVET's role in national development strategies (Wang et al., 2024; Fan, 2017).

Systemic Challenges: Funding, Infrastructure, and Policy Implementation

Persistent systemic challenges permeate TVET systems, particularly in Sub-Saharan Africa, where underfunding, infrastructural inadequacies, and outdated curricula undermine the modernization and responsiveness of vocational training programs. Case studies from Nigeria (Udoudo & Essien, 2018; Okoye & Arimonu, 2016) elucidate how insufficient governmental investment translates into limited access to modern technologies and facilities, restricting institutional capacity to align curricula with evolving labor market needs. Similar impediments are reported in Kenya and other African countries, where policy implementation remains fragmented and under-resourced, exacerbating equity issues and limiting TVET's potential as an engine for inclusive socio-economic development. These systemic constraints reflect global challenges, indicating the need for coordinated reforms to strengthen governance and funding mechanisms (McGrath et al., 2019).

Public-Private Partnerships and International Cooperation

Public-private partnerships (PPPs) have emerged as strategic mechanisms to mitigate resource limitations, foster innovation, and enhance the resilience of TVET systems. Evidence from Nigeria illustrates that PPPs have facilitated improved resource mobilization and program continuity, particularly during the COVID-19 pandemic, where they helped sustain learning delivery under challenging conditions (Olabiyi et al., 2022; Okoye, 2013). Furthermore, international cooperation, exemplified by Kenya's engagement with China's Belt and Road Initiative, has introduced significant financial and technical support to the TVET sector. However, these partnerships introduce complex challenges related to governance, sustainability, and local ownership, as dependency risks may compromise the autonomy of recipient countries (Musyimi et al., 2018). These findings stress the imperative for establishing transparent and accountable governance frameworks that foster equitable stakeholder participation and long-term sustainability.

Teacher Professional Development and Pedagogical Innovation

The professional competencies of TVET educators critically influence the quality and relevance of training delivery. Studies consistently report gaps in continuous professional development opportunities and insufficient integration of industry practices within teacher training programs (Zhou et al., 2023; Wu et al., 2018). These deficiencies impair instructors' capacity to provide contemporary, market-aligned vocational education. Despite these challenges, integrating digital pedagogical innovations presents promising avenues for enhancing instructional quality and learner engagement. Case studies from South Africa and Ghana demonstrate the potential transformative impact of digital tools on teaching and learning processes. However, limited infrastructure and the need for targeted capacity building among educators remain significant barriers to widespread adoption (Mbatha, 2024).

Social Inclusion and Equity

TVET's role extends beyond economic imperatives to encompass critical social inclusion and equity dimensions. The evidence base reveals ongoing efforts to promote gender equity and empower marginalized groups through targeted interventions. Research in Sub-Saharan Africa documents progress to increasing women's participation and skill development in TVET programs, contributing to transformative gender equity objectives (Wignall et al., 2023; Ilokanulo et al., 2021). Similarly, studies from China highlight how vocational training supports the socio-economic empowerment of migrant girls despite entrenched cultural and structural barriers (Li & Seeberg, 2022). Nevertheless, the inclusion of persons with disabilities remains an area of concern, with stigma, limited accessibility, and inadequate facilities continuing to restrict full participation, and the need for comprehensive, culturally sensitive inclusion strategies (Ebuonyi et al., 2020).

Emerging Themes: Sustainable Development and Global Models

Comparative research points to the increasing importance of embedding TVET within broader sustainable development frameworks. Adaptive models, such as China's industry-education partnerships, are valuable approaches for enhancing TVET systems in Africa by promoting alignment between vocational training, labor market demands, and sustainable economic growth (Osidiye, 2019b; Gyimah, 2020). Successful adaptation of these models necessitates policymaking that addresses local socio-economic and infrastructural realities, emphasizing participatory governance, ongoing evaluation, and flexibility to respond to emerging economic sectors and environmental considerations.

Discussions

The synthesis of evidence from this review affirms TVET's indispensable role in closing skills gaps, fostering inclusive economic growth, and advancing social equity across diverse contexts. However, systemic barriers—particularly underfunding, infrastructural deficits, and fragmented policy implementation—significantly hinder the capacity of TVET systems, especially in resource-constrained regions like sub-Saharan African countries, to fully realize their transformative potential (Udoudo & Essien, 2018; Okoye & Arimonu, 2016). Recent studies show that inadequate funding remains a critical constraint; in South Africa, annual TVET funding shortfalls are projected to range dramatically depending on scenarios, highlighting the urgent need for increased fiscal commitments (Ngidi, 2023). Addressing these systemic constraints requires coordinated reforms emphasizing sustained fiscal investment, curriculum modernization, and enhanced policy coherence aligned with evolving labor market and socio-economic realities (McGrath et al., 2019). The proliferation of public-private partnerships (PPPs) presents a pragmatic avenue for resource mobilization and innovation diffusion; yet, their efficacy depends on governance frameworks that promote transparency, local agency, and mutual accountability, mitigating risks associated with donor or external dependency (Olabiye et al., 2022; Musyimi et al., 2018). Empirical evidence from Cameroon and Ghana further corroborates the role of PPPs in strengthening TVET quality and responsiveness through industry collaborations and infrastructure improvements (Addy & Adabor, 2021; Leigland, 2020).

Teacher professional development constitutes a critical lever for improving instructional quality and relevance. The documented deficiencies in continuous professional learning and weak industry linkages highlight the need for systemic investment in educator training, including integrating digital pedagogical tools to enhance engagement and learning outcomes (Wu et al., 2018; Mbatha, 2024). However, a critical synthesis of African teacher professional development programs reveals pervasive mismatches between top-down training models and teachers' contextual realities, which often undermine participation and impact (Mitchell et al., 2024; Guthrie, 2018). Addressing this gap demands more contextualized, participatory, and sustained professional learning approaches.

Social equity and inclusion remain central to TVET's broader societal objectives. Persistent gender disparities, alongside barriers faced by persons with disabilities and marginalized groups, call for comprehensive policies that mainstream inclusion, dismantle cultural stigmas, and provide accessible facilities and support systems to ensure equitable participation and outcomes (Wignall et al., 2023; Ebuonyi et al., 2020). Globally, UNESCO reports that most member states have introduced measures such as scholarships and gender-friendly infrastructure to improve access, signaling progress, albeit with continued challenges (UNESCO, 2024).

Finally, the African Union's continental strategy for TVET further stresses the need to align vocational education with global trends and monitor progress using context-appropriate indicators to achieve sustainable impact

(Olayele, 2022; A.U, 2014), and the successful adaptation of global models like China's industry-education partnership shows how powerful cross-contextual learning can be, provided policies are geared to local needs and inclusive of everybody. Therefore, embedding TVET within sustainable development agendas offers promising pathways for holistic growth, linking education with environmental stewardship, economic diversification, and social inclusion

Limitations

This research was constrained by the availability of standardized data on TVET outcomes, particularly in Sub-Saharan Africa. The absence of comprehensive, nationally representative data on graduate employment rates and career progression hindered a full assessment of the long-term impact of TVET programs. Furthermore, the use of comparative effectiveness scores may not capture the unique social, economic, and cultural contexts of each country, limiting the study's ability to fully account for regional variations. The scope of the research was also constrained by a limited selection of studies and keywords, which may not have captured the full breadth of factors influencing the effectiveness of TVET systems in both regions. Finally, the differences in political, economic, and cultural contexts between China and Sub-Saharan Africa make it challenging to directly apply findings from one region to the other, as each faces distinct challenges and opportunities in the development of vocational education.

Implications

Theoretical Implications

These findings contribute to the theoretical understanding of how government support, industry collaboration, and teacher quality influence the effectiveness of TVET programs. The comparative approach highlights the importance of aligning vocational education with national economic strategies and the labor market. The analysis also reinforces the theoretical concept that access to education, particularly for marginalized populations, is pivotal in economic mobility and poverty alleviation. Moreover, this study underlines the role of the government in shaping educational outcomes through policy frameworks and resource allocation.

Practical Implications

From a practical perspective, both recommendations provide clear-cut measures that both nations can implement to enhance TVET systems. These measures could help African countries close the gap between vocational education and employment by increasing access, especially in rural areas, improving the quality of teachers, and developing relationships between education and industry. Nevertheless, China can still improve its situation with tracking systems to continue to develop the teaching system, not only in terms of its skills but also as skilled professionals. About this, the data collection and feedback process between industries and TVET institutions is emphasized for policymakers to guarantee that vocational training is agreeable to the market and evolving to meet emerging market standards. These measures are fundamental in steering students towards appropriate employment, thus improving a country's general human resource capital.

Conclusion

The study on Technical and Vocational Education and Training (TVET) systems in two regions (China and Sub-Saharan Africa) outlines the respective strengths and challenges. Findings from the study show how China has developed a robust TVET system through strong government support, strategic industry partnerships, and ongoing curriculum updates that align with national economic priorities. This approach has enabled building a highly skilled workforce that meets the demands of its rapidly changing industrial environment. In SSA, the TVET systems face significant barriers, including funding, outdated and non-aligned curricula to industry needs, inadequate infrastructure, and a dearth of skilled instructors, which hinder the effectiveness of vocational education programs. Despite these challenges, the potential of TVET to enhance employability, promote economic growth, and support social inclusion in SSA remains evident. The review emphasizes that, while the Chinese model offers valuable insights, the socio-economic and cultural contexts of SSA's distinctiveness require contextual adaptations thus selecting elements of China's TVET framework, such as competence-based curricula, enhanced teacher professional development, and stronger industry linkages, could significantly improve the relevance and quality of vocational training in SSA. Furthermore, aligning TVET more closely with labor market needs and promoting inclusivity, particularly gender equity, are essential for ensuring the broader impact of these programs in both regions.

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