

Tested or Recommended? Examining evidence on curriculum design and institutional management to TVET graduate employability

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Abstract

Technical and Vocational Education and Training (TVET) institutions are widely recognized as engines of youth employment and economic development, yet persistent challenges continue to undermine graduate employability across low- and middle-income regions. This systematic literature review employed utilized PRISMA for identification and selection process, synthesizing peer-reviewed literature published between 2015-2026 addressing curriculum design, institutional governance, resource management, and quality assurance in TVET institutions, focus on the Philippines, and comparative coverage of Sub-Saharan Africa and South Asia. Through a structured search from academic databases and repositories, 21 studies met the inclusion criteria requiring an explicit employability-related outcome such as job placement, employer satisfaction, graduate readiness, skills utilization, graduate readiness, skills utilization, or wage outcomes. The most frequently mentioned challenges were curriculum-industry misalignment, inadequate facilities and equipment, weak institutional leadership, and interagency coordination, and underdeveloped outcome-based quality assurance systems. However, only few studies (n=6) have tested empirically the relationship of a specific curriculum or management intervention to a measurable change in an employability outcome; the majority described problems and recommended, but did not assess, solutions. Empirically supported findings include a positive correlation between institutional management quality and graduate employability outcomes in the Philippines, a measurable wage premium for post-secondary TVET graduates, and evidence that work-based training intensity, but not dual-system status alone, predicts short term labor market advantage. Notable gaps the limited outcome-tested quality assurance and accreditation reforms and application of signaling theory for TVET-credentialing. Implications for institutional practice, policy, and future research are discussed.

Keywords: TVET; Curriculum Design; Institutional Management; Graduate Employability; Quality Assurance; Skills Mismatch; Systematic Review

1. Introduction

TVET plays an important role in national development strategies across Asia and Africa, framed by policymakers as the primary mechanism wherein youth can be equipped with skills and seek for employment [2]. In the Philippines, the Technical Education and Skills development authority (TESDA) operates within the Philippine Qualification Framework to deliver competency-based training intended to increase labor productivity and worker mobility [2]. Similarly in Sub-Saharan Africa and South Asia, TVET has been positioned as leverage to address unemployment and skills mismatch [11]. However, TVET graduates in varying contexts were continuously reported to have difficulty in acquiring stable and relevant employment [1].

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This literature has two emerging comprehensive and interacting explanations. First is the curriculum design which is often characterized as outdated, insufficiently responsive with employer expectations, and weak integration of digital and soft skills [7]. Secondly, the institutional management which is described as weak governance, fragmented interagency coordination, inadequate facilities and workshop equipment, and underdeveloped quality assurance and accreditation systems which are persistent constraints the translation of curricular intent into workforce-ready graduates [14,15]. Although both explanations are pervasive in the descriptive and policy literature, it remains unclear how much of this evidence base reflects rigorously tested causal relationships between specific interventions and employability outcomes, as opposed to accumulated expert opinion and yet to be verified recommendations.

This review addresses the gap by systematically searching, screening, and synthesizing peer-reviewed literature published between 2015 and 2026 that examines curriculum design and institutional management challenges in TVET institutions in relation to graduate employability outcomes. This is guided by the following research questions:

- What curriculum design and institutional challenges do TVET institutions encounter, and
- What strategies have been shown, empirically, to improve graduate employability outcomes?

This literature review prioritized on studies from the Philippines and Southeast Asia, with comparative literature drawn from Sub-Saharan Africa and South Asia, where TVET curriculum reform research is similarly active.

2. Methods

2.1. Search Strategy and Sources

A structured literature search was conducted using academic search engines and repositories, including Google Scholar-indexed journal databases and institutional repositories (e.g. Philippine Ejournals, PIDS, ADB). Search terms combined the core construct “TVET” or “technical and vocational education and training with combinations of ‘curriculum’, ‘institutional management’, ‘graduate employability’, ‘employability’, ‘graduate readiness’, ‘employment outcomes’. Regional search terms (Philippines, Southeast Asia, Sub-Saharan Africa and South Asia, Kenya, Nigeria, South Africa, Ghana, Tanzania, Bangladesh, Pakistan, India, Nepal) were layered onto core searches to ensure geographic coverage consistent with the review’ priority scope.

2.2. Inclusion and Exclusion Criteria

Studies were included if they (a) were peer-reviewed journal articles between 2015 and 2026; (b) specifically about TVET or vocational education rather than general tertiary education, unless directly comparative; (c) addressed curriculum and institutional management challenges; (d) reported or discussed an employability-related outcome, including job placement, employer satisfaction, graduate readiness and the like. Gray literature were excluded from the primary evidence table, though several were consulted for contextual background and are noted where relevant. One pre-2015 study by Tripney and Hombrados (2013) was retained outside the primary window because it constitutes the only large-scale meta-analysis of tested TVET interventions in low-and middle-income countries identified in the search and functions as an essential comparative benchmark for the tested versus recommended distinction central to this review.

2.3. Study Selection Process

Figure 1 summarizes the identification and selection process using a PRISMA-style flow diagram. An initial pool of 97 records was identified through the database and repository searching, with 9 additional records identified through citation tracking of key articles, yielding 84 records after duplicates were removed. Title and abstract screening excluded 39 records that were not TVET institution specific, were gray literature, or addressed general higher education without a direct TVET comparison. The remaining 45 records underwent full-text assessment, of which 18 were excluded for not reporting employability-related outcome, for substantial overlap with another included record, or for falling outside the 2015-2026 window without qualifying as the foundational pre-2015 exception described above. Twenty-one studies were retained for narrative synthesis: nine from the Philippines and Southeast Asia, and eighteen from comparative regions (Sub-Saharan Africa, South Asia and global comparative contexts) including the one pre-2015 foundational meta-analysis.

2.4. PRISMA-style flow diagram of study Identification and Selection

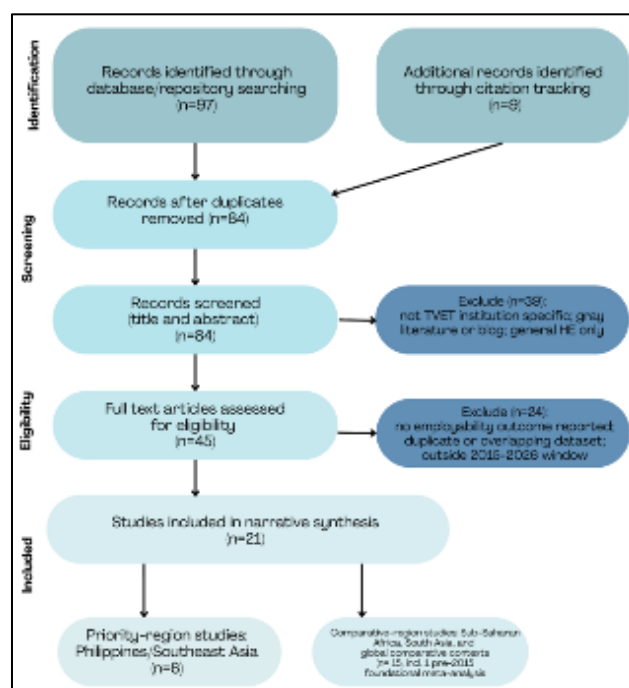


Figure 1 PRISMA-style flow diagram of study identification, screening, and inclusion.

2.5. Data Extraction and Synthesis

For each included study, the following data were extracted: full citation, country or region, methodology, including sample size and sampling; specific curriculum or management challenge (s) identified; specific strategy or intervention discussed, and whether it was evaluated empirically or only recommended; reported employability outcome or effect, with specific metrics where available. Studies were further flagged according to whether they empirically tested an intervention's effect on an employability outcome (using comparison group, before-after design, regression/structural model, or meta-analysis) versus whether they only described a problem or recommended an untested solution. Where two or more studies reported apparently conflicting findings on the same construct, for example, the effect of curriculum-updating frequency or resource adequacy on employability, these were identified and discussed explicitly in the Results and Discussions section.

3. Results

Twenty-one studies met the inclusion criteria and were retained for narrative synthesis, spanning the Philippines (n=6), Sub-Saharan (n=8, including Kenya, Nigeria, South Africa, Ghana, and Tanzania), South Asia (n=3, including Bangladesh and Pakistan), and comparative or global contexts (n=4, including a Belgian and a Spanish dual-apprenticeship study and one foundational low-and middle-income country meta-analysis). A representative subset of these studies, selected to illustrate the range of methodologies, challenges, and empirical strength encountered, is summarized in Table 1.

3.1. Curriculum-Industry Alignment

TVET curricula and employer skill requirements. In the Philippines, Mariano and Tantoco [9] found a substantial variation across the employment outcomes across field, alongside a persistent gap between curriculum-taught and industry required competencies. In Bangladesh, industry expert surveys similarly documented explicit crucial, urgent and reasonable skill gaps between TVET and employer expectations [6]. Comparable findings emerged from Kenya [11], Tanzania [8], and a qualitative synthesis of global literature [7], all converging on the claim that infrequent curriculum updating a weak employer participation in curriculum design constrain graduate readiness. Notably, however, this convergence rests almost entirely on stakeholder perception and self-report; no study in this review directly manipulated curriculum update frequency and measured a subsequent change in employment outcomes.

3.2. Institutional Leadership, Management and Governance

A second cluster of studies examined institutional management as a determinant of graduate outcomes. The most methodologically rigorous of these was Omicini et al. [15], who compared public and private TESDA-accredited training centers in North Cotabato, Philippines, using a quantitative descriptive-comparative design with 79 respondents across administrator, trainer, and graduate groups. Public centers demonstrated stronger administrative structure and leadership and higher assessment pass rates, while private centers demonstrated stronger facilities and resources; critically, no significant difference emerged between sectors in employment within six months or job relevance and satisfaction. A strong statistically significant positive correlation ($r=.59$) in Nigeria, Okolie et al. [14] linked effective workshop management to improved student performance and discipline using mixed method designs with technical colleges teachers and craft trainers, though this relationship was observed rather than experimentally tested. This management outcome link is made explicit in the North Cotabato comparative study, which concludes that effective institutional management practices directly support graduate readiness and satisfaction [15].

3.3. Resource and Facility Management

Resource and faculty inadequacy, including insufficient workshop equipment, outdated tools, and constrained physical infrastructure, was cited as a barrier to skills acquisition in nearly every Sub-Saharan African study reviewed, including Kenyan studies in Meru County [10] and [23]. Notably, Mutembei et al. [10], using mixed methods convergent parallel design across six institutions with 142 trainees and 72 graduates, reported that graduate employability remained low despite institutions being equipped with the modern tools and equipment, a partial null finding that complicates the dominant narrative that resource shortages are the primary bottleneck to employability.

3.4. Quality Assurance and Accreditation

Quality assurance and accreditation system were widely discussed as levers for improving institutional performance, particularly in Asia-Pacific regional frameworks and in an emerging Nepali modified-Delphi method study developing an institutional accreditation assessment tool linked to enrollment, graduation, and employability indicators [4]. However, no study identified in this review empirically tested whether accreditation status or a strengthened quality assurance system produced a measurable change in graduate employment, wage, or employer-satisfaction outcomes; the body of literature remains at the level of system design and instrument development rather than outcome evaluation.

3.5. Comparative and Wage Outcome Evidence

A small number of studies provided stronger causal or quasi-causal evidence using national survey data or apprenticeship-systems comparisons. Using 2015-2026 Philippine household survey data and ordinary least squares regression, Vanderberg and Laranjo [22] found that post-secondary TVET graduates earned significantly higher wages than individuals with secondary education or below and were more likely to be employed than either secondary-only or university-only graduates, though individuals combining TVET with tertiary education showed an unexpected wage penalty. Generalao et al. [5], applying treatment-effects estimation to Philippine labor force and tracer survey data, reported more mixed and limited effects of TVET on labor force participation and job quality, illustrating the national level empirical estimates of TVET's employability. Effects are not uniformly positive. Outside the priority region, Muja et al. [12] used a dynamic selection-bias-correction method on Belgian panel data to show that dual apprenticeship programs produced short-term labor market advantages only for the program variant with the most on-the-job training days, and that these advantages faded quickly over time, a finding that qualifies more optimistic claims about the durability of dual-system effects found in comparative European literature, including a quasi-experimental Catalanian study linking dual vet to improved grades and graduation [12].

Table 1 Full extraction for all 21 included studies, summarizing methodology, identified challenges, intervention status, and reported employability outcomes.

Study and Region	Methodology	Key Challenge(s)	Strategy (Tested vs. Recommended)	Employability Outcomes
Bascon et al 2026-Philippines	Qualitative	Societal bias against TVET; weak job placement systems	NOT TESTED-descriptive/exploratory	Reports persistent difficulty securing stable jobs; no rate given
Edralin & Pastrana (2023)-Philippines	Qualitative content analysis of national policy documents	Weak interagency coordination; poor quality assurance implementation	RECOMMENDED ONLY-policy alignment with PDP/SDG4	General claim of past strategic contribution; no metric reported.
Bano (2025)-China-Pakistan	Qualitative; PRISMA guided review of 45 documents, NVivo coding	Fragmented Pakistani policy vs China's integrated model	RECOMMENDED ONLY-curriculum reform, teacher training, enterprise partnership	Review-level synthesis; cites external wage education evidence, does not test an intervention itself
Neupane et al. (2026)-Nepal accreditation	Modified Delphi method (expert panel)	Underdeveloped QA/ accreditation systems; weak indicator-outcome linkage	NOT YET TESTED Instrument Development	No employability outcome yet reported; tool-development only
Generalao et al. (2025)-Philippines	Quantitative; Secondary analysis of national LFS and TESDA tracer data; treatment effects estimation	Weak interagency coordination; low share of enterprise-based training	NOT AN INTERVENTION-descriptive/econometric analysis	Mixed, limited effects of TVET participation on labor force and job quality
Haolader & Khan (2022)-Bangladesh	Mixed methods; online survey of academicians and industry experts	Clear hard/soft skills gap, especially in E & E sector	NOT TESTED-empirical gap mapping only	Descriptive gap analysis intended to inform future curriculum revision
Nkunya & Mwila (2024)-Tanzania	Quantitative-survey descriptive	Outdated curricula, equipment and weak industry linkages	RECOMMENDED ONLY-employer feedback integration, infrastructure investment	Descriptive training-outcome gaps; converges with Kenya/Pakistan findings on update frequency
Mariano & Tantoco (2023)-Philippines	Mixed method-survey descriptive with graduates and interview with employers	Gap between curriculum taught and industry demand skills	RECOMMENDED ONLY-curriculum review, industry collaboration	87.94% overall employment; wide variation by trade and cohort year
Mutembei et al (2024)-Kenya	Mixed Methods; institutions, trainees and graduates	Persistently low employability despite resource investment	ASSOCIATIVE-not a controlled intervention	Weak or uneven association between resource adequacy and employability skills (partial null findings)

Muchira et al. (2023)-Kenya	Cross sectional mixed methods	Inadequate resources/ equipment; minimal practical curriculum components	RECOMMENDED ONLY-industry partnership, competency alignment	Barriers qualitatively linked to reduced capacity to secure employment
Blommaert et al. (2020)-Belgium	Quantitative; dynamic selection bias-correction, panel data	System-design comparison (dual apprenticeship vs. school-based VET)	TESTED- direct/indirect effects estimation	Short-term labor-market advantage only for highest on the job training intensity; fades quickly
Okolie et al. (2020)-Nigeria	Qualitative; 55 interviews and focus group discussion	Inadequate facilities; unqualified teacher recruitment; corruption	PERCEPTUALLY EVALUATED – problem-based learning (PBL) reform	Perceived (not measured) improvement in graduate competencies/ employability
Okolie et al. (2019)-Nigeria	Mixed methods; teachers and craft trainers, focus group	Poor workshop / resource management, underfunding	NOT TESTED-correlational observation only	Descriptive link between workshop management and students performance/ discipline
Omictin et al (2026) - Philippines	Quantitative-descriptive comparative; public vs private TESDA centers); t-test Pearson r	Weaker facilities in public centers; weaker leadership formalization in private centers	TESTED management-practice domains correlated against outcomes	r=.59 management outcomes correlation; no significant difference in sector within 6-month employment
Apau (2026)-Ghana	Quantitative cross-sectional; structural model	Skills mismatch; institutional capacity as moderator	TESTED-structural model of responsiveness-employability pathway	Reports structural relationship among curriculum responsiveness, capacity, and employability
Maceke et al.(2025)-South Africa	Systematic review	Multidimensional policy-pedagogy-career constraints	RECOMMENDED ONLY-Multidimensional reform	Descriptive; illuminates the interplay of policy-pedagogy-career qualitatively
Nkoana & Semele (2025)	Qualitative case study- interview	Institutional and socio-cultural barriers to post-graduation employment	NOT TESTED-exploratory/ descriptive	Describes lived experience of unemployment; no rate given
Mora et al.(2024)-Spain	Quantitative, quasi-experimental	System-design comparison	TESTED	Positive association with grades/ graduation; broader European evidence of better skilled-occupation employment shares

Tripney & Hombrados (2013)	Meta-analysis of RCT/ quasi-experimental studies	Meta-level heterogeneity across interventions	TESTED (aggregated)- only meta-analytic pooling of tested interventions found	Small, positive significant mean effects on employment and earnings; substantial heterogeneity
Vandenberg & Laranjo (2021)- Philippines	Quantitative; OLS regression on 2015-2016 household survey	Not curriculum-specific; wage returns analysis	N/A- Labor market returns study	TVET graduates earn higher wages than secondary or below; more likely employed
Ngelu et al. (2026)- Kenya	Sequential mixed methods	Inadequate funding; limited facilities; outdated equipment	ASSOCIATIVE-influence of funding/ facilities examined	Facilities/ funding significantly shape self-reported skills acquisition
Khan et al. (2024)- Pakistan	Quantitative; Structural Equation Modelling (SEM)	Fragmented policy; insufficient funding; weak industry linkage	TESTED-HRD tested as mediator of TVET growth relationship	Confirms positive TVET growth contribution mediated through HRD

4. Discussion

4.1. The Tested versus Recommended

The central finding of this review is a pronounced imbalance between the volume of literature describing TVET curriculum alignment and management challenges and the volume of literature that empirically tests whether a proposed strategy changes outcome. Of the 21 studies reviewed, only six, Omictin et al. (2026), Muja et al. (2020)-, Apau (2026), Mora et al. (2024), Khan et al. (2024), Vandenberg and Laranjo (2021) and Tripney and Hombrados (2013) meta-analysis, employed a design capable of supporting a causal or quasi-causal claim (comparison groups, regression/structural modeling, matching, or meta-analytic pooling). The remaining studies, while often methodologically competent as descriptive or exploratory research, characterize problems and propose solutions such as updating curricula, strengthening industry partnerships, investing in facilities, and adopting competency-based or problem-based pedagogy, without varying the proposed intervention and measuring a subsequent change in employment, wages, or employer satisfaction. This pattern mirrors a broader critique in the international development literature, where TVET evaluation has historically lagged behind the policy enthusiasm directed at the sector [21].

4.2. Empirically Supported Claims

Despite the imbalance, several claims in the literature do rest on reasonably strong empirical footing. First, institutional management quality is positively associated with graduate performance and employment outcomes in the Philippine TVET system, with a moderate to strong correlation reported by [15]. Second, post-secondary TVET confers a measurable wage and employment premium over lower levels of education in the Philippines [22] consistent with the broader positive, if heterogenous, effects of employment and earnings reported in the Tripney and Hombrados [21] meta-analysis of TVET interventions across low- and middle-income countries. Third, the intensity and structure of work-based training, rather than the mere presence of a dual system, appears to be the operative mechanism behind short term labor market advantage, and these advantages can decay rapidly [12]. These three findings, taken together, lend qualified support to human capital theory as applied to TVET: investment in structured, work-integrated training does appear to translate into measurable productivity and earnings gains, though the magnitude and durability of these gains vary considerably by context and are not guaranteed by institutional inputs alone.

4.3. Conflicting Findings

Two conflicts in the literature merit particular attention. First, while several African and South Asian studies converge on the claim that infrequent curriculum updating damages employability [7],[8], this claim has not been tested against a study that varies update frequency and observes a resulting change in outcomes; it therefore remains a plausible but unverified consensus. Second, the assumption that resource and facility adequacy is the primary bottleneck to graduate employability is complicated by Mutembei et al. [10], who found that employability remained low in Meru County,

Kenya, despite institutions being equipped with modern tools, suggesting that resource adequacy may be necessary but not sufficient, and that unmeasured factors such as instructional quality, employer engagement, or local labor market absorption capacity may moderate the resource-employability relationship. A third, more indirect conflict concerns institutional sector: where informal or advocacy literature often assumes private-sector flexibility straightforwardly produces superior job-placement outcomes, Omictin et al., [15] found no significant difference in six-month employment between public and private TESDA centers, despite differing management strengths.

Limitations

This review has several limitations. The search relied on publicly accessible search engines and repositories rather than single systematic database with full Boolean operator control, which may have introduced coverage gaps, particularly for non-English language TVET literature. Several included studies were sourced from preprint servers (e.g., Research Square) or institutional repositories where full peer-review status could not independently confirmed at the time of writing; these are noted accordingly. Finally, because studies varied substantially in sample size, sampling method, and outcome definition, no formal meta-analytic pooling of effect sizes was attempted beyond referencing the existing Tripney and Hombrados (2013) meta-analysis; the synthesis presented here is narrative rather than statistical.

5. Conclusion

The systematic review synthesized 21 peer-reviewed between 2015 and 2026 examining curriculum design and institutional management challenges in TVET institutions and their relationships to graduate employability outcomes, with priority coverage of the Philippines and comparative coverage of Sub-Saharan Africa and South Asia. Curriculum industry misalignment, inadequate facilities, weak institutional governance, and underdeveloped outcome-based quality assurance systems emerged as the most consistently cited challenges. However, the evidence based supporting specific remedial strategies remain thin: the large majority of studies described problems and recommended solutions without empirically testing them, while a smaller set of methodologically stronger studies demonstrated that institutional management quality, work-based training intensity, and post-secondary TVET completion are each measurable associated with improved employability outcomes. Future research would benefit from intervention-based designs, particularly randomized or quasi-experimental evaluations of curriculum-update cycles, accreditation reform, and industry partnership models, areas that are underdeveloped despite their relevance to workplace readiness, employment sustainability and career growth.

Compliance with ethical standards

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Disclosure of conflict of interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Statement of ethical approval

The author ensured that all sources came from reputable databases and ethical standards are highly observed.

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