

Industry Collaboration and Employability Competency Acquisition among Trainees in Agricultural Technical and Vocational Education and Training Colleges in Bomet County, Kenya

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ABSTRACT

Industry collaboration, particularly through structured dual training arrangements, has been identified as a central mechanism for strengthening employability competencies within Agricultural Technical and Vocational Education and Training (ATVET) systems, yet empirical evidence on its effectiveness within Kenyan ATVET institutions remains limited. This study's objective was to examine the influence of industry collaboration on trainees' acquisition of employability competencies in ATVET colleges in Bomet County, Kenya. A mixed-methods design was adopted, drawing on data from 248 trainees (structured questionnaire), 8 trainers and 4 administrators (semi-structured interviews), and structured observation across four institutions. Quantitative data were analyzed using SPSS v.27, applying descriptive statistics, Pearson's correlation, one-way Welch's ANOVA with Games-Howell post hoc comparisons, and multiple regression; qualitative data were analyzed thematically. Trainees rated industry collaboration lowest of the three predictor constructs examined ($M = 3.58$, $SD = 0.96$), with particular uncertainty about the structure of industrial attachment ($M = 3.41$) and its tangible contribution to practical skills ($M = 3.43$). Despite this modest implementation profile, industry collaboration recorded the strongest bivariate correlation with employability competency acquisition of any independent variable, $r(246) = 0.304$, $p < .001$, and remained the strongest unique predictor in the regression model, $\beta = 0.278$, $t = 3.913$, $p < .001$. Institutional variation was substantial, $F(3, 74.89) = 11.78$, $p < .001$, partial $\eta^2 = 0.19$, the largest effect size observed in the study. Qualitative and observational evidence converged to show that existing partnerships, while functional and pedagogically valuable, are informal, trainer-brokered, and institutionally fragile rather than formally documented. The study concluded that industry collaboration is the single most impactful lever for improving employability outcomes among the variables studied, but its current effectiveness rests on an unsystematic and institutionally fragile foundation, representing both the greatest opportunity and the most urgent gap for policy and institutional intervention.

Keywords: industry collaboration; dual training; employability competencies; Competency-Based Education and Training (CBET); Agricultural TVET; Bomet County, Kenya

INTRODUCTION

Agriculture remains a key pillar of Kenya's economy, contributing significantly to food security, employment creation, and national development. The sector's sustainable transformation increasingly depends on a skilled workforce capable of adopting modern technologies, engaging in agribusiness, and participating effectively in agricultural value chains. Agricultural Technical and Vocational Education and Training (ATVET) institutions are therefore expected to play a central role in developing employability competencies through the Competency-Based Education and Training (CBET) framework. Despite the adoption of CBET in Kenyan TVET institutions, concerns persist regarding its effectiveness in fostering employability competencies among agricultural trainees.

Among the mechanisms through which CBET is expected to deliver industry-relevant competencies, industry collaboration and dual training occupy a central place. Dual training integrates institutional learning with structured workplace-based experience, enabling trainees to apply classroom knowledge in real agricultural production and agribusiness environments, and to develop higher-order competencies such as problem solving, adaptability, teamwork, innovation, and workplace communication alongside technical proficiency. However, empirical evidence on the effectiveness of industry collaboration and dual training models within ATVET institutions in Bomet County specifically has remained limited, particularly regarding the extent to which structured workplace learning contributes to both technical competencies and soft employability skills. This study addresses that gap by examining the influence of industry collaboration on trainees' acquisition of employability competencies in ATVET colleges in Bomet County, Kenya.

The specific objective addressed in this paper was: to examine the influence of industry collaboration on trainees' acquisition of employability competencies in ATVET colleges in Bomet County. This broad objective was pursued through the following specific objectives: (i) to assess trainees' perceptions of the extent and quality of industry collaboration in ATVET colleges in Bomet County; (ii) to establish the relationship between industry collaboration and employability competency acquisition among trainees; (iii) to examine institutional variation in industry collaboration across ATVET colleges in Bomet County; and (iv) to explore trainers' and administrators' perspectives on the nature and sustainability of industry\u2013institution partnerships. The corresponding research question was: What is the influence of industry collaboration on the acquisition of employability competencies among trainees in ATVET colleges in Bomet County?

LITERATURE REVIEW

Industry collaboration and dual training have increasingly been recognized as central mechanisms for strengthening employability competencies within Agricultural Technical and Vocational Education and Training (ATVET) systems. Dual training integrates institutional learning with structured workplace-based experiences, enabling trainees to apply classroom knowledge in real agricultural production and agribusiness environments. According to Fürstenau, Pilz and Gonon, (2014) dual systems deliberately combine theoretical instruction with supervised on-the-job training, thereby facilitating the transfer of knowledge into practical competence. In agricultural contexts, this often involves placements in farms, agri-processing facilities, dairy units, seed companies, cooperatives, and input-supply enterprises. Through such exposure, trainees develop technical proficiency alongside higher-order competencies such as problem solving, adaptability, teamwork, innovation, and workplace communication. The experiential component enhances occupational identity formation and strengthens alignment between training outcomes and labour market expectations.

Globally, the dual training model has demonstrated considerable effectiveness in promoting smooth school-to-work transitions. Germany remains widely regarded as the benchmark for dual vocational education systems, characterized by strong employer participation, standardized competency assessment, and shared responsibility between industry and training institutions. As noted by Odjo, (2024). the German model ensures that trainees acquire industry-validated competencies, resulting in high labour market absorption and reduced youth unemployment. Beyond Europe, countries such as Israel and Brazil have implemented agricultural dual training frameworks that integrate farm-based apprenticeships with formal instruction. These models underscore the importance of structured partnerships between educational institutions and agricultural enterprises in building both technical mastery and entrepreneurial capacity.

Within the African context, efforts to institutionalize industry collaboration in technical and vocational education are expanding but remain uneven. In Kenya, reforms toward Competency-Based Education and Training (CBET) emphasize workplace learning as a core element of competency acquisition. However, empirical evidence suggests that structured and sustained partnerships between ATVET institutions and agribusiness firms are still limited (Kirui & Kozicka, 2018). Many institutions rely on informal attachment arrangements rather than formalized dual training agreements with clearly defined learning outcomes, mentorship structures, and joint competency assessments. Weak institutional–industry linkages often lead to insufficient practical exposure, limited industry feedback in curriculum implementation, and graduates whose technical and soft skills do not fully align with labour market demands.

Despite growing policy attention, there is limited empirical evidence on the effectiveness of industry collaboration and dual training models within ATVET institutions in Bomet County. In particular, little is known about the extent to which structured workplace learning contributes to the development of both technical competencies and soft employability skills such as communication, teamwork, adaptability, and problem solving. This gap underscores the need for context-specific investigation into how industry engagement mechanisms influence competency outcomes in agricultural training institutions.

MATERIALS AND METHODS

Research Design

The study adopted a descriptive research design using a mixed-methods approach, integrating quantitative and qualitative approaches for methodological triangulation, and was guided by Constructivist Learning Theory, which emphasizes learner-centred and experiential learning. The study focused on a limited number of Agricultural TVET colleges within Bomet County; this geographical and institutional concentration defines the scope of the study and restricts the extent to which the findings can be generalized to other regions or to non-agricultural TVET institutions in Kenya.

Study Population and Sample

The target population comprised trainees, trainers, and institutional administrators drawn from four purposively selected Agricultural TVET institutions in Bomet County (total trainee population $N = 1,760$). Institutions were selected purposively on the basis of their registration as Agricultural TVET colleges under the CBET framework and their active implementation of Level 5 and Level 6 agricultural programmes. The individual trainee was adopted as the unit of sampling. The trainee sample size was determined using Yamane's formula ($n = N / [1 + N(e)^2]$, where $e = 0.05$), yielding a sample of 326 trainees, allocated proportionately across the four institutions. Trainees were then selected within each institution using simple random sampling. All 8 trainers and 4 administrators across the four institutions were included through census sampling, given their small population size. For the industry-collaboration construct specifically, valid responses were obtained from 248 trainees, alongside interview data from all 8 trainers and 4 administrators, and observation data from all four institutions.

Data Collection Instruments

Three instruments were used to enable methodological triangulation. A structured questionnaire was administered to trainees, comprising sections corresponding to the study's constructs; the industry-collaboration items used a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) covering the existence, organisation, and perceived skill impact of industry partnerships and industrial attachment. A semi-structured interview guide was administered individually to the eight trainers and four institutional administrators, with one thematic area addressing the nature and extent of industry partnerships and collaboration arrangements. An observation checklist was completed by the researcher during direct physical inspection of each institution, including a category on industry linkage evidence visible signage, notice boards, or records of memoranda of understanding (MoUs) with industry partners.

Validity and Reliability

Content validity was established by submitting all draft instruments to a panel of three experts (two academic supervisors and a TVET/CBET specialist), who rated each item against the study objectives using a content validity index; items rated relevant by at least 80% of reviewers were retained. Construct validity was established by mapping each instrument item to its corresponding study objective, research question, and conceptual framework variable. A pilot study was conducted with approximately 10% of the total sample (33 trainees, 1 trainer, 1 administrator) in a neighbouring county with a comparable ATVET context, and findings were used to refine the instruments.

Data Analysis

Quantitative data were analyzed using the Statistical Package for Social Sciences (SPSS Version 27). Descriptive statistics (means, standard deviations, percentage response distributions) characterized trainee perceptions of industry collaboration; Neutral responses were reported separately for transparency and excluded from mean/SD computation. Pearson's correlation and multiple regression analysis (significance level $p \leq 0.05$) were used to test the association between industry collaboration and employability competency acquisition. Institutional differences were tested using Welch's ANOVA (robust to unequal variances/sample sizes across institutions) with Games-Howell post hoc comparisons. Qualitative data from interviews and observations were coded and analyzed thematically to complement and triangulate the quantitative findings.

RESULTS AND DISCUSSION

Response Rate

The response rate, by category of respondent, is given in Table 1. 248 trainees out of 326 completed all the questionnaires (76.1%). The total 8 trainers (100%) and all 4 administrators (100%) were involved in the study. The institutional observation visits were conducted four times with 100% completion of observation checklist. The overall response rate of 77.2% is considered to be satisfactory for the conduct of mixed methods research of this type (Wu, Zhao, & Fils-Aime, 2022).

Table 1: Response Rate by Respondent Category

Respondent Category	Target	Achieved	Response Rate (%)
Trainees	326	248	76.1
Trainers	8	8	100.0
Administrators	4	4	100.0
Observation Visits	4	4	100.0
Overall	342	264	77.2

Trainee Perceptions of Industry Collaboration

Table 1 presents trainee ratings on industry collaboration. Neutral (N) responses were excluded from the computation of item means and standard deviations; the proportion of Neutral responses per item is reported alongside each mean for transparency and ranged from 25.4% to 33.9% (average = 30.4%). The overall section mean was $M = 3.58$ ($SD = 0.96$), the lowest of the three independent variable sections, confirming that industry collaboration is less robustly implemented, or at least less consistently experienced by trainees, compared to CBET delivery ($M = 4.07$) and trainer qualifications ($M = 4.06$).

The highest-rated item was institutions have active industry partnerships ($M = 3.89$, $SD = 0.91$), indicating that trainees are generally aware that formal industry linkages exist. However, this awareness did not consistently translate into stronger ratings for the practical dimensions of those partnerships: industrial attachment well-organized with clear objectives ($M = 3.41$) was the lowest-rated item in the section, and it also carried the highest Neutral rate (33.5%) alongside collaboration enhanced practical/technical skills ($M = 3.43$, $N = 33.9\%$). Similarly, attachment exposed me to real agricultural environments ($M = 3.47$) and industry professionals visit for lectures/demonstrations ($M = 3.57$) received comparatively modest ratings.

Table 2. Trainee Perceptions of Industry Collaboration (n = 248)

Note: SD = Strongly Disagree; D = Disagree; A = Agree; SA = Strongly Agree. Neutral responses (avg. 30.4%, range 25.4%–33.9%) were excluded from mean/SD computation but are retained above for transparency.

Statement	SD%	D%	A%	SA%	%N	Mean	SD
Institutions have active industry partnerships	2.4	10.1	42.7	19.4	25.4	3.89	0.91
Industry professionals visit for lectures/demonstrations	3.2	14.5	41.1	9.3	31.9	3.57	0.89
Industrial attachment well-organized with clear objectives	2.0	21.4	33.5	9.7	33.5	3.41	0.92
Attachment exposed me to real agricultural environments	4.4	18.5	39.9	10.9	26.2	3.47	0.99
Industry feedback used to improve training	2.8	18.1	31.9	14.5	32.7	3.55	0.98
Collaboration enhanced practical/technical skills	3.2	20.2	30.2	12.5	33.9	3.43	0.98
Partnerships enhanced entrepreneurial competencies	2.4	18.1	36.3	16.9	26.2	3.64	0.99
Industry exposure increased confidence and readiness	3.2	14.9	35.5	15.3	31.0	3.65	0.97
Participated in industry-linked agribusiness projects	3.2	15.3	36.7	12.1	32.7	3.58	0.94
Collaboration expanded professional networks	2.8	18.5	29.8	18.1	30.6	3.61	1.02
Section Mean					30.4	3.58	0.96

Source: Field Data (2026).

This pattern is a relatively strong perception that partnerships nominally exist, alongside weaker and more uncertain ratings for their structure, consistency, and tangible skill impact suggests that industry collaboration in these institutions is more established in principle than in practice. The unusually high Neutral response rates across this section (nearly a third of trainees on several items) further imply that many trainees may lack sufficient direct exposure to industry-linked activities to form a confident judgment, pointing to industry collaboration being unevenly experienced across the trainee population, rather than uniformly present but modestly rated.

Inferential Analysis: Industry Collaboration and Employability Competencies

Industry collaboration showed the strongest bivariate correlation with employability competency acquisition among all independent variables: $r(246) = 0.304$, $p < .001$. In the multiple regression analysis, industry collaboration was also the strongest and most significant unique predictor of employability outcomes ($B = 0.226$, $\beta = 0.278$, $t = 3.913$, $p < .001$), explaining a unique and meaningful proportion of variance in competency acquisition beyond the contributions of CBET implementation and trainer qualifications.

Table 3. Institutional Comparison of Industry Collaboration Scores

Institution	n	Mean	SD
Institution A	92	3.57	0.27
Institution C	67	3.50	0.27
Institution D	21	3.40	0.42
Institution B	68	3.09	0.64

Welch's ANOVA: $F(3, 74.89) = 11.78, p < .001, \text{partial } \eta^2 = 0.191$.

Institutional differences in perceived industry collaboration were statistically significant, $F(3, 74.89) = 11.78, p < .001, \text{partial } \eta^2 = 0.19$, the largest effect size observed in the study, indicating that institution accounts for a substantial share of the variance in how industry collaboration is experienced. Games-Howell post hoc tests showed that Institution B trainees rated industry collaboration significantly lower than their counterparts at Institution A (Mean Diff. = 0.485, $t = 5.87, df = 85.11, p < .001$) and Institution C (Mean Diff. = $-0.412, t = -4.89, df = 90.51, p < .001$), with no other pairwise institutional differences reaching significance. This finding reinforces the qualitative evidence of fragmented, trainer-dependent partnerships: where institutional industry linkage is weakest (Institution B), the gap from better-performing institutions is both the largest in absolute terms and the most statistically robust of any variable studied.

Observational Evidence: Industry Linkage

The study assessed visible evidence of industry linkage across the four site visits. The grand mean was 3.05 (range: 2.3 to 3.9 across visits). One institution's first visit recorded the highest rating ($M = 3.9$), with signed MoUs, visible notice boards showing industry visits, and employer-signed attachment evaluation forms all observed on site. Another institution's first visit was the weakest ($M = 2.3$), with no placement list displayed, no notice board evidence of industry visits, and only partial evidence of advisory committee records. These observational contrasts map onto the lower trainee ratings on attachment quality, suggesting that where institutional partnership infrastructure is weaker, trainees' attachment experiences are also less satisfactory (overall mean across all visits: $M = 3.05$).

Qualitative Findings: Industry Collaboration

Thematic analysis of administrator and trainer interview data revealed a consistent pattern across both groups: while partnerships with industry exist and are valued, they remain predominantly informal, relationship-dependent, and institutionally fragile.

Functional yet fragmented partnerships. Administrators at multiple institutions confirmed the existence of industry partnerships, particularly with local agricultural enterprises, cooperatives, and manufacturing entities, but these are not systematically formalised at the institutional level:

"We do have partnerships with some local companies and cooperatives, but most of them are based on personal relationships between individual trainers and contacts they know. If that trainer leaves, the partnership is at risk because there is no formal agreement to hold it in place." (Administrator)

Trainer perspectives corroborated this concern:

"We work with several farms and agricultural enterprises informally, they take our students, they give feedback on practical competencies, but if you asked me to produce a signed document for most of them, I couldn't. It's more of a relationship than a contract." (Trainer 4)

"MoUs take a long time to process at the institutional level. Trainers build the relationships with commercial farms and agribusinesses on the ground, but the paperwork to formalise them lags behind." (Trainer 6)

Informal networks as the engine of collaboration. Trainers' prior professional experience and personal networks emerged as the actual mechanism sustaining industry engagement:

"Most of my industry contacts come from people I trained with or worked alongside in commercial farming before I became a trainer. I call them directly when I need a guest assessor or a placement slot for students on large-scale farms." (Trainer 1, Agricultural Crop Production Department)

"A partnership with a commercial farm is strong as long as the specific person we know at the operation is still there. When they get transferred to another region or leave the business, we sometimes have to start over building trust with whoever replaces them." (Trainer 5, Agricultural Farm Management)

Pedagogical and entrepreneurial value. Despite the sustainability challenges identified, trainers consistently articulated the transformative impact of authentic industry engagement on student learning outcomes:

"When we run a joint project with a local commercial farmer or agribusiness, the students take it far more seriously than a classroom exercise. They know the work will actually be inspected by someone from outside the college who understands real farm conditions." (Trainer 2)

"Some of our best graduates started their own small agricultural enterprises after seeing how the commercial farms and agribusinesses we work with run their operations, not just the technical farming skills, but how they price produce, handle contracts, manage workers, and deal with buyers." (Trainer 8, Agricultural Agribusiness Department)

Sustainability challenges. All administrators cited difficulty maintaining meaningful industry collaboration, including geographic isolation from major agricultural enterprises, limited institutional capacity to manage partnership agreements, and reluctance from some agribusiness partners to commit to structured mentoring:

"Agricultural industry partners are willing to take our trainees for attachment on their farms and processing facilities. But when it comes to sitting down and doing a formal assessment or coming to participate in curriculum review for agricultural programmes, that is where we lose them. They are busy commercial operations - they do not always see it as their responsibility to help us train." (Administrator)

Overall, the qualitative evidence indicates that agricultural industry collaboration, while valued and functionally operative, lacks the institutional infrastructure necessary for systematic, sustainable partnership development, being characterized instead by episodic rather than continuous engagement, fluctuating with individual relationships, trainer initiative, and agribusiness partner availability.

DISCUSSION

The findings confirm that industry collaboration is the most potent predictor of employability competency acquisition in the study population ($r = 0.304$; $\beta = 0.278$, $p < .001$), yet simultaneously the weakest implemented of the three variables studied, with trainees rating it at $M = 3.58$ compared to $M = 3.86$ for CBET implementation and $M = 3.87$ for trainer qualifications. This gap between potential impact and actual implementation quality represents the most critical finding of this study. Majumdar (2011) found that TVET–industry linkages are essential for competency training but are often the weakest institutional capacity in developing-country TVET systems, a conclusion that directly aligns with the present study's findings. Oketch (2007) similarly documented that TVET institutions in Kenya maintain nominal industry partnerships without substantive curriculum integration or employer-led assessment, a pattern corroborated by the current study's observational evidence and administrator narratives. However, Maclean and Wilson (2009) offer a contrasting perspective, arguing that in resource-constrained TVET environments, informal industry linkages facilitated by individual trainer relationships can be as effective as formal MoU-based partnerships when trainers are motivated and industry contacts are responsive a finding that partially explains the higher trainer-level industry engagement ($M = 3.80$) relative to institutional formalisation (MoUs: $M = 2.50$) observed in this study. This pattern is corroborated by

more recent Kenyan evidence: Mwaura et al. (2022), studying industrial attachment among TVET trainees in Nairobi County, similarly found that the quality and duration of trainees' industry exposure, rather than the formal existence of an institutional agreement, was the stronger predictor of employability skill development, while Mwaura, Ndirangu, and Muthoni (2023) further established that longer, better-structured industrial attachment periods were associated with significantly higher employability outcomes, reinforcing this study's finding that the structure and consistency of industry engagement matter more than its nominal existence. The overall implication is that individual trainer initiative currently compensates for institutional partnership deficits, a model that is neither sustainable nor equitable across institutions.

These findings point to what is arguably the most consequential pattern in this study: the variable with the greatest capacity to influence employability outcomes is also the one institution have invested in least systematically. Industry collaboration's position as the strongest unique predictor of employability competencies, combined with its status as the lowest-rated and most inconsistently experienced of the three independent variables, suggests that current gains in trainee employability are being achieved despite weak institutional infrastructure for industry linkage, not because of it. The convergence of the observational evidence (grand mean = 3.05, with one site scoring as low as 2.3) and the qualitative accounts of personality-dependent, trainer-brokered partnerships indicates that where industry collaboration is working, it is working informally and precariously sustained by individual trainer initiative rather than institutional systems. This is a fragile arrangement: it leaves the quality of trainees' industry exposure dependent on which trainers happen to have external contacts, rather than on any guaranteed institutional standard, and it means that partnership quality is likely to vary sharply not only between institutions but between cohorts within the same institution as trainer staff changes. Rather than reading the low mean score ($M = 3.58$) as evidence that industry collaboration is unimportant, this study's regression results argue the opposite: industry collaboration is the variable most worth strengthening, precisely because current implementation levels are already yielding the strongest measurable return per unit of engagement of any of the three variables examined.

In answer to the research question guiding this study what is the influence of industry collaboration on the acquisition of employability competencies among trainees in ATVET colleges in Bomet County? The findings establish that industry collaboration has the strongest and most significant positive influence on employability competency acquisition of the variables examined, despite being the least robustly implemented. This quantitative pattern was corroborated by observational evidence showing inconsistent and often absent partnership documentation, and by administrator and trainer accounts describing partnerships as functional but fragmented sustained largely through informal, trainer-brokered relationships rather than formal institutional agreements, and difficult to sustain given geographic isolation, limited institutional capacity, and inconsistent industry-partner commitment.

CONCLUSION

On industry collaboration, the study objective was fully achieved and yielded the study's most significant finding: industry collaboration is the strongest predictor of employability competency acquisition despite being the least implemented variable, representing the greatest untapped opportunity for improving trainee outcomes. The evidence indicates that industry collaboration is the single most impactful lever for improving employability outcomes among the variables studied in agricultural TVET colleges in Bomet County, but its current effectiveness rests on an unsystematic and institutionally fragile foundation, representing both the greatest opportunity and the most urgent gap for policy and institutional intervention identified in this study.

RECOMMENDATIONS

The Director of Partnerships and Linkages, Technical and Vocational Education and Training Authority (TVETA), should develop a national framework requiring all TVET–industry partnerships to be documented through formal, renewable Memoranda of Understanding (MoUs), rather than relying on informal trainer-brokered relationships.

Limitations And Suggestions For Further Research

The study relied partly on self-reported trainee data, which may be subject to response bias and subjectivity; this was mitigated through methodological triangulation with trainer/administrator interviews and independent observational data.

Future research should examine employer-side perspectives on graduate employability, since the present study relied exclusively on trainee self-assessment, which may not fully capture actual labour-market performance. A comparative study across a larger sample of ATVET colleges beyond Bomet County is also recommended, to establish whether the institutional variation patterns identified here reflect a broader national trend in Kenyan TVET delivery.

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