

Information and Communication Technology Training, Industrial Attachment, and Graduate Employability: Policy Lessons from Kenya

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Abstract

Youth unemployment remains a major development challenge in Kenya despite sustained investments in education and skills training. This study examined the contribution of Information and Communication Technology (ICT) training, soft skills development, and industrial attachment to graduate employability, drawing evidence from the Kenya Youth Employment and Opportunities Project (KYEOP). Anchored in Human Capital Theory and the School-to-Work Transition framework, the study employed a mixed-methods approach within a quasi-experimental pretest–post-test design. Data were collected from 1,200 KYEOP beneficiaries trained between 2018 and 2023, complemented by a focused field study involving 240 trainees from Kwale, Mombasa, Nakuru, and Kisumu counties. Quantitative data were analyzed using correlation and multiple regression techniques, while qualitative evidence was generated through interviews and trainee reflections. Findings revealed that ICT and soft skills training significantly enhanced trainees' competencies. Strong positive relationships were observed between baseline and endline soft skills ($r = .927$) and technical skills ($r = .952$), indicating substantial improvement following training. Industrial attachment emerged as the strongest contributor to workplace readiness, with the relationship between attachment and workplace exposure increasing from a weak baseline correlation ($r = .231$) to an exceptionally strong endline correlation ($r = .957$, $p < .01$). Further analysis demonstrated that attachment and internship skills had the strongest association with overall employability ($r = .553$), followed by soft skills training ($r = .410$), basic work skills ($r = .386$), and technical ICT skills ($r = .369$). Multiple regression results showed that work preparedness, technical training skills, basic work skills, soft skills, and processing skills collectively explained 38.8% of the variation in youth employability ($R^2 = .388$). The study concludes that graduate employability is multidimensional and is significantly strengthened through the integration of ICT training, soft skills development, and structured industrial attachment. It recommends institutionalizing work-integrated learning, strengthening industry partnerships, and expanding access to digital skills training to improve school-to-work transition outcomes and sustainable youth employment in Kenya.

Keywords: Graduate Employability; Information and Communication Technology Training; Industrial Attachment; School-to-Work Transition; Youth Employment.

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1.0 INTRODUCTION AND CONTEXT

1.1 Contextual Background

The transition from industrial economies to knowledge- and technology-driven societies has fundamentally altered the nature of work and the competencies required for successful labour market participation (ILO, 2024; Orodho, 2025). Across the globe, countries face the persistent challenge of developing training systems that address skills mismatches undermining graduate employability (Orodho, 2022). Graduates often possess limited practical workplace experience, uneven soft skills, and technical training poorly aligned with industry needs, weakening transitions from education to productive employment and threatening the impact of policy reforms (World Bank, 2024).

In response to these challenges, several advanced economies have adopted integrated education-to-employment systems that combine classroom-based instruction with structured workplace learning. Germany, Switzerland, Austria, and Denmark have institutionalized dual vocational training systems that closely link training institutions with employers, facilitating the acquisition of both technical competencies and workplace experience, thereby reducing skills mismatches and improving youth employment outcomes (OECD, 2023).

Likewise, Singapore has successfully leveraged digital technologies, industry partnerships, and continuous workforce upskilling initiatives to create a responsive skills ecosystem that aligns training with emerging labour market demands (World Bank, 2022). These integrated policies are credited by the OECD (2025) and World Bank (2024) for achieving 60–85% graduate job placement rates through mandatory industry attachments and structured soft-skills curricula.

By contrast, Kenya persists in a crisis characterized by significant gaps in graduate readiness. Recent evidence indicates that 64% of fresh graduates lack appropriate technical skills, 46% lack essential soft skills, and only 28% of employers report satisfaction with recent graduates' competencies (Federation of Kenya Employers, 2023). Comparative data further reveal that TVET graduates achieve 63% higher job placement within the first year compared to university degree holders (Government of Kenya, 2025), while over 60% of Kenyan graduates fail to secure formal employment (Strathmore University, 2024). These findings underscore the urgent need to reform technical training, soft-skills development, and industrial attachment to enable seamless education-to-work transitions.

The growing influence of the Fourth Industrial Revolution (4IR), characterized by automation, artificial intelligence, robotics, big data, and digital platforms, has further transformed workforce requirements. Contemporary employers increasingly prioritize digital competence, problem-solving ability, innovation, and adaptability alongside technical qualifications (World Economic Forum, 2025). As a result, Information and Communication Technology (ICT) skills are now considered foundational employability competencies rather than specialized skills confined to the technology sector. Continuous learning, reskilling, and workplace-based training have therefore become central strategies for enhancing workforce competitiveness in rapidly evolving labour markets (ILO, 2024; Orodho, 2025).

Despite these global advances, youth unemployment remains a major challenge across many developing regions. Sub-Saharan Africa faces a particularly complex paradox: educational enrolment has expanded substantially over the past two decades, yet many graduates continue to experience difficulties securing decent employment due to persistent skills mismatches and limited workplace experience (African Development Bank [AfDB], 2024). Employers frequently report that graduates possess theoretical knowledge but lack practical competencies, professional behaviours, and work readiness skills necessary for successful integration into the labour market.

Recognizing these challenges, several African countries have introduced reforms aimed at strengthening technical and vocational education and training (TVET) and promoting digital skills development. Rwanda's Smart Rwanda Master Plan and Digital Economy Strategy have prioritized ICT skills and innovation as drivers of socio-economic transformation. South Africa has expanded work-integrated learning programmes within TVET institutions, while Ghana and Ethiopia have invested in competency-based training approaches designed to improve labour market responsiveness (UNESCO, 2024). Nevertheless, challenges related to infrastructure deficits, limited employer engagement, inadequate funding, and weak quality assurance mechanisms continue to constrain the effectiveness of these interventions.

In Kenya, youth unemployment remains one of the country's most pressing socio-economic and development challenges. According to recent labour market reports, young people account for a disproportionately large share of the unemployed and underemployed population despite significant investments in education and skills development (Kenya National Bureau of Statistics [KNBS], 2024). This situation presents a critical policy concern because youth constitute a substantial proportion of Kenya's population and represent a key driver of future economic growth.

To address this challenge, the Government of Kenya has implemented extensive reforms in the education and training sector, including the Competency-Based Curriculum (CBC), expansion of TVET institutions, and increased investment in digital literacy programmes. These reforms aim to develop a workforce equipped with both technical and transferable skills required in contemporary labour markets (Republic of Kenya, 2023). Furthermore, industrial attachment and internship programmes have been incorporated into many training curricula to facilitate school-to-work transition and expose learners to real workplace environments.

However, concerns persist regarding the quality, accessibility, and effectiveness of these interventions. Many training institutions face resource constraints that limit their capacity to provide up-to-date ICT infrastructure and industry-relevant training. Similarly, industrial attachment opportunities remain unevenly distributed, with many trainees experiencing inadequate supervision, limited mentoring, and insufficient exposure to meaningful workplace tasks. Weak collaboration between training institutions and employers further undermines the effectiveness of workplace learning programmes (UNESCO, 2024).

Emerging empirical evidence suggests that employability outcomes are strongest when technical training is complemented by practical workplace experience and soft skills development. The findings of the present study reinforce this proposition by demonstrating that ICT training substantially enhanced trainees' technical and soft skills competencies, while industrial attachment emerged as the strongest contributor to workplace readiness and overall employability. These findings underscore the importance of integrated training models that combine digital skills acquisition, transferable competencies, and experiential learning to facilitate successful school-to-work transitions in Kenya's rapidly evolving digital economy.

1.2 Problem Statement

Despite considerable investments in education, training, and youth empowerment programmes, unemployment and underemployment among young people remain persistent challenges in Kenya and across much of Sub-Saharan Africa. While governments and development partners have increasingly promoted ICT training as a pathway toward enhanced employability and participation in the digital economy, labour market outcomes have not improved at a commensurate pace. This suggests that the acquisition of technical skills alone may be insufficient to secure successful labour market integration.

Globally, employers consistently report significant gaps between the competencies possessed by graduates and those required in contemporary workplaces. Beyond technical expertise, employers increasingly seek transferable skills such as communication, teamwork, adaptability, problem-solving, and digital fluency. However, many education and training systems continue to emphasize theoretical knowledge at the expense of practical application and workplace exposure, resulting in persistent skills mismatches (OECD, 2023; World Economic Forum, 2025).

In Kenya, these challenges are compounded by rapid population growth, limited formal employment opportunities, and the predominance of informal labour markets. Although the country has made significant progress in expanding TVET education, introducing competency-based approaches, and promoting digital literacy, evidence suggests that many graduates continue to face difficulties transitioning into employment due to inadequate work readiness and limited exposure to real workplace environments (KNBS, 2024).

Industrial attachment is widely recognized as a critical mechanism for bridging the gap between education and employment by enabling learners to apply classroom knowledge in authentic work settings. Nevertheless, attachment programmes often suffer from inadequate institutionalization, weak supervision, limited placement opportunities, and inconsistent quality across sectors and regions. Consequently, many trainees complete their programmes without acquiring the practical experience necessary to meet employer expectations.

The Kenya Youth Employment and Opportunities Project (KYEOP) was designed to address these deficiencies through an integrated model combining ICT training, soft skills development, and industrial attachment. While previous studies have examined the individual effects of technical training or workplace exposure, limited empirical evidence exists regarding the combined and interactive effects of ICT training and industrial attachment on employability outcomes within the Kenyan context. Moreover, little is known about the relative contribution of technical skills, soft skills, workplace readiness, and experiential learning in predicting employability.

This knowledge gap limits the ability of policymakers, training institutions, and development partners to design evidence-based interventions capable of addressing youth unemployment effectively. Therefore, this study sought to examine the contribution of ICT training and industrial attachment to graduate employability and determine the extent to which integrated training approaches enhance school-to-work transition outcomes. By generating rigorous evidence from the Kenya Youth Employment and Opportunities Project, the study contributes to policy and practice aimed at strengthening employability pathways and promoting inclusive youth employment in Kenya's emerging digital economy.

1.3 Purpose and Objectives

Purpose

To evaluate the combined and interactive effects of **ICT training** and **industrial attachment** on **skills development** and **youth employability**, and to generate evidence-based policy insights for strengthening the education-to-work transition

Specific Objectives

1. To assess the contribution of ICT training to youth skills development (Quantitatively measure changes in trainees' technical (digital) competencies and transferable soft skills (interpersonal, teamwork, communication, problem-solving, and basic work skills) between pretest and post-test within the training period.)
2. To determine the role of industrial attachment in strengthening workplace readiness and applied competencies. (Evaluate the extent to which structured industrial attachment improves workplace readiness, including practical task performance, professional behaviour, and job-specific skills, using supervisor ratings and post-attachment assessments).
3. To evaluate the combined effect of ICT training and industrial attachment on youth employability outcomes (Compare employability outcomes—such as employment status, job quality, earnings potential, and self-employment opportunities—between participants exposed to integrated training and those with training-only pathways over the study period)
4. To examine equity and inclusion in skills development and employability outcomes (Analyse the influence of gender, geographic location, and socio-economic status on access to ICT training and industrial attachment, participation rates, and differential employability outcomes.
5. To identify key predictors of youth employability and generate policy-relevant insights for scaling integrated training models

1.4 Theoretical Framework

This study is anchored in two complementary and mutually reinforcing theoretical perspectives—Human Capital Theory and the School-to-Work Transition Framework. Together, these frameworks provide a coherent analytical lens for understanding how investments in ICT training and industrial attachment translate into enhanced skills development and improved youth employability outcomes. While Human Capital Theory explains how skills are acquired and valued, the School-to-Work Transition Framework elucidates how these skills are activated and translated into labour market participation.

1.4.1 Human Capital Theory

Human Capital Theory, as advanced by Gary Becker (1964), conceptualizes education and training as investments that enhance individuals' productive capacities, thereby increasing their earnings potential and economic value. Within this framework, skills, knowledge, and competencies are treated as forms of capital that individuals accumulate and deploy in the labor market.

In the context of this study, ICT training represents a strategic investment in sector-specific human capital. It equips youth with critical digital competencies—including computer repair, mobile technology, networking, and other technical skills—that are increasingly demanded in contemporary economies. Beyond these technical capabilities, ICT training—particularly when integrated with soft skills development—also strengthens transferable competencies such as communication, critical thinking, adaptability, and problem-solving, all of which are essential for workplace effectiveness.

However, a key insight emerging from contemporary applications of Human Capital Theory is that not all investments in education yield equal returns. The effectiveness of such investments depends largely on their relevance to labor market needs. In many developing contexts, including Kenya, education and training systems have often been criticized for being overly theoretical and insufficiently aligned with industry demands. This misalignment results in underutilized skills and diminished returns on educational investment.

This study extends Human Capital Theory by emphasizing the importance of demand-driven and competency-based training. It moves beyond assessing whether ICT training increases skills to interrogating whether those skills are relevant, applicable, and capable of translating into meaningful employment outcomes. In doing so, the study foregrounds the quality, relevance, and applicability of human capital as critical determinants of employability.

1.4.2 School-to-Work Transition Framework

Complementing this perspective, the school-to-Work Transition Framework, as articulated by Ryan (2001), focuses on the processes and institutional arrangements that facilitate the movement of individuals from education into the labor market. The framework underscores that successful transitions are not automatic but require structured pathways that bridge the gap between learning and employment.

Central to this framework is the concept of work-based learning, which encompasses mechanisms such as internships, apprenticeships, and, in this study, industrial attachment. These experiences enable learners to apply theoretical knowledge in real-world settings, thereby acquiring tacit knowledge—practical skills and insights that are difficult to codify but essential for effective job performance.

Within this framework, industrial attachment performs several critical functions. It enables the application and refinement of skills acquired during training, facilitates workplace socialization by exposing trainees to organizational norms and professional expectations, and serves as a signaling mechanism by providing employers with credible information about a candidate's capabilities. Additionally, it supports the formation of professional networks, which are vital for job search and career progression.

These functions are particularly significant in contexts characterized by high unemployment and competitive labour markets. In such environments, the absence of structured transition mechanisms often results in prolonged job search periods, underemployment, or entry into low-quality informal work. Industrial attachment, therefore, plays a pivotal role in bridging the divide between education and employment by operationalizing acquired skills within authentic workplace contexts.

1.5 Conceptual Framework

This study adopts a narrative conceptual framework that operationalizes the integration of Human Capital Theory and the School-to-Work Transition Framework into a coherent and contextually grounded model explaining how ICT training and industrial attachment jointly influence youth employability in Kenya. The framework moves beyond simplistic linear cause–effect assumptions and instead conceptualizes employability as a multi-stage, interactive, and context-sensitive process shaped by the dynamic interplay of training inputs, experiential learning, individual characteristics, and labour market conditions.

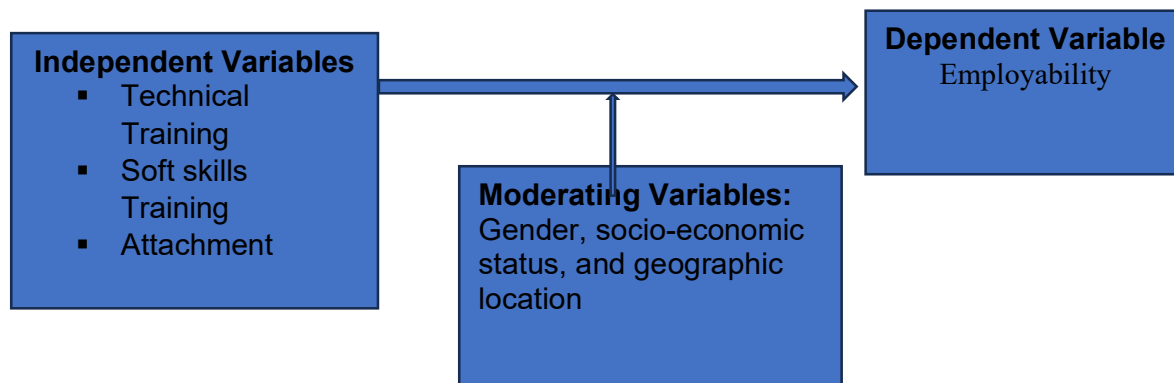


Figure 1: The relationship between technical and Soft Skills Training and Employability

Drawing from both theoretical traditions, the framework explicates the interrelationships among key variables— independent, mediating, moderating, and dependent—and how these collectively shape employability outcomes. The interpretive logic underpinning the framework is that Human Capital Theory explains what is invested, namely the acquisition of knowledge, technical competencies, and soft skills through ICT training. In contrast, the school-to-Work Transition Framework explains how these investments are activated, refined, and translated into meaningful labour market outcomes through industrial attachment, which provides real-world application, workplace exposure, and signalling value to employers.

Within this integrated model, ICT training and industrial attachment function as the primary independent variables, while skills development (encompassing both technical and soft skills) operates as the central mediating mechanism through which these inputs influence outcomes. The ultimate dependent variable is youth employability, conceptualized as the ability to secure, sustain, and progress in gainful employment or self-employment.

The framework further incorporates key moderating variables—namely gender, socio-economic status, and geographic location—which shape access to opportunities, participation in training and attachment, and the translation of acquired skills into employment outcomes. These factors introduce an essential equity dimension,

recognizing that employability is not solely determined by training inputs but is also influenced by broader structural and contextual realities.

By grounding the study in these two complementary theoretical perspectives, the conceptual framework enhances both analytical rigor and explanatory depth. It provides a structured lens for examining how integrated training models function in practice, while also situating the study within broader scholarly and policy debates on skills development, school-to-work transitions, and youth employment. Importantly, it offers a robust foundation for interpreting the empirical relationships observed within the Kenya Youth Employment and Opportunities Project (KYEOP) and for deriving actionable insights for policy and practice.

2.0 RESEARCH DESIGN AND METHODOLOGY

2.1 Research Paradigm and Research Design

This study was anchored within the Transformative Research Paradigm, which emphasizes social justice, inclusion, empowerment, and the generation of evidence capable of informing policy and practice for marginalized populations. The paradigm was particularly appropriate because youth unemployment remains a significant socio-economic challenge in Kenya, disproportionately affecting young people transitioning from training institutions into the labour market. The study therefore sought not only to assess the effectiveness of ICT training and industrial attachment but also to generate actionable knowledge for strengthening youth employability pathways and promoting inclusive economic participation.

Guided by this paradigm, the study adopted an Explanatory Sequential Mixed Methods Design embedded within a quasi-experimental pretest–post-test framework. The quantitative phase constituted the dominant strand and was designed to determine the contribution of Information and Communication Technology (ICT) training, soft skills development, and industrial attachment to graduate employability. The qualitative phase subsequently explored participants' experiences and perceptions to explain and enrich the quantitative findings.

The quasi-experimental design was selected because random assignment of beneficiaries within the Kenya Youth Employment and Opportunities Project (KYEOP) was neither feasible nor ethically desirable. Nevertheless, the availability of structured baseline and endline assessments provided a robust basis for measuring change attributable to the intervention. The design enabled comparison of participants' competencies before and after exposure to the training programme and industrial attachment, thereby facilitating assessment of programme effectiveness.

The mixed-methods approach enhanced methodological triangulation by integrating numerical evidence of skill acquisition and employability outcomes with contextual insights from trainees, trainers, and workplace supervisors. Such integration is increasingly recommended in employability research because labour market transitions are influenced by both measurable competencies and contextual realities that cannot be adequately captured through quantitative methods alone (Creswell & Plano-Clark, 2018; Orodho, Nzabirirwa, Odundo, Waweru & Ndayambaje, 2016).

2.2 Study Area

The study was conducted in five Kenyan counties: Nairobi, Nakuru, Kisumu, Mombasa, and Kwale. These counties were purposively selected to represent diverse socio-economic, geographical, and labour market environments and because they served as implementation sites for the Kenya Youth Employment and Opportunities Project (KYEOP).

Nairobi represents Kenya's largest urban and economic hub, characterized by advanced ICT infrastructure and diverse employment opportunities. Nakuru and Kisumu provide perspectives from rapidly growing secondary cities, while Mombasa and Kwale capture coastal economic dynamics driven by tourism, trade, and emerging digital enterprises. This geographic diversity enhanced the representativeness, transferability, and policy relevance of the study findings.

2.3 Target Population and Sample Size

The study targeted three categories of participants directly involved in KYEOP implementation: ICT trainees who participated in the training and industrial attachment programme, ICT trainers responsible for delivering technical and soft skills training, and industrial attachment supervisors drawn from host organizations.

A total sample of 245 participants was included, comprising 172 trainees, 25 trainers, and 48 industrial attachment supervisors. The inclusion of multiple stakeholder groups facilitated triangulation of perspectives regarding training effectiveness, workplace readiness, and employability outcomes (Orodho, 2017).

2.4 Sampling Procedures

A stratified random sampling technique was employed to select trainee participants, with stratification based on county, gender, and area of specialization to ensure proportional representation across key demographic and programme characteristics. This approach minimized sampling bias and enhanced the generalizability of findings.

Trainers and industrial attachment supervisors were selected purposively due to their direct involvement in programme implementation and supervision. Their participation provided valuable insights regarding training quality, workplace performance, mentorship practices, and labour market expectations (Creswell & Plano-Clark, 2018).

2.5 Intervention and Implementation Process

The intervention consisted of two integrated and sequential phases. Phase I involved a three-month ICT and soft skills training programme delivered by qualified ICT trainers. The curriculum combined technical ICT competencies—including digital literacy, computer maintenance and repair, mobile technology, networking, and digital applications—with employability-oriented soft skills covering communication, teamwork, problem-solving, adaptability, professional ethics, workplace discipline, and customer relations. This phase sought to enhance participants' human capital by strengthening both technical and transferable skills required in contemporary labour markets.

Phase II comprised a structured three-month industrial attachment in selected organizations following completion of training. Each trainee was assigned a workplace supervisor responsible for mentoring, monitoring performance, and providing feedback. The attachment phase provided opportunities for experiential learning through practical application of acquired skills in real work environments, enabling trainees to develop workplace readiness, professional confidence, problem-solving capabilities, and an understanding of organizational culture and employer expectations.

2.6 Data Collection Methods and Instruments

Data were collected using both quantitative and qualitative methods. Quantitative data were gathered through structured assessment instruments administered at two points: a baseline assessment conducted immediately before commencement of industrial attachment to establish participants' initial technical and soft skills levels, and an endline assessment conducted after completion of the attachment programme to measure changes in competencies and employability readiness. Supervisor assessment forms were also used to evaluate workplace performance, professional behaviour, technical competence, communication skills, and overall employability readiness.

Qualitative data were collected through focus group discussions with trainees and key informant interviews with trainers and industrial attachment supervisors. These methods generated rich contextual information regarding programme experiences, workplace challenges, mentorship quality, and perceived employability outcomes (Orodho, 2009).

2.7 Variables and Measurement

The study examined two principal independent variables: ICT training and industrial attachment. Skills development was conceptualized as the mediating variable and comprised technical ICT skills, soft skills, basic work skills, processing and problem-solving skills, and workplace readiness. The dependent variable was graduate employability, operationalized through composite measures of workplace readiness, supervisor ratings, internship performance, and employability assessment scores. The study controlled for four moderating variables: gender, county of residence, socio-economic background, and training specialization.

2.8 Data Analysis Procedures

Quantitative data were analyzed using the Statistical Package for Social Sciences (SPSS). Descriptive statistics, including frequencies, percentages, means, and standard deviations, summarized participant characteristics and competency levels. Inferential statistics included paired-sample t-tests to determine pretest-post-test changes, Pearson Product-Moment Correlation Analysis to establish relationships among ICT skills, soft skills, industrial

attachment, and employability, multiple regression analysis to identify key predictors of employability, and effect size calculations to determine the magnitude of programme impacts. The regression model examined the predictive influence of work preparedness, technical training skills, basic work skills, soft skills training, and processing skills on employability outcomes(Orodho, Khatete & Mugiraneza, 2016).

Qualitative data were analyzed thematically following coding, categorization, and interpretation procedures. Themes emerging from interviews and focus group discussions were integrated with quantitative findings during interpretation to explain observed statistical relationships and provide deeper insights into programme effectiveness.

2.9 Validity, Reliability, and Trustworthiness Quantitative instruments were reviewed by experts in TVET, employability, and educational research to establish content validity. Pilot testing was conducted to refine instruments and assess reliability. Internal consistency reliability was established using Cronbach's alpha coefficients, with values of 0.70 or higher considered acceptable.

For the qualitative strand, trustworthiness was enhanced through triangulation of data sources, member checking, prolonged engagement with participants, and maintenance of an audit trail. The integration of quantitative and qualitative evidence further strengthened the credibility and confirmability of findings.

2.10 Ethical Considerations

Ethical principles guided all stages of the study. Ethical approval was obtained from relevant institutional review bodies before commencement of fieldwork. Participants were informed of the study purpose and voluntarily provided informed consent before participation.

Confidentiality and anonymity were maintained throughout the research process, and all data were used strictly for academic and policy purposes. Particular attention was given to ensuring equitable participation across gender, socio-economic status, and geographic location. Participants were assured of their right to withdraw from the study at any stage without penalty. The study adhered to internationally accepted standards of research ethics, including respect for persons, beneficence, justice, and integrity in data management and reporting (Orodho,2017) .

3.0 FINDINGS AND DISCUSSION

4.1 Contribution of ICT and Soft Skills Training to Skills Development

The findings from this study demonstrate that the three-month ICT training phase played a pivotal role in establishing a solid foundation for both technical competencies and transferable soft skills among trainees.

Skills Acquired	Baseline Soft Skills	Endline Soft Skills	Baseline Technical Skills	Endline Technical Skills
Baseline Soft Skills	1	.927	.236	.281
Endline Soft Skills		1	.220	.291
Baseline Technical Skills			1	.952

4.1 Contribution of ICT and Soft Skills Training to Skills Development

The results presented in Table 4.1 examine the relationships between trainees' soft skills and technical skills at baseline and at the end of the three-month ICT training programme. The correlation coefficients provide insight into the extent to which skills acquired during training were associated with improvements in trainees' competencies.

Relationship between Baseline and Endline Soft Skills

A very strong positive correlation was observed between Baseline Soft Skills and Endline Soft Skills ($r = .927$). This finding indicates a high degree of consistency in trainees' soft skills over the training period while also

suggesting substantial reinforcement and enhancement of these skills through the ICT training programme. The strong relationship implies that participants who possessed relatively stronger soft skills at entry tended to maintain and further develop these competencies by the end of the programme.

Correlation Analysis of Technical and Soft Skills Baseline Technical Skills and Endline Technical Skills exhibited an extremely strong positive correlation ($r = .952$, $p < .001$), indicating that the training programme effectively strengthened participants' technical competencies while building upon their existing knowledge and skills. The correlation coefficient, which is close to unity, suggests that trainees who entered the programme with higher technical skill levels generally achieved correspondingly higher levels of technical competence upon completion. This finding demonstrates strong programme effectiveness in advancing technical skill development.

The correlations between soft skills and technical skills were positive but relatively weak, as presented in Table 1. Baseline Soft Skills correlated with Baseline Technical Skills at $r = .236$, with Endline Technical Skills at $r = .281$. Similarly, Endline Soft Skills showed weak correlations with Baseline Technical Skills ($r = .220$) and Endline Technical Skills ($r = .291$). These findings suggest that although soft skills and technical skills are related, they represent distinct dimensions of competency development. Improvements in one domain are associated with improvements in the other, but the relationships are not sufficiently strong to indicate that mastery of technical skills automatically leads to mastery of soft skills, or vice versa.

Table 1

Correlations Between Soft Skills and Technical Skills

Variable Pair	Coefficient	p-value
Baseline Soft Skills and Baseline Technical Skills	0.236	0.01
Baseline Soft Skills and Endline Technical Skills	0.281	0.01
Endline Soft Skills and Baseline Technical Skills	0.220	0.01
Endline Soft Skills and Endline Technical Skills	0.291	0.01

The correlation analysis revealed critical insights regarding skills development following the three-month ICT training programme. The exceptionally strong positive correlations between baseline and endline measures for both soft skills ($r = .927$, $p < .001$) and technical skills ($r = .952$, $p < .001$) indicate that the programme effectively consolidated and enhanced participants' existing competencies. The highest cross-domain relationship was observed between Endline Soft Skills and Endline Technical Skills ($r = .291$, $p = .01$), implying that after training, trainees who demonstrated stronger technical competencies also tended to exhibit somewhat better soft skills. This finding likely reflects the integrated nature of the training programme, which provided opportunities for communication, teamwork, problem-solving, adaptability, and digital competence to develop simultaneously.

Positive but weak correlations were observed between soft skills and technical skills across all measurement points, with coefficients ranging from $r = .220$ to $r = .291$. These findings indicate that although soft skills and technical skills are related, they represent distinct dimensions of competency development. Improvements in one domain are associated with improvements in the other, but the relationships are not sufficiently strong to suggest that mastery of technical skills automatically leads to mastery of soft skills, or vice versa. Despite the weak magnitude of these cross-domain relationships, the consistent positive direction across all correlations supports the value of integrating both technical and soft skills training within vocational programmes.

Overall, the findings indicate that the training programme contributed significantly to holistic skills development by strengthening both soft skills and technical competencies simultaneously. The results demonstrate that the ICT training programme enhanced technical ICT competencies and transferable soft skills that are essential for employability and workplace effectiveness. Each skill set remained relatively distinct, yet the training fostered complementary development across both domains.

These findings align with and extend the broader theoretical literature on skills development and labour market outcomes. Positioned within Human Capital Theory, as advanced by Becker (1964), which posits that investments in education and skills development yield measurable improvements in productivity and employability, the results provide empirical validation of this theoretical framework. The exceptionally strong

pre-post correlations demonstrate that targeted training investments produce substantial gains in human capital. Empirical evidence from cross-country analyses similarly demonstrates that skills acquisition is positively associated with labour market outcomes, particularly in emerging economies (Psacharopoulos & Patrinos, 2018). Furthermore, the study aligns with global findings emphasizing the centrality of digital competencies as foundational to participation in the 21st-century knowledge economy (World Bank, 2019). The concurrent development of technical and soft skills observed in this study reflects contemporary understandings of employability that recognize the interdependence of technical proficiency and transferable competencies in determining workplace success (ILO, 2024).

4.1.2 Role of Industrial Attachment in Workplace Readiness and School-to-Work Transition

The results revealed that the correlation between industrial attachment for workplace exposure at baseline ($r=.231, p > .01$) and exposure at the workplace ($r=.957, p=.01, n=205$).

The results indicate a positive relationship between industrial attachment and workplace readiness among trainees. At baseline, the correlation between industrial attachment and workplace exposure was weak and positive ($r = .231$), suggesting that before participating in the attachment programme, trainees had relatively limited exposure to real workplace environments and only a modest level of readiness for employment.

However, at endline, the relationship between industrial attachment and workplace exposure became extremely strong and positive ($r = .957, p < .01, n = 205$). This correlation coefficient is very close to 1.0, indicating a near-perfect association between participation in industrial attachment and workplace exposure after the intervention. The statistically significant p-value ($p < .01$) further demonstrates that the observed relationship is unlikely to have occurred by chance.

The substantial increase from $r = .231$ at baseline to $r = .957$ at endline suggests that the industrial attachment programme played a critical role in enhancing trainees' exposure to real work settings, organizational culture, professional practices, and employer expectations. Through direct engagement with workplaces, trainees were able to translate classroom knowledge into practical competencies, thereby strengthening their readiness for employment.

From a school-to-work transition perspective, the findings imply that industrial attachment serves as an effective bridge between training institutions and the labour market. The workplace exposure gained during attachment likely enabled trainees to develop practical experience, professional networks, confidence, and an understanding of workplace norms, all of which are essential for successful labour market integration.

Academic Interpretation The findings revealed a weak positive relationship between industrial attachment and workplace exposure at baseline ($r = .231$), indicating limited workplace readiness among trainees prior to participation in the attachment programme. Following the intervention, the correlation increased dramatically to an extremely strong and statistically significant positive relationship ($r = .957, p < .01, n = 205$). This finding suggests that industrial attachment substantially enhanced workplace exposure and readiness, enabling trainees to acquire practical work experience and competencies required for successful school-to-work transition. The results provide strong evidence that industrial attachment is a key mechanism through which training programmes improve graduate employability and labour market preparedness.

Policy and Discussion Implication

The very high endline correlation ($r = .957$) suggests that industrial attachment was arguably the most influential component in preparing trainees for employment. Therefore, training institutions and policymakers should strengthen partnerships with industry, expand attachment opportunities, improve supervision and mentoring during placements, and ensure that industrial attachment remains an integral component of competency-based training programmes aimed at enhancing graduate employability.

4.1.3 Combined Effect of ICT Training, Soft Skills Training, and Industrial Attachment on Employability

The third objective of this study sought to establish the combined effect of ICT training, soft skills training, and industrial attachment on graduate employability. Table 2 presents the regression results examining the simultaneous influence of these three predictors on overall employability outcomes.

The abbreviations used in Table 2 are defined as follows: TSE represents Technical ICT Skills at Endline, SSE represents Soft Skills Training at Endline, BWSE represents Basic Work Skills at Endline, ASE represents Attachment/Internship Skills, and OE represents Overall Graduate Employability. These endline measures capture participants' competency levels following completion of the training and industrial attachment programme.

The results summarised in Table 2 demonstrate the predictive power of the combined training intervention on graduate employability

Table 2: Correlation matrix

Training and Readiness	BWSE	ASE	TSE	Internship	Overall Employability (OE)
SSTE	.168	.380	.291	.428	.410
BWSE	1	.422	.182	.376	.386
ASE		1	.378	.550	.553
TSE			1	.446	.369

*Significance level at $\alpha = .05$ level

4.1.3 Combined Effect of ICT Training, Soft Skills Training, and Industrial Attachment on Graduate Employability

Table 2 presents the relationships among soft skills training, basic work skills, attachment/internship skills, technical ICT skills, and overall graduate employability. The correlation coefficients indicate the strength and direction of the associations among these variables. All reported relationships are positive, suggesting that improvements in one area are associated with improvements in the others.

Soft Skills Training at Endline (SSTE) was positively associated with all employability dimensions. The relationship was weakest with Basic Work Skills ($r = .168$), indicating a weak positive association. However, moderate positive relationships were observed between soft skills training and Attachment/Internship Skills ($r = .380$), Technical ICT Skills ($r = .291$), Internship Readiness ($r = .428$), and Overall Employability ($r = .410$).

These findings suggest that graduates who received more effective soft skills training tended to demonstrate higher levels of workplace readiness, technical competence, and employability. The strongest association was between soft skills training and internship readiness ($r = .428$), highlighting the important role of communication, teamwork, problem-solving, and interpersonal skills in preparing graduates for workplace experiences.

Relationship Among Employability Components Basic Work Skills at Endline (BWSE) demonstrated positive relationships with Attachment/Internship Skills ($r = .422$), Technical ICT Skills ($r = .182$), Internship Readiness ($r = .376$), and Overall Employability ($r = .386$). The moderate relationship between basic work skills and attachment/internship skills suggests that graduates possessing foundational workplace competencies are better able to benefit from internship experiences and workplace learning opportunities.

Attachment/Internship Skills (ASE) exhibited the strongest relationships in the correlation matrix. ASE was positively correlated with Technical ICT Skills ($r = .378$), Internship Readiness ($r = .550$), and Overall Employability ($r = .553$). The correlation of $r = .553$ with overall employability represents the highest coefficient reported, indicating that internship-related skills are a critical determinant of graduate employability. This finding underscores the value of workplace exposure in helping graduates acquire practical competencies demanded by employers.

Technical ICT Skills at Endline (TSE) were positively associated with Internship Readiness ($r = .446$) and Overall Employability ($r = .369$). These results indicate that ICT competence contributes meaningfully to employability by enhancing graduates' ability to function effectively in modern technology-driven work environments.

Overall, graduate employability is influenced by a combination of soft skills training, technical ICT skills, basic workplace skills, and attachment/internship experiences. Among these factors, Attachment/Internship Skills (ASE) demonstrated the strongest relationship with Overall Employability ($r = .553$), followed by Soft Skills Training ($r = .410$), Basic Work Skills ($r = .386$), and Technical ICT Skills ($r = .369$).

These findings indicate that employability is multidimensional and is strengthened when graduates are equipped with both technical and non-technical competencies and provided opportunities for practical workplace exposure. The relatively strong associations involving attachment/internship skills support the argument that experiential learning bridges the gap between academic preparation and labour market expectations. Consequently, institutions of higher learning should continue integrating ICT training, soft skills development, and structured industrial attachment programmes to enhance graduate employability and workplace readiness.

In summary, the correlation analysis revealed positive relationships among soft skills training, basic work skills, attachment/internship skills, technical ICT skills, and overall graduate employability. Attachment/Internship Skills exhibited the strongest association with Overall Employability, affirming the importance of experiential and competency-based training in preparing graduates for successful labour market participation.

4.1.5 Key Predictors of Youth Employability

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.623 ^a	.388	.357	.42817

A multiple regression analysis was conducted to determine the extent to which Work Preparedness at Baseline (WPB), Technical Training Skills at Endline (TTSE), Basic Work Skills at Endline (BWSE), Soft Skills Training at Endline (SSTE), and Processing Skills at Endline (PSE) predict youth employability. The model yielded a multiple correlation coefficient of $R = .623$, indicating a moderately strong positive relationship between the combined predictor variables and youth employability. This suggests that the five variables collectively have a substantial association with employability outcomes.

The coefficient of determination ($R^2 = .388$) shows that approximately 38.8% of the variation in youth employability can be explained by the combined effects of work preparedness, technical training skills, basic work skills, soft skills training, and processing skills. In social science and employability research, this represents a meaningful proportion of explained variance, suggesting that the model has good explanatory power. The Adjusted $R^2 = .357$ indicates that after accounting for the number of predictors included in the model, approximately 35.7% of the variance in youth employability remains explained. The relatively small difference between R^2 (.388) and Adjusted R^2 (.357) suggests that the predictors contribute meaningfully to the model and that there is limited overfitting.

The Standard Error of the Estimate (SEE = .42817) represents the average deviation of observed employability scores from those predicted by the regression model. The relatively low value indicates that the model provides reasonably accurate predictions of youth employability, although some unexplained variation remains due to factors not included in the analysis. Since approximately 61.2% ($100\% - 38.8\%$) of the variance remains unexplained, other factors such as educational attainment, labour market conditions, work experience, career guidance, personal motivation, socio-economic background, employer perceptions, and networking opportunities may also influence employability.

Collectively, the findings indicate that soft skills training (including communication, teamwork, problem-solving, and interpersonal competencies), basic work skills (including workplace discipline, responsibility, and adaptability), processing skills (reflecting the ability to apply knowledge and solve work-related problems), technical training skills (particularly ICT and occupation-specific competencies), and work preparedness are important determinants of youth employability. The model demonstrates that these factors jointly account for a significant proportion of employability outcomes, highlighting the multidimensional nature of employability.

These findings imply that work preparedness, technical training skills, basic work skills, soft skills training, and processing skills are important predictors of youth employability. The results support the view that employability is a multidimensional construct that requires the development of both technical and transferable workplace competencies.

Synthesis and Contribution to Knowledge

Overall, the study both affirms and extends existing scholarship in several significant ways. First, it corroborates global evidence on the effectiveness of integrating formal training with experiential learning in enhancing

employability outcomes (OECD, 2018). Second, it extends regional insights by providing robust quasi-experimental evidence from Kenya, thereby enriching the relatively limited empirical literature on integrated employability interventions in Sub-Saharan Africa.

4.3 Conclusion and Actionable Recommendations

4.3.1 Conclusion

This study provides robust, empirically grounded evidence that integrating ICT training with industrial attachment significantly enhances youth skills development and employability in Kenya. Consistent with Human Capital Theory and the School-to-Work Transition Framework, the findings affirm that ICT training builds foundational technical and soft skills, while industrial attachment activates, contextualizes, and validates these competencies within real labour market environments.

A clear developmental progression emerges from the dual-pathway perspective advanced in this study. First, structured ICT training equips trainees with essential technical knowledge and transferable soft skills, forming the bedrock for workplace engagement. However, this foundational layer, while necessary, is not sufficient on its own to guarantee employability or entrepreneurial readiness. Second, industrial attachment operates as a transformative bridge between learning and practice, enabling trainees to apply, refine, and internalize their competencies in authentic work environments. The findings underscore that the quality of attachment, particularly the presence of effective supervision, mentorship, and task relevance, is the single most critical determinant of workplace readiness and employability outcomes.

Third, the integration of these two components generates a powerful synergistic effect. Trainees transition from abstract competence to applied capability, demonstrating enhanced technical proficiency alongside improved communication, problem-solving ability, and workplace confidence. Fourth, the study reveals that employability is shaped by multi-level dynamics. At the micro level, individual attributes such as motivation, adaptability, and learning capacity are pivotal. At the meso level, institutional quality, program design, and industry linkages play critical roles. At the macro level, labour market structures, economic conditions, and policy frameworks influence opportunity landscapes. Soft skills, supervisor engagement, and attachment quality emerge as key mediating variables, while structural inequalities continue to moderate access and outcomes.

Overall, integrated, demand-driven, and experiential training models grounded in both lifelong learning and practical exposure offer a credible, scalable, and transformative pathway for enhancing youth employability and job creation. The Kenya Youth Employment and Opportunities Project experience provides an evidence-based blueprint for strengthening education-to-work transition systems, with broader applicability across comparable developing contexts.

4.3.2 Actionable Recommendations

Building on these findings, the study advances strategic and actionable recommendations aimed at strengthening youth employability systems through an integrated and ecosystem-based approach.

1. **Institutionalize high-quality experiential learning within Technical and Vocational Education and Training (TVET) systems.** Industrial attachment should be structured, supervised, and outcome-oriented, with clearly defined learning objectives, standardized mentorship frameworks, and robust assessment mechanisms. Embedding reflective and lifelong learning practices within these programs will strengthen the translation of knowledge into competence and innovation.
2. **Strengthen demand-driven and responsive training systems aligned with evolving labour market needs.** This requires continuous curriculum alignment, deeper collaboration between training institutions and industry, and the integration of emerging digital and sector-specific skills. Co-creation of training programs with employers will ensure relevance and enhance both employability and entrepreneurial capacity.
3. **Invest sustainably in infrastructure and learning resources.** Expanding access to modern ICT tools, digital platforms, and simulation-based learning environments will enhance technical mastery and the development of 21st-century skills. Targeted efforts should ensure equitable access for youth in marginalized, rural, and underserved regions.
4. **Promote inclusion and equity deliberately through policy interventions.** Addressing gender disparities, socio-economic inequalities, and regional imbalances in access to training and industrial

attachment opportunities is critical. Targeted support mechanisms and transparent placement systems are necessary to ensure that no group is excluded from transformative learning pathways.

5. **Strengthen monitoring, evaluation, and research systems.** Continuous, data-driven assessment integrating both quantitative and qualitative evidence should guide program improvement. Longitudinal tracking of graduates will provide deeper insights into employment trajectories, sustainability of outcomes, and scalability of interventions.
6. **Enhance multi-level coordination among government, training institutions, industry, and civil society.** Integrated national strategies that align education, skills development, and labour market policies will ensure that both catalytic capabilities and core competencies are nurtured in a complementary and sustainable manner.

5 Limitations

While this study provides valuable insights, several limitations should be acknowledged.

First, the quasi-experimental design, although robust, does not fully eliminate the possibility of selection bias. Participants who opted into attachment programs may have been more motivated or better prepared, potentially influencing outcomes.

Second, the study relies partly on self-reported data for employment and earnings, which may be subject to recall bias or social desirability effects. Efforts were made to triangulate these data with employer reports, but some inaccuracies may persist.

Third, the follow-up period (6–12 months) may not fully capture long-term employment trajectories and career progression. Future studies should adopt longitudinal designs to assess sustained impacts over multiple years.

Fourth, while the study includes diverse geographic contexts, findings may not be fully generalizable to all regions of Kenya, particularly highly marginalized or conflict-affected areas.

Finally, the rapidly evolving nature of the ICT sector means that skills demands are constantly changing. As such, the relevance of specific training components may diminish over time without continuous curriculum updates.

6. Declaration of Interest

The author declares no conflict of interest in the conduct and reporting of this study. The research was undertaken independently, with data collected and analyzed in accordance with established academic and ethical standards. While the study draws on data from the Kenya Youth Employment and Opportunities Project (KYEOP), the interpretations and conclusions presented herein are solely those of the author and do not necessarily reflect the official positions of implementing agencies, funding partners, or affiliated institutions.

Biography of the Author

Professor John Aluko Orodho, PhD, is a distinguished Kenyan educator, researcher, and academic leader with over four decades in education. He holds a BEd (Science) from the University of Nairobi, an MEd (TVET Curriculum), and a PhD (Science Curriculum) from Kenyatta University. He taught secondary Physics and Mathematics and served in technical-vocational institutions before joining university academia, where for 38+ years he has taught Educational Research Methods, Statistics, Measurement and Evaluation, and supervised over 200 postgraduate students. A prolific scholar, he has authored 200+ publications (including 165 refereed articles and five books), led national and international research projects, and helped secure over KSh 1 billion in research funding. He is Co-Chair of Kenyatta University's CBET Committee and Chair of the Competency-Based Education Directorate, a member of several professional bodies, and a journal peer reviewer. As of June 2026 he had 11,769 citations, an H-index of 39, and an i10-index of 100.

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